



RAIDXPERT
USER MANUAL

Version 0.9

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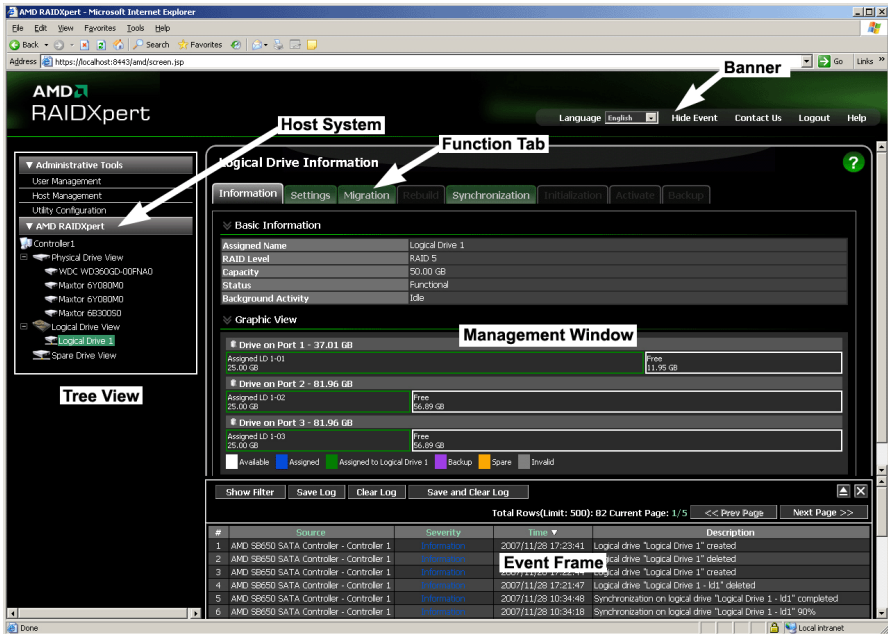
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Chapter 1: Introduction

- RAIDXpert Components (page 2)
- About This Manual (page 3)

The AMD RAIDXpert software offers local and remote management and monitoring of all AMD SB6xx/SB7xx SATA logical drives that exist anywhere on a network.

Figure 1. RAIDXpert in a browser window



Its browser-based GUI provides email notification of all major events or alarms, memory cache management, drive event logging, logical drive maintenance, rebuild, and access to all components in the RAID configuration (server, controller, logical drives, and physical drives).

RAIDXpert is designed to work with AMD SB6xx/SB7xx SATA RAID controllers. Other brands of RAID controllers are not supported.

RAIDXpert Components

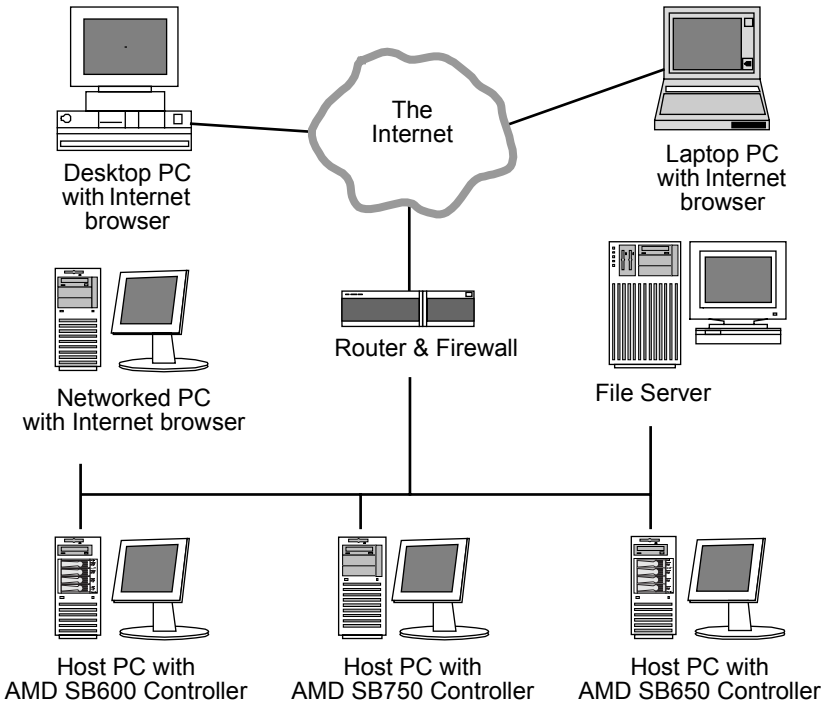
RAIDXpert installation software will install two major components:

- RAIDXpert RAID management software
- Java Runtime Environment (in a private folder)

RAIDXpert Software

The RAIDXpert software installs on the PC with the SB6xx/SB7xx SATA RAID Controller (the "Host PC").

Figure 1. RAIDXpert on a network



About This Manual

This *User Manual* describes how to setup, use, and maintain the RAIDXpert software.

This manual includes a full table of contents, chapter task lists, and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:



Note

A *Note* provides helpful information such as hints or alternative ways of doing a task.



Important

Important calls attention to an essential step or point required to complete a task. Important items include things often missed.



Caution

A *Caution* informs you of possible equipment damage or loss of data and how to avoid them.



Warning

A *Warning* notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

Chapter 2: Installation

- Utility Server (below)
- Operating System Support (page 6)
- Installing RAIDXpert (page 7)

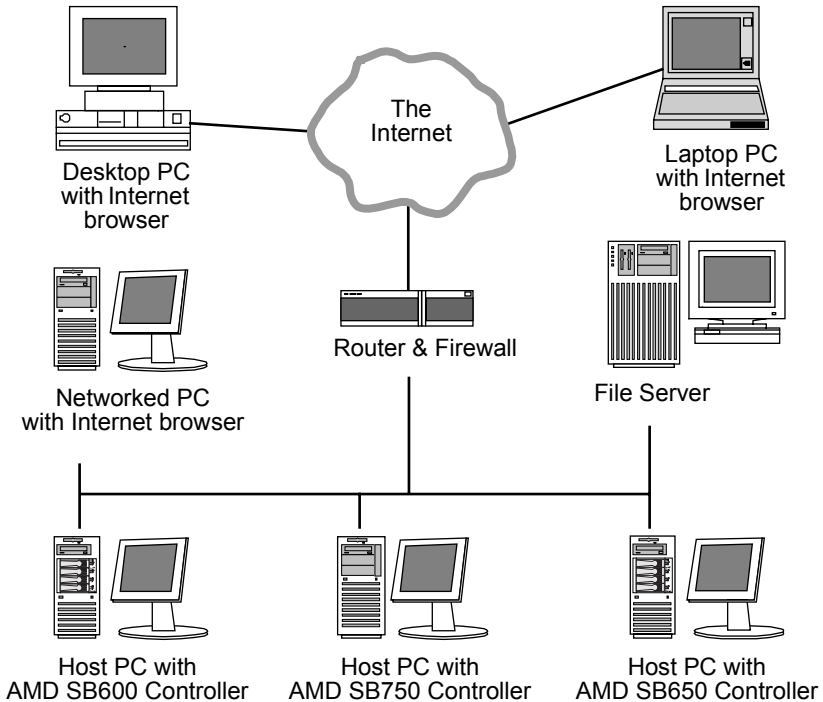
RAIDXpert installation software will install two major components:

- Utility Server – RAIDXpert RAID monitoring and Networking software
- Java Runtime Environment

Utility Server

The Utility Server installs on the PC with the AMD product (the “Host PC”).

Figure 1. RAIDXpert on a network



Java Runtime Environment

The RAIDXpert installation program installs a private JRE in folder `_jvm` under the same directory where RAIDXpert is installed. RAIDXpert uses this private JRE to avoid incompatibility issues with any other JREs that may be present on your system.

Operating System Support

On the Host PC with the AMD SB6xx/SB7xx Controller, where you install RAIDXpert, AMD recommends 32-bit or 64-bit versions of:

- Windows 2000
- Windows XP Professional
- Windows Server 2003
- Windows Vista Business, Enterprise, or Ultimate
- Red Hat Enterprise 4.0 or 5.0
- SuSE ES 9.0 or 10.0

These operating systems support RAIDXpert. Choose one of them to take full advantage of RAIDXpert's features and functions.

Browser Support

On the Host PC with the AMD SB6xx/SB7xx Controller, where you install RAIDXpert, you must have one of the following browsers:

- Internet Explorer 6.0 or newer
- Mozilla Suite 1.7 or newer
- Mozilla Firefox 1.0 or newer
- Netscape Navigator 7.1 or newer

If you do not have one of the above browsers, install the browser first and make it the default browser. Then install RAIDXpert.

You must use one of the browsers listed above on your networked PC in order to access RAIDXpert over the network.

Installing RAIDXpert

Windows

Follow these steps to install RAIDXpert on your Windows-based PC or Server.

1. Boot the PC or server, launch Windows, and log in as the Administrator.
If the computer is already running, exit all programs. If you are not logged in as the Administrator, log out, then log in again as the Administrator.
2. Insert the software CD into your CD-ROM drive.
3. Double-click the Install CD's icon to open it.
4. Double-click the Installer icon to launch it (right).
The first RAIDXpert installation dialog box appears.
5. Follow the prompts in the installation dialog boxes.



Linux

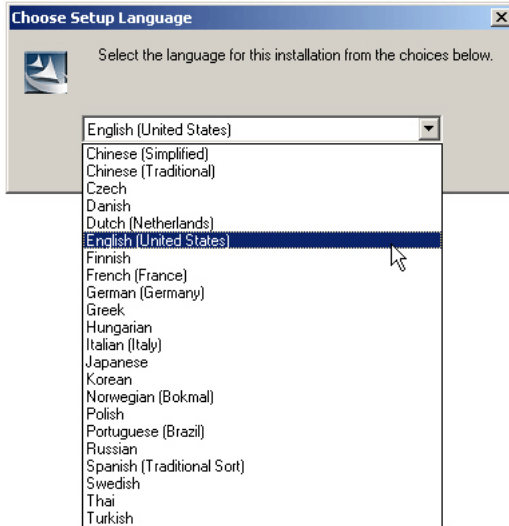
Follow these steps to install RAIDXpert on your Linux-based PC or Server.

1. Boot the PC or server, log in as **root**, and launch the Linux GUI.
If the computer is already running, exit all programs. If you are not logged in as **root**, log out, then log in again as **root**.
2. Insert the software CD into your CD-ROM drive.
3. In the CD window, double-click the **RAIDXpert...bin** icon to begin installation (right).
4. When the Run or Display? dialog box appears, click *Run in Terminal*.
After several moments, the first RAIDXpert installation dialog box appears.
5. Follow the prompts in the installation dialog boxes.

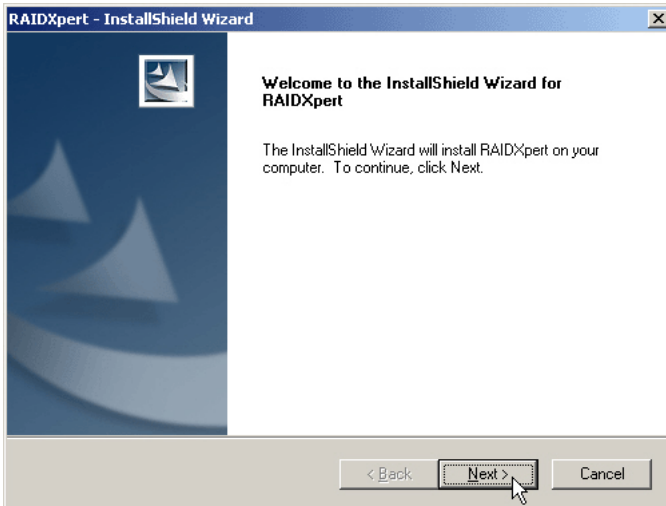


Installation under Windows and Linux, continued

- When the first installation screen appears, choose an installer language from the dropdown menu.

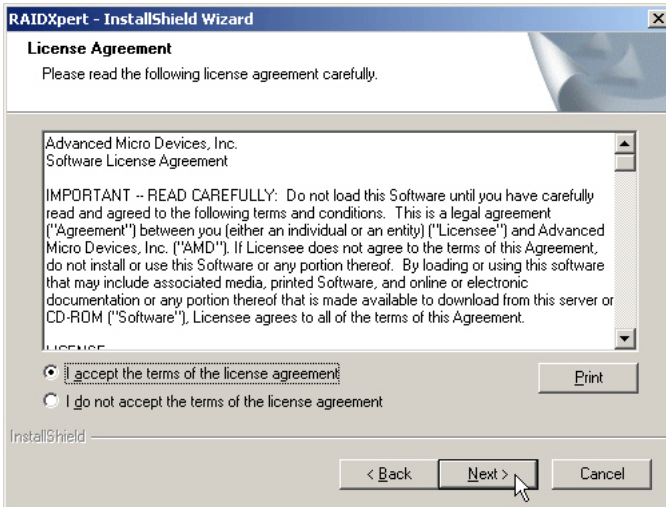


- When the Welcome screen appears, click the **Next** button.



- When the License Agreement screen appears, click the “I accept the terms of the license agreement” option to proceed with installation. Then click the **Next** button to continue.

Note: If you leave the “I do not accept the terms of the license” option selected, the installation will quit when you click **Next**.



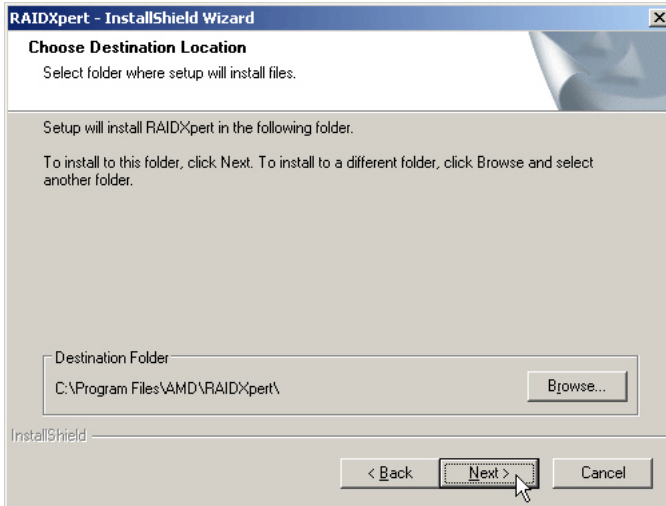
9. When the Choose Install Folder screen appears, make your selection of a folder for the RAIDXpert applications you are installing.

For example, the Windows default folder is:

C:\Program Files\AMD\RAIDXpert

If you want a different folder, type its location or click the **Choose...** button and select a new location.

Click the **Next** button when you are finished.



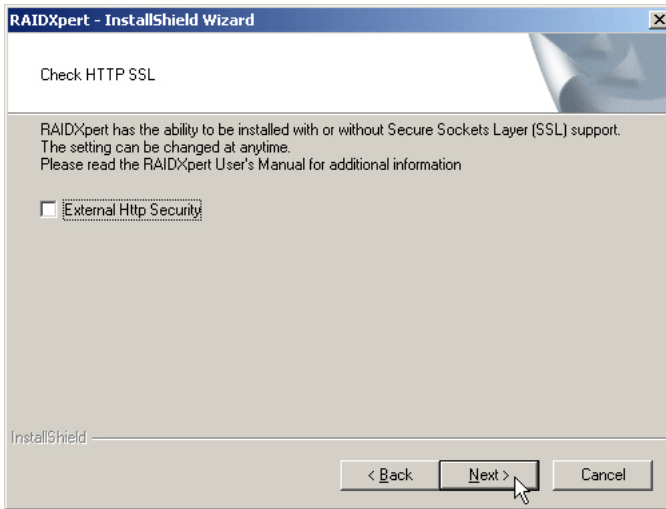
- When the Check HTTP SSL screen appears, you can choose External Security. An explanation follows.

External SSL Security – Applies security to all connections involving the Internet or outside your company firewall.

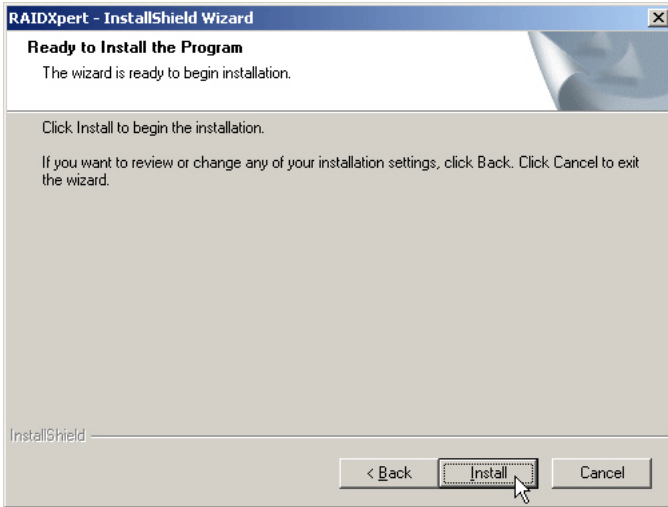
Security options are invisible to authorized users.

AMD provides a default certificate for the server as well as for internal data communication. However, in some cases it is better to install and verify your own certificate for the webserver. And, if possible, verify your certificate by certificate authority like Verisign or Thwate. See your MIS Administrator for guidance.

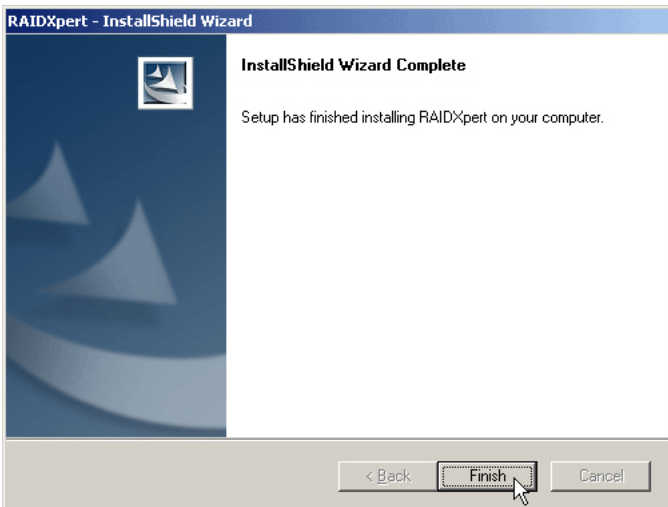
Click the **Next** button when you have made your choice.



11. When the Ready to Install screen appears, click the **Install** button to continue.



12. When the Install Complete screen appears, click the **Finish** button.



This completes the RAIDXpert installation. Go to “Chapter 3: Setup” on page 13.

Chapter 3: Setup

- Logging into RAIDXpert (below)
 - Choosing a Language (page 16)
 - Accessing the Host PC (page 16)
 - Making the Recommended Initial Settings (page 17)
 - Creating a New Logical Drive (page 20)
 - Logging out of RAIDXpert (page 24)
 - Connecting to RAIDXpert from the Internet (page 25)
 - Running RAIDXpert without Network Connection (page 25)
-

After installation, the next step is to log into and configure RAIDXpert.

Logging into RAIDXpert

Choose RAIDXpert in the Windows Programs menu.

Choose RAIDXpert in the Linux Applications menu.

Or, log on manually with your browser:

1. Launch the Browser.
2. In the Browser address field, type the entry explained below.

If you did *not* choose the External Security option during RAIDXpert installation (see page 11), use the *Regular* connection.

If you chose the External Security option during RAIDXpert installation (see page 11), use the *Secure* connection.

Regular Connection

- RAIDXpert uses an HTTP connection `http://`
- Enter the Host PC's IP address `127.0.0.1` or `localhost`
- Enter the Port number `:25902`
- Add to launch RAIDXpert. `/amd`

Together, your entry looks like this:

`http://127.0.0.1:25902/ati` or `http://localhost:25902/ati`

Secure Connection

- RAIDXpert uses a secure HTTP connection `https://`
 - Enter the Host PC's IP address `127.0.0.1` or `localhost`
 - Enter the Port number `:8443`
 - Add to launch RAIDXpert. `/amd`
-

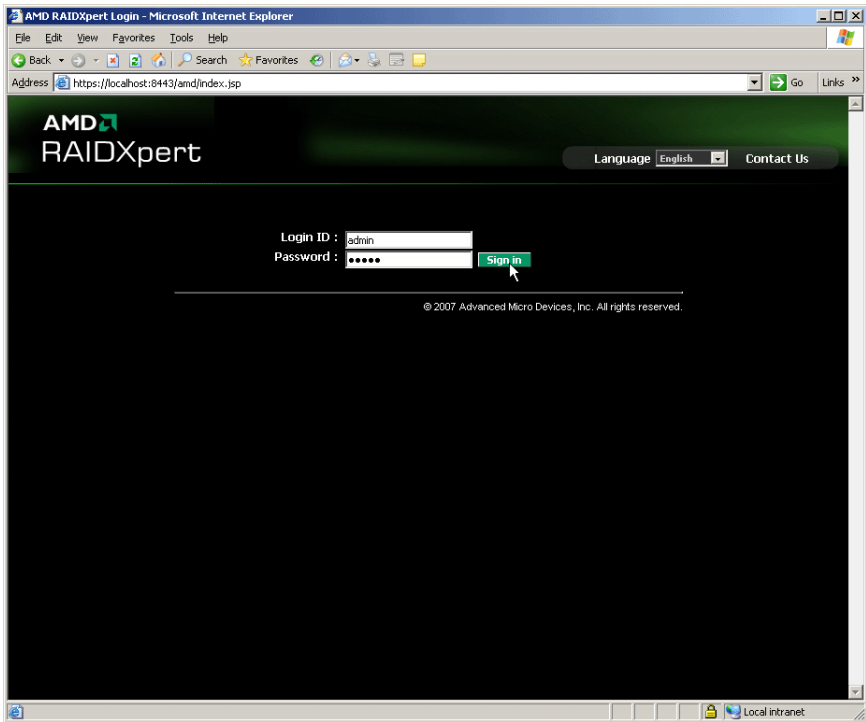
Together, your entry looks like this:

https://127.0.0.1:8443/amd or **https://localhost:8443/amd**

Note that the IP address shown above applies to a log-in at the Host PC. When you log in over a network, enter the Host PC's actual IP address or hostname.

3. Press the Enter key.
4. When the login screen appears, type **admin** in the Login ID field. Type **admin** again in the Password field.

The RAIDXpert login and password are case sensitive.



5. Click the **Sign in** button.



Note

Make a Bookmark (Netscape Navigator) or set a Favorite (Internet Explorer) of the Login Screen so you can access it easily next time.

After sign-in, the RAIDXpert opening screen appears.



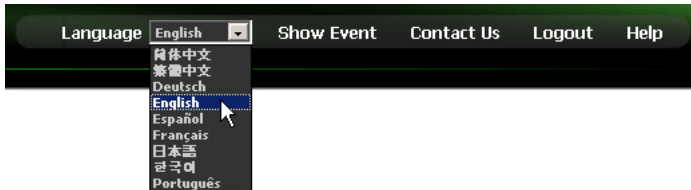
Choosing a Language

RAIDXpert can display in multiple languages.

To choose your language:

1. Click the **Language** dropdown menu in the RAIDXpert banner.
2. Highlight the language you prefer.

The RAIDXpert GUI displays in the language selected.



Note

To display some of the supported languages, you might have to install additional fonts or other files to your operating system.

Accessing the Host PC

RAIDXpert includes a navigation tree or Tree View in the left frame of the browser window. Click the + icons to expand the tree. A Host PC's RAID system is made up of:

- **Administrative Tools** – User and Host Management, and Utility Configuration
- **AMD RAIDXpert** – Controller, Physical Drives, Logical Drives, and Spare Drives

If you do not see these details in the Tree View and you are connecting over a network, it means your network connection to the Host PC is not working. Restore your connection before proceeding.

If you do not see RAIDXpert at all, lower your browser's security settings.

A detailed discussion of RAIDXpert graphic user interface is found in Chapter 4 on page 27.

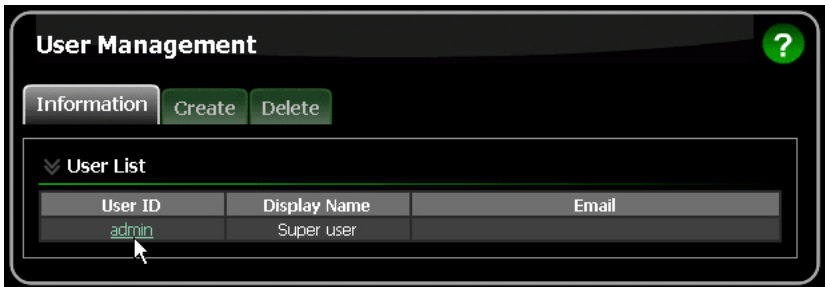
Making the Recommended Initial Settings

These settings are recommended and now is the best time to make them. You can change them later as necessary.

Administrator's Settings

To make the Administrator's password and notification settings:

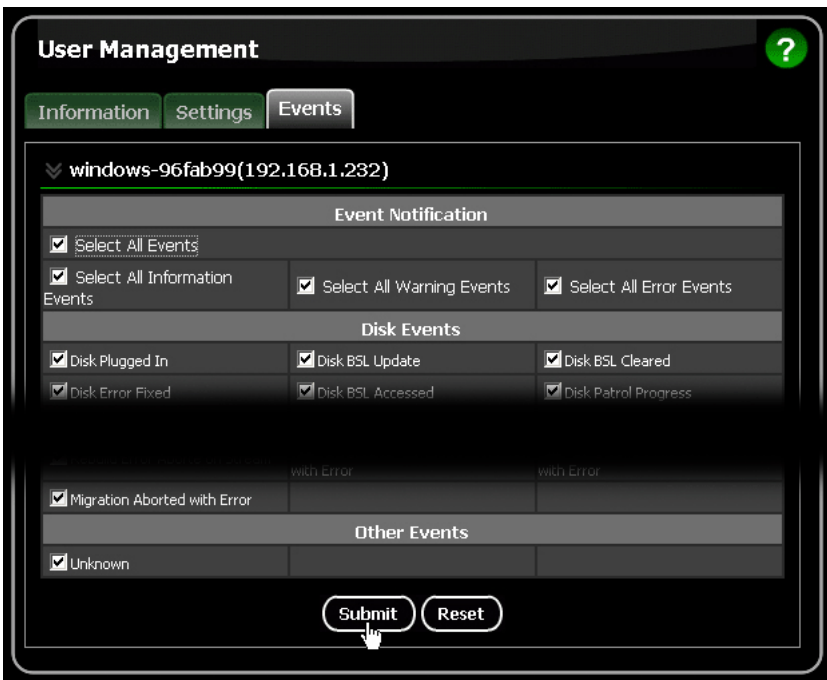
1. In Tree View, under Administrative Tools, click **User Management**.
2. In the Management Window, click the **admin** link.



3. Click the **Settings** tab.



4. If you want to change the default password, type the new password into the New Password field.
Use up to 8 letters and numbers but no spaces or other characters.
5. Type the same password into the Retype Password field.
6. If you plan to set up Event Notification, type the Administrator's email address in the Email field.
7. Click the **Submit** button.
If the action was successful, the Management Window will display the message "Update Success."
8. If you plan to set up Event Notification, click the **Settings** tab.



The image above was shortened to fit on this page.

9. Check the boxes of the notification events that you want to have reported to you via email and popup messages.
To select events by their severity, check one of the four Select Events boxes at the top of the window.
10. Click the **Submit** button.
For more information about Event Notification, see page 38.

Utility Configuration

If you plan to set up Event Notification, you must make these settings.

1. In Tree View, under Administrative Tools, click **Utility Configuration**.

Configuration		
Email Sender	<input type="text" value="ITmgr@amd.com"/>	Email Server Desc.
Email Server	<input type="text" value="mail.amd.com"/>	Email Server Desc.
Email Subject	<input type="text" value="RAIDXpert email notification"/>	Email Subject Desc.
Event Frame Refresh Time	<input type="text" value="30"/> secs	Event Frame Refresh Time Desc.
Simplified Backup Dialog Display	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	Simplified Backup Dialog Display Desc.
System Event Notification Dialog Display	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	System Event Notification Dialog Display Desc.

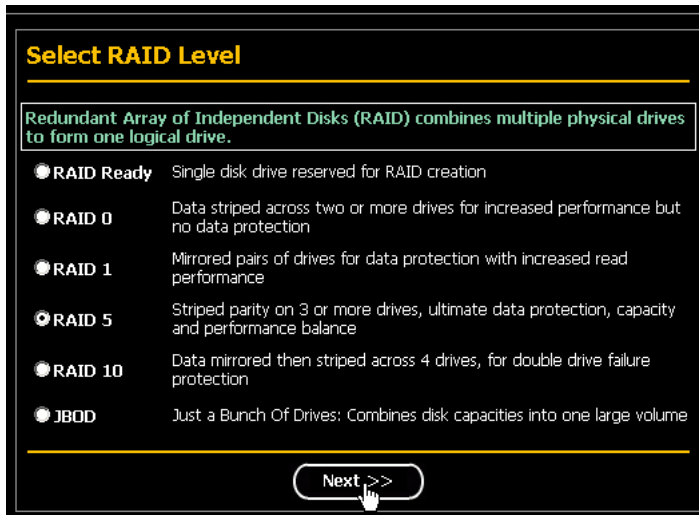
2. Enter the Sender's address in the Email Sender field.
Be sure the sender has an account in your email system. See your IT administrator.
3. Enter your email server in the Email Server field.
4. Optional. Change the Email Subject line as needed.
5. Click the **Submit** button when you are done.

Creating a New Logical Drive

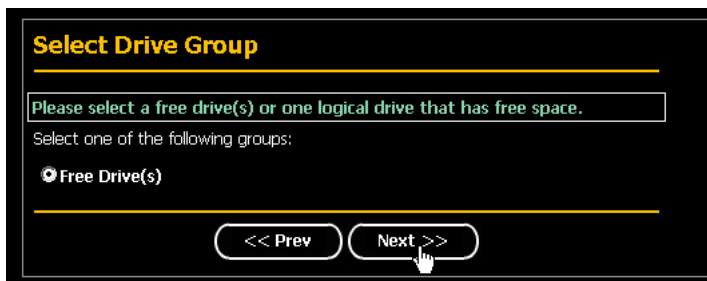
A logical drive is a collection of physical drives in a RAID. To create a new logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Create** tab in Management View.
The Select RAID Level screen appears.
3. Select the option beside the RAID level you want for your logical drive.

RAIDXpert displays the RAID levels you can use with the available physical drives. See page 100 for information about the available RAID levels.



4. In the Select Drive Type screen, click the following option:
 - **Free Drives** – Select all Free (unassigned) physical drives



5. Click the **Next** button.

The Select Drives screen appears.

- If you want to split the capacity of your physical drives between two logical drives, enter the capacity for the first logical drive in the Logical Drive Size field.

Or, to use the maximum capacity of the physical drives, check the Use Maximum Capacity box.

For RAID Ready and JBOD, the system will check the Use Maximum Capacity Box automatically.

Logical Drive Size GB(Use Maximum Capacity)

Please select at least 3 drives for RAID 5.

- Click the physical drives to select them.
Available drives have a black frame. Selected drives have a red frame.
For RAID Ready, select only one physical drive.

Select Drives

RAID 5 Striped Parity: Data is striped over 3 or more drives, parity provides redundancy using less space. Best overall balance of performance, capacity and protection.

Logical Drive Size GB(Use Maximum Capacity)

Please select at least 3 drives for RAID 5.

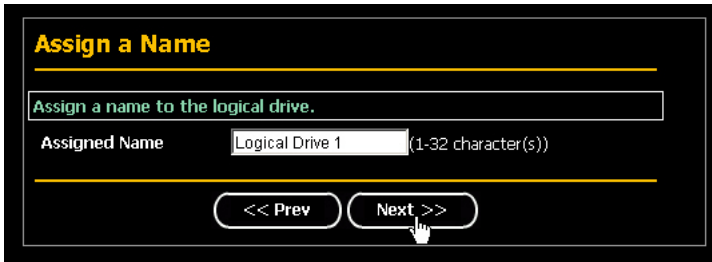
- Drive on Port 1 - 81.9 GB
Free
81.89 GB
- Drive on Port 2 - 81.9 GB
Free
81.89 GB
- Drive on Port 3 - 81.9 GB
Free
81.89 GB
- Drive on Port 4 - 81.9 GB
Free
81.89 GB

Selected Available Assigned Spare Invalid

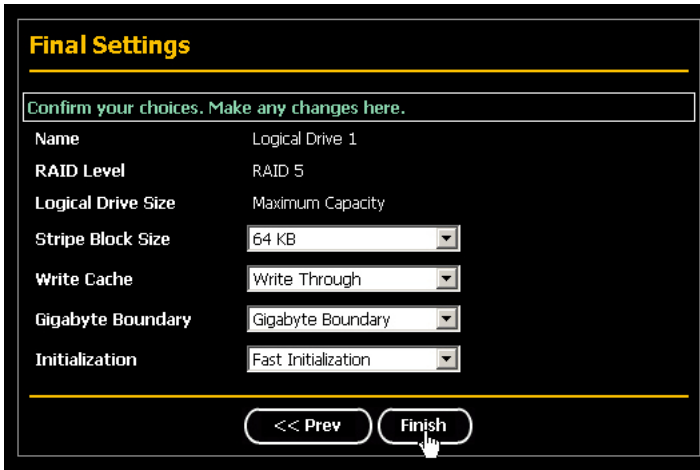
<< Prev Next >>

- Click the **Next** button.
The Assign a Name screen appears.

9. Enter a name for the logical drive in the field provided.



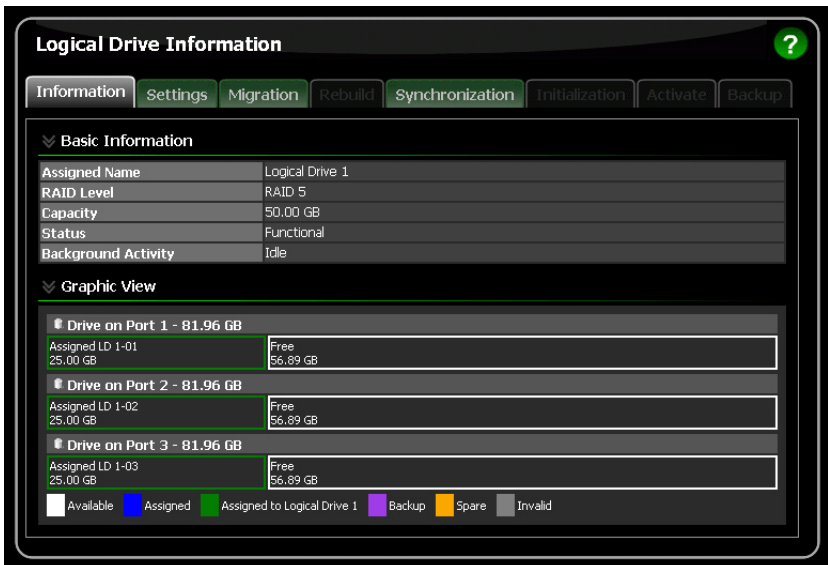
10. Click the **Next** button.
The Final Settings screen appears.
11. RAID 0, 5, and 10. Choose a Stripe Block Size from the dropdown menu.
The choices are 64 and 128 KB. For more information, see “Choosing Stripe Block Size” on page 103.
The Write Cache policy is None. You cannot change this setting.
12. RAID 0, 1, and 5. Select a Gigabyte Boundary policy from the dropdown menu.
 - **GigaByte Boundary** – Rounds the size of the logical drive down to the nearest whole gigabyte. This is the default. For more information, see “Gigabyte Boundary” on page 103.
 - **None** – No Boundary function.
13. Select an Initialization policy from the dropdown menu.
 - **Fast Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.
 - **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. RAID 0, 1, and 5 only.
 - **None** – No initialization. This choice is not recommended.



14. Click the **Finish** button.

If there are physical drives available, the Select RAID Level screen appears again, where you can create an additional logical drive.

Click the **Logical Drive** in Tree View to see all of the information about your new logical drive.

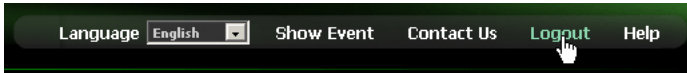


Before you can use your new logical drive, you must partition and format the logical drive using your PC's operating system. See "Appendix B: Partition and Format" on page 111 for more information.

Logging out of RAIDXpert

There are two ways to log out of RAIDXpert:

- Close your browser window
- Click **Logout** on the RAIDXpert Banner



After logging out, you must enter your username and password to log in again. Clicking **Logout** brings you back to the Login Screen.

Connecting to RAIDXpert from the Internet

The above instructions cover connections between the Host PC and other PCs using RAIDXpert over your company network. It is also possible to connect to a Host PC from the Internet.

Your MIS Administrator can tell you how to access your network from outside the firewall. Once you are logged onto the network, you can access the Host PC using its IP address. See “Logging into RAIDXpert” on page 13 for more information.

Please note that only the Host PC can read and write data to the logical drives. However, other PCs can monitor the Host PC from virtually any location.

Running RAIDXpert without Network Connection

While RAIDXpert was designed to run over a network, you can run RAIDXpert without a network connection but only from the Host PC. Follow this procedure:

1. Choose RAIDXpert in the Windows Programs menu.
Or choose RAIDXpert in the Linux Applications menu.
Your browser opens and displays a “no connection to the Internet is currently available” message.
2. Click the **Work Offline** button.
3. In the RAIDXpert login screen, enter your user name and password (if used), then click the **Sign in** button.
A “webpage unavailable while offline” message will display.
4. Click the **Connect** button.
A “no connection to the Internet is currently available” message will display.
5. Click the **Try Again** button.

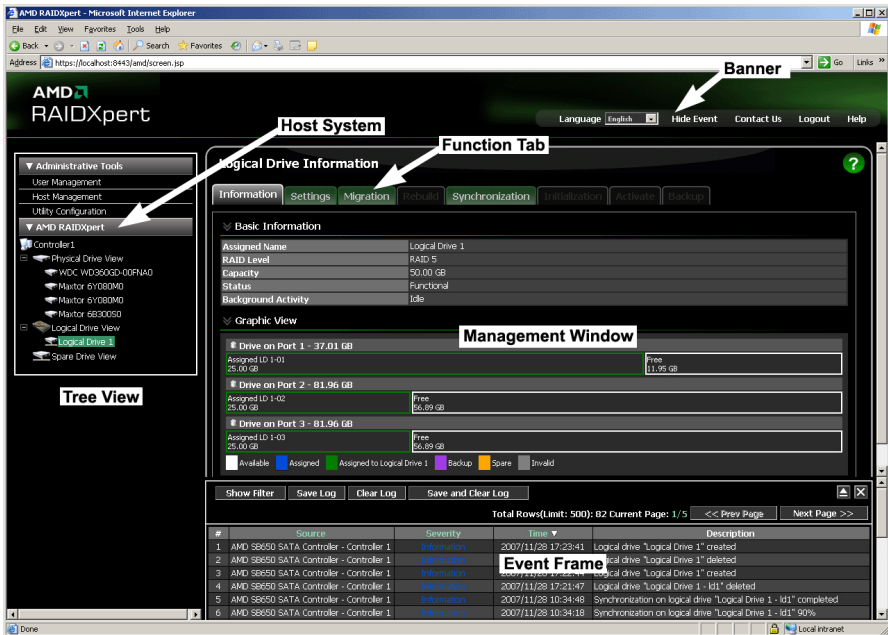
After a few moments, RAIDXpert will display normally in your browser.

Chapter 4: RAIDXpert User Interface

- Banner (page 28)
- Tree View (page 28)
- Management Window (page 30)
- Event Frame (page 31)

This chapter describes RAIDXpert's Graphic User Interface (GUI). You should understand that RAIDXpert is software running on your Internet Browser. RAIDXpert adds a graphic user interface to make RAID management functions easier to understand and perform.

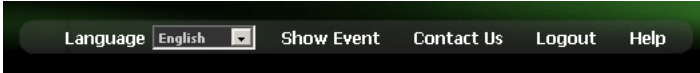
Figure 1. The RAIDXpert Graphic User Interface



Banner

The RAIDXpert banner appears at the top of your browser window when you are running RAIDXpert.

Figure 2. The RAIDXpert Banner



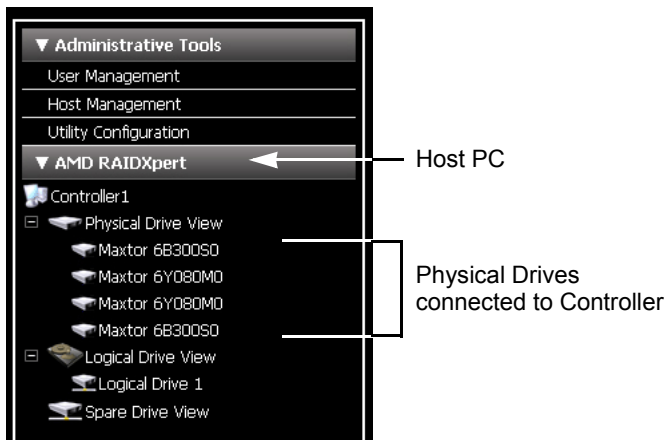
The RAIDXpert banner enables you to do the following actions:

- Select the language in which RAIDXpert displays from the dropdown menu.
- Show or Hide the Event Frame. See Event Frame, below
- Display AMD contact information including links to the AMD website and address
- Log out of RAIDXpert
- Display the Main Online Help menu

The banner always appears when your browser displays RAIDXpert.







Tree View

Figure 3. The RAIDXpert Tree View



The purpose of Tree View is Navigation. Tree View appears in the left frame of the browser window. Click the + icons to expand the tree.

A Host PC's RAID system is made up of:

- **Administrative Tools** – User and Host Management, and Utility Configuration
 - **User Management** – Create and Delete Users, Passwords, and Permissions
 - **Host Management** – Information on Host PCs
 - **Utility Configuration** – Email settings and Event Frame refresh interval
- **AMD RAIDXpert** – Controller, Physical Drives, Logical Drives, and Spare Drives
 -  **Controller** – Priority settings, Status settings, Scheduled activities, Lock
 -  **Physical Drive View** – Information on attached physical drives, Split/Merge function
 -  **Physical Drive** – Information on a specific physical drive, Cache setting, Media Patrol, Bad Sector Log (BSL) and Drive Locator
 -  **Logical Drive View** – Information on logical drives, Create and Delete logical drives
 -  **Logical Drives** – Information on logical drives, Cache settings, Rebuild, and Synchronization functions
 -  **Spare Drive View** – Physical drives assigned as global or dedicated hot spares

Management Window

The purpose of the Management Window is to monitor and manage your RAID system. The Management Window appears in the right frame of the browser window. What appears in the Management Window depends on which item you click in Tree View.

Figure 4. Management Window as it appears when you click a logical drive in Tree View



Basic Information	
Assigned Name	Logical Drive 1
RAID Level	RAID 5
Capacity	50.00 GB
Status	Functional
Background Activity	Idle

Graphic View	
Drive on Port 1 - 81.96 GB	
Assigned LD 1-01 25.00 GB	Free 56.89 GB
Drive on Port 2 - 81.96 GB	
Assigned LD 1-02 25.00 GB	Free 56.89 GB
Drive on Port 3 - 81.96 GB	
Assigned LD 1-03 25.00 GB	Free 56.89 GB

Legend: Available (white), Assigned (blue), Assigned to Logical Drive 1 (green), Backup (purple), Spare (orange), Invalid (grey)

In the example above, the Management Window shows the information about a logical drive because you clicked a Logical Drive in Tree View.

Every Management View window has at least one tab, typically the Information tab. In most cases, there are other tabs each with a particular function that applies to the RAID component you have chosen. In the example above, you can:

- Click the **Settings** tab to change the name of the logical drive or its cache settings.
- Click the **Rebuild** tab to rebuild a replacement physical drive.
- Click the **Synchronization** tab to set the synchronization policy, set an automatic synchronization schedule, or begin a manual synchronization operation.

A full discussion of these and other RAID monitoring and management functions is included in “Chapter 5: Monitor and Manage” on page 33.

Event Frame

The purpose of the Event Frame is to maintain a log of all events related to your RAID system. The information is especially helpful for RAID management and troubleshooting.

To see the Event Frame, click **Show Event** from the RAIDXpert banner.

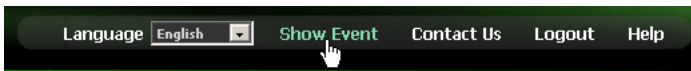



Figure 5. Event Frame appears below the Management Window.

#	Source	Severity	Time	Description
1	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 18:16:39	Logical drive "Logical Drive 1" created
2	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 18:10:04	Logical drive "Logical Drive 1" deleted
3	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 17:23:41	Logical drive "Logical Drive 1" created
4	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 17:23:08	Logical drive "Logical Drive 1" deleted
5	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 17:22:44	Logical drive "Logical Drive 1" created
6	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 17:21:47	Logical drive "Logical Drive 1 - ldr1" deleted
7	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:34:48	Synchronization on logical drive "Logical Drive 1 - ldr1" 90%
8	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:34:18	Synchronization on logical drive "Logical Drive 1 - ldr1" 90%
9	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:33:51	Synchronization on logical drive "Logical Drive 1 - ldr1" 80%
10	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:33:21	Synchronization on logical drive "Logical Drive 1 - ldr1" 70%
11	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:32:54	Synchronization on logical drive "Logical Drive 1 - ldr1" 60%
12	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:32:24	Synchronization on logical drive "Logical Drive 1 - ldr1" 50%
13	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:31:54	Synchronization on logical drive "Logical Drive 1 - ldr1" 40%
14	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:31:27	Synchronization on logical drive "Logical Drive 1 - ldr1" 30%
15	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:31:00	Synchronization on logical drive "Logical Drive 1 - ldr1" 20%
16	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:30:33	Synchronization on logical drive "Logical Drive 1 - ldr1" 10%
17	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:30:06	Synchronization on logical drive "Logical Drive 1 - ldr1" started
18	AMD SB650 SATA Controller - Controller 1	Information	2007/11/28 10:30:06	Scheduled Synchronization has started on Logical Drive "Logical Drive 1 - ldr1".
19	AMD SB650 SATA Controller - Controller 1	Information	2007/11/27 10:34:48	Synchronization on logical drive "Logical Drive 1 - ldr1" completed
20	AMD SB650 SATA Controller - Controller 1	Information	2007/11/27 10:34:21	Synchronization on logical drive "Logical Drive 1 - ldr1" 90%

The Event Frame lists 20 per screen. Events are listed by events by Number, Source (the AMD SB6xx/SB7xx Controller), Severity (Information, Warning, Critical), Date and Time of occurrence, and Description.

Click the **Prev Page** and **Next Page** buttons to move through the Event list.

Click the Close Management Window  button in the top right corner of the Event Frame to hide the Management Window and allow more space to view the Event Frame.

Click the Open Management Window  to display the Management Window again.

On the Event Frame, you can also:

- Clear the events
- Save the events an text file
- Display events by severity
- Display events by date and time
- Filter the events

Chapter 5: Monitor and Manage

- Logging into RAIDXpert (below)
 - Choosing a Language (page 36)
 - User Management (page 37)
 - Host Management (page 47)
 - Utility Configuration (page 48)
 - Controller (page 51)
 - Physical Drives (page 56)
 - Logical Drives (page 65)
 - Spare Drives (page 90)
-

Logging into RAIDXpert

Windows PCs: In the Windows Start menu, choose
Programs > AMD > RAIDXpert > RAIDXpert.

Linux PCs: Choose *RAIDXpert* in the Applications menu.

Or, log on manually with your browser:

1. Launch the Browser.
2. In the Browser address field, type the entry explained below.

If you did *not* choose the External Security option during RAIDXpert installation (see page 11), use the *Regular* connection.

If you chose the External Security option during RAIDXpert installation (see page 11), use the *Secure* connection.

Regular Connection

- RAIDXpert uses an HTTP connection `http://`
- Enter the Host PC's IP address `127.0.0.1` or `localhost`
- Enter the Port number `:25902`
- Add to launch RAIDXpert. `/amd`

Together, your entry looks like this:

`http://127.0.0.1:25902/amd` or `http://localhost:25902/amd`

Secure Connection

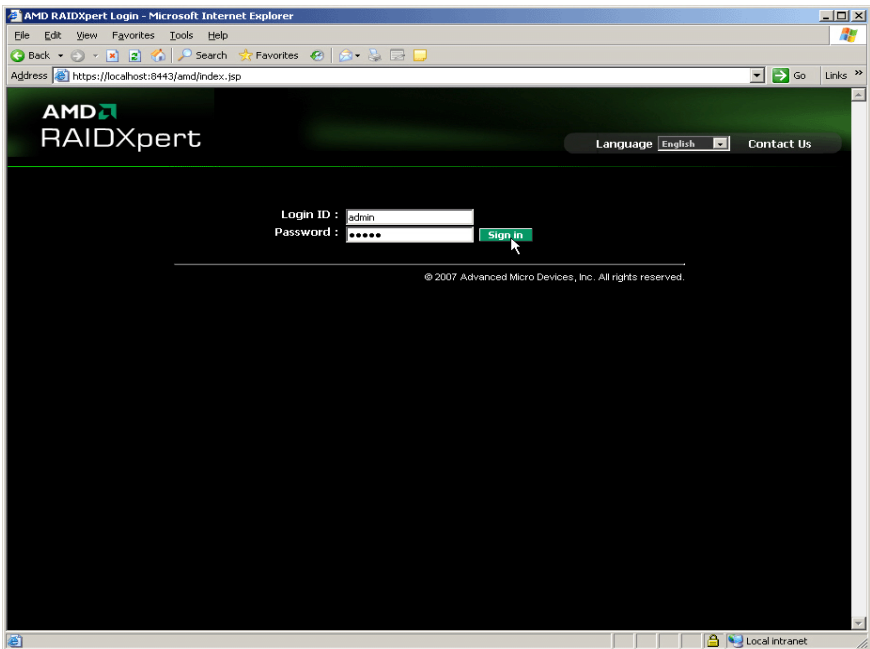
- RAIDXpert uses a secure HTTP connection `https://`
- Enter the Host PC's IP address `127.0.0.1` or `localhost`
- Enter the Port number `:8443`
- Add to launch RAIDXpert. `/amd`

Together, your entry looks like this:

`https://127.0.0.1:8443/amd` or `https://localhost:8443/amd`

Note that the IP address shown above applies to a log-in at the Host PC. When you log in over a network, enter the Host PC's actual IP address or hostname.

3. Press the Enter key.
4. When the login screen appears, type **admin** in the Login ID field.
Type **admin** again in the Password field.
The RAIDXpert login and password are case sensitive.



5. Click the **Sign in** button.



Note

Make a Bookmark (Netscape Navigator) or set a Favorite (Internet Explorer) of the Login Screen so you can access it easily next time.

After sign-in, the RAIDXpert opening screen appears.



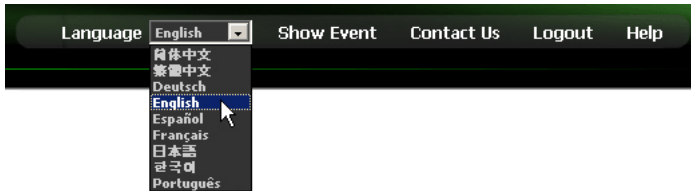
Choosing a Language

RAIDXpert can display in multiple languages.

To choose your language:

1. Click the **Language** dropdown menu in the RAIDXpert banner.
2. Highlight the language you prefer.

The RAIDXpert GUI displays in the language selected.



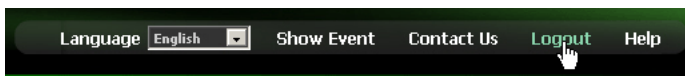
Note

To display some of the supported languages, you might have to install additional fonts or other files to your operating system.

Logging out of RAIDXpert

There are two ways to log out of RAIDXpert:

- Close your browser window
- Click **Logout** on the RAIDXpert banner



After logging out, you must enter your user name and password to log in again. Clicking **Logout** brings you back to the Login Screen.

User Management

- Adding a User (below)
- Setting up Event Notification (page 38)
- Deleting a User (page 42)
- Changing a User's Password (page 42)
- Changing a User's Email Address (page 44)
- Changing a User's Access Rights (page 45)

Adding a User

1. Log into RAIDXpert as the Administrator.
2. Click **User Management** in Tree View.
3. Click the **Create** tab in Management View.

User Management ?

Information **Create** Delete

▼ User Creation

User ID*	Samuel	(4-20 character(s))
Display Name	Samuel Adams	(0-20 character(s))
Password*	•••••	(4-8 character(s))
Retype Password*	•••••	
Email	sadams@amd.com	

▼ Host User Rights

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Submit Reset

4. Type a User ID into the User ID field.
This ID will be the User's login name.
5. Type the user's display name into the Display Name field.
This name could be the User's actual name.
6. Type a password into the Password field.
Use up to 8 letters and numbers but no spaces or other characters.
7. Type the same password into the Retype Password field.
8. If you plan to set up Event Notification, type the user's email address in the Email field.

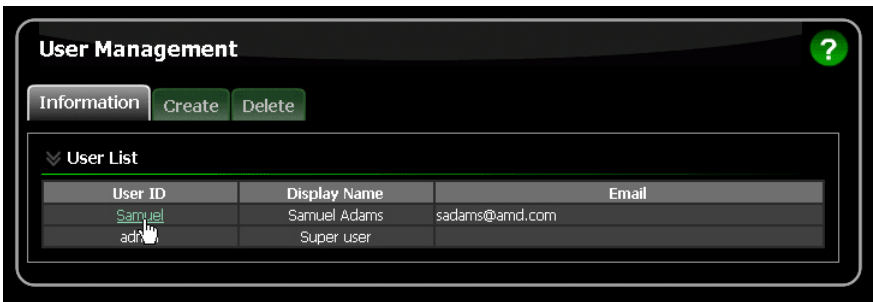
- Under Host User Rights, check the boxes to select rights for this user.

Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild, and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings
Notification	Permission to receive notification of events affecting the logical drive

- Click the **Submit** button.

Setting up Event Notification

- Click **User Management** in Tree View.



- Click the **User ID** link in Management View.
- Click the **Events** tab.

User Management ?

Information Settings **Events**

▼ windows-96fab99(192.168.1.232)

Event Notification

Select All Events

Select All Information Events

Select All Warning Events

Select All Error Events

Disk Events

Disk Plugged In

Disk BSL Update

Disk BSL Cleared

Disk Error Fixed

Disk BSL Accessed

Disk Patrol Progress

Migration Aborted with Error

Other Events

Unknown

Submit Reset

The image above was shortened to fit on the page.

4. Check the boxes of the notification events that you want to have reported to you via email and popup messages.
To select events by their severity, check one of the four Select Events boxes at the top of the window. See the table on the next page.
5. Click the **Submit** button.

Event Notification Severity Levels

Warning Events

Disk Unplugged
Disk Timeout
Task Error
Disk Media Patrol Aborted with Error
Bad Block Remapped
Disk Pre Fail
Array Critical
Array Degrade
Synchronization Requested
Redundancy Check Rejected

Error Events

Disk Setdown
Disk Non-ECC Error
Disk S.M.A.R.T. Error

Error Events

Array Offline
Background Initialization Aborted with Error
Synchronization Aborted with Error
Redundancy Check Aborted with Error
Redundancy Check Inconsistency Found
Rebuild Aborted with Error
Rebuild Error Aborted on Stream
Background Initialization Aborted with Error
Migration Aborted with Error
Backup Aborted
Fast Copy Aborted
Unknown Error

Event Notification Severity Levels, continued

Information Events

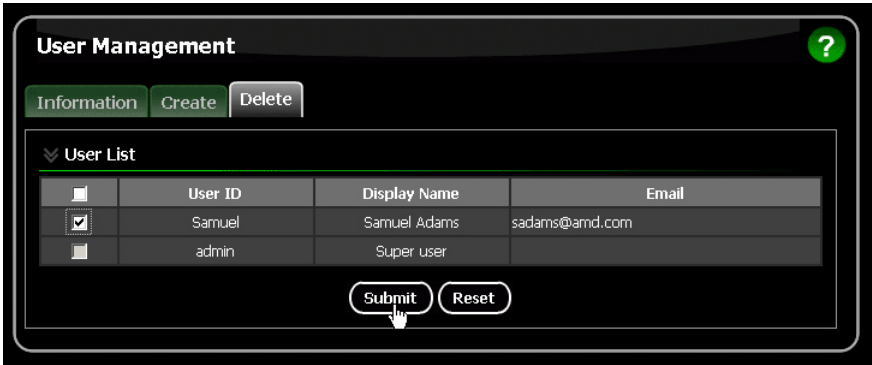
Disk Plugged In
 Disk BSL Update
 Disk BSL Cleared
 Disk Error Fixed
 Disk BSL Accessed
 Disk Patrol Progress
 Disk Media Patrol Started
 Disk Media Patrol Completed
 Disk Media Patrol Paused
 Disk Media Patrol Resumed
 Disk Media Patrol Aborted
 Array Online
 Array Created
 Array Deleted
 Array Cache Mode Changed
 Array Auto Cache Mode Change
 Synchronization Started
 Synchronization Completed
 Synchronization Paused
 Synchronization Resumed
 Synchronization Aborted
 Synchronization Progress
 Synchronization Inconsistency Fixed
 Redundancy Check Started
 Redundancy Check Completed
 Redundancy Check Paused
 Redundancy Check Resumed
 Redundancy Check Aborted
 Redundancy Check Progress

Information Events

Rebuild Started
 Rebuild Completed
 Rebuild Paused
 Rebuild Resumed
 Rebuild Aborted
 Rebuild Restarted
 Rebuild Progress
 Background Initialization Progress
 Background Initialization Started
 Background Initialization Completed
 Background Initialization Paused
 Background Initialization Resumed
 Background Initialization Aborted
 Migration Started
 Migration Completed
 Migration Paused
 Migration Resumed
 Migration Aborted
 Migration Progress
 Backup Started
 Backup Completed
 Backup Paused
 Backup Resumed
 Backup Progress
 Fast Copy Started
 Fast Copy Completed
 Fast Copy Paused
 Fast Copy Resumed
 Fast Copy Progress

Deleting a User

1. Log into RAIDXpert as the Administrator.
2. Click **User Management** in Tree View.
3. Click the **Delete** tab in Management View.

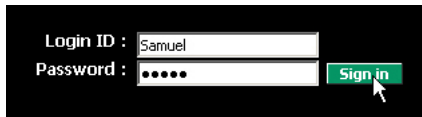


4. Check the box to the left of the user you want to delete.
5. Click the **Delete** button.
6. In the Confirmation box, click the **OK** button.

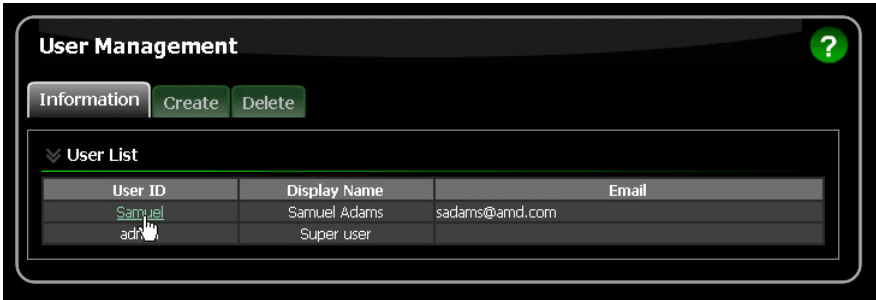
Changing a User's Password

In RAIDXpert, each user can change his or her own password. To change a user's password:

1. Log into RAIDXpert under your User name.



2. Click **User Management** in Tree View.
3. Click your **User ID** link in Management View.



User Management ?

Information Create Delete

▼ User List

User ID	Display Name	Email
Samuel	Samuel Adams	sadams@amd.com
admin	Super user	

4. Click the **Settings** tab.
5. Type the current password in the Old Password field.
6. Type a new password in the New Password field.
7. Retype the new password in the Retype Password field.
8. Click the **Submit** button.



User Management ?

Information Settings Events

▼ User Settings

User ID *	Samuel	
Display Name	Samuel Adams	(0-20 character(s))
Password *	•••••	(4-8 character(s))
New Password *	••••••	(4-8 character(s))
Retype Password *	••••••	
Email	sadams@amd.com	

▼ Host User Rights

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Submit Reset



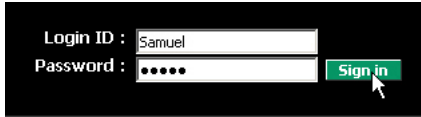
Important

If a user forgets his or her password, the Administrator must delete that User account and create a new one, as described above.

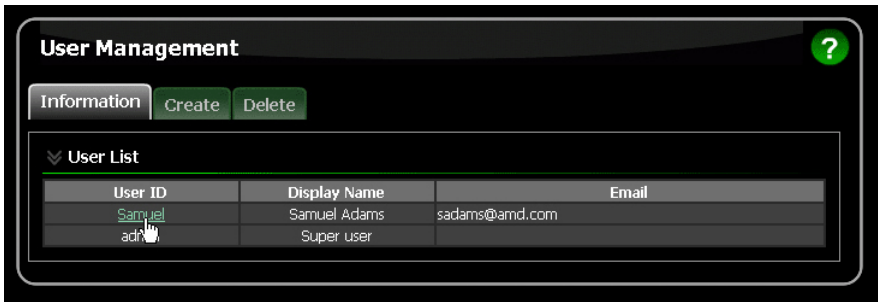
Changing a User's Email Address

In RAIDXpert, each user can change his or her own email address or the Administrator can do it. To change your email address:

1. Log into RAIDXpert under your User name.



2. Click **User Management** in Tree View.
3. Click your **User ID** link in Management View.



4. Click the **Settings** tab.
5. Type a new email address in the Email field.
6. Click the **Submit** button.

User Management ?

Information Settings Events

▼ User Settings

User ID *	Samuel	
Display Name	Samuel Adams	(0-20 character(s))
Password *		(4-8 character(s))
New Password *		(4-8 character(s))
Retype Password *		
Email	samuela@amd.com	


▼ Host User Rights

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Submit Reset

Changing a User's Access Rights

In RAIDXpert, the Administrator can change a user's access rights. To change a user's access rights:

1. Log in as the Administrator.
2. Click User Management  in Tree View.
The user list displays in Management View.
3. Click the **User ID** link for the user whose access rights will change.

User Management ?

Information Create Delete

▼ User List

User ID	Display Name	Email
Samuel	Samuel Adams	sadams@amd.com
admin	Super user	

4. Under Host User Rights, check the boxes to select rights for this user.
Uncheck the boxes of rights to be deleted.

Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild, and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings
Notification	Permission to receive notification of events affecting the logical drive

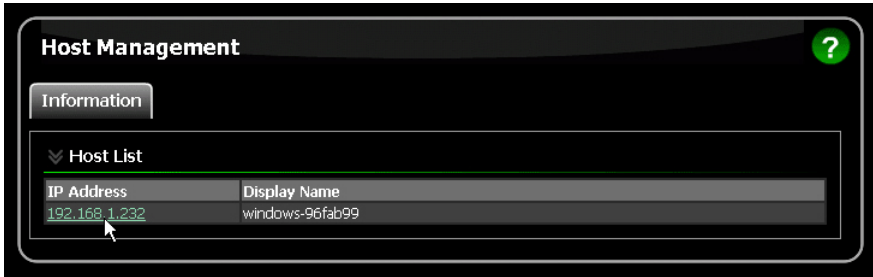
5. Click the **Submit** button.



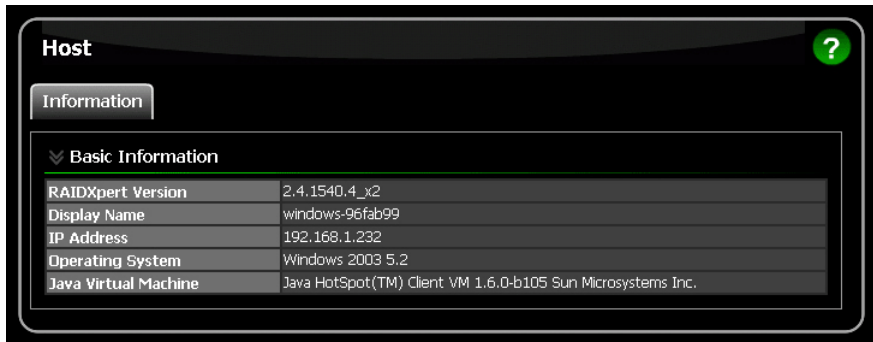
Host Management

This function provides information only. There are no user settings. To access Host Management:

1. Click **Host Management** in Tree View.
Host information displays in Management View.



2. Under Host List, click the **IP Address** link to the host you want to see.



The Information tab displays with information about the Host PC.

- **RAIDXpert Version** – The version number of the RAIDXpert software.
- **Display Name** – The display name of the Host PC. “localhost” is the default.
- **IP Address** – Refers to the Host PC. 127.0.0.1 means accessed at the Host PC itself. Other addresses, such as 192.168.1.232, means accessed either at the Host PC or over a network.
- **Operating System** – The Operating System running on the Host PC.
- **Java Virtual Machine** – The version number of private JVM that installs with RAIDXpert.

Utility Configuration

- Making Utility Configuration Settings (page 48)
- Choosing Utility Configuration Options (page 49)

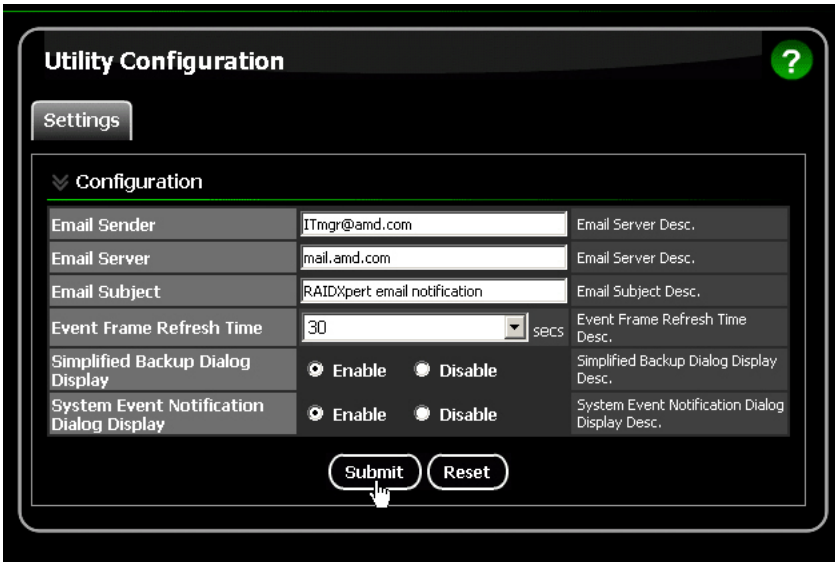
Making Utility Configuration Settings

Use this function to make email settings for RAIDXpert and also to set the refresh interval for the Event Frame.

To make Utility Configuration settings:

1. Click **Utility Configuration** in Tree View.
The Utility Configuration Settings appear in Management View.
2. Enter the Sender's address in the Email Sender field.
Be sure the sender has an account in your email system. See your IT administrator.
3. Enter your email server in the Email Server field.
4. Keep or change the Email Subject line.
5. Type a new interval (in seconds) in the Event Frame Refresh Time field.
30 seconds is the default interval.
6. Click the **Enable** or **Disable** options for:
 - **Backup Prompt** – Offers to make a backup copy of a RAID Ready logical drive. See page 49.
 - **System Event Notification** – Displays messages on the Host PC's desktop. See page 50.
7. Click the **Submit** button when you are done.

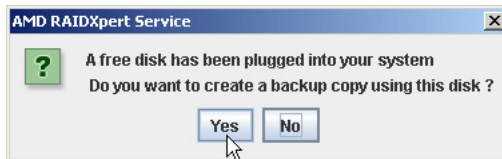
Also see "Setting up Event Notification" on page 38.



Choosing Utility Configuration Options

Backup Prompt

This feature makes a copy of your RAID Ready logical drive onto a separate disk drive. Because a RAID Ready consists of only one physical drive, there is no redundancy to protect against drive failure. The Backup feature provides that protection. The backup drive is monitored as a logical drive in the RAIDXpert interface.

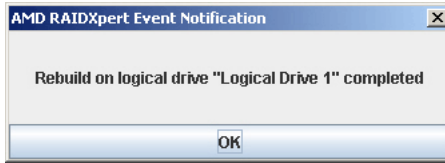


When you have a RAID Ready logical drive on your system and you plug in a new disk drive, RAIDXpert will ask you if you want to make a backup of the RAID Ready logical drive. Capabilities include:

- Bootable drives
- Automatic incremental backups
- Backup continues after system reboot
- Hot unplug and plug-in of backup drive

System Event Notification

An example of a System Event Notification message.



These messages display on the top right corner of the Host PC's desktop, whether or not RAIDxpert is running at the time. This feature makes it easy to monitor your RAID system without having to keep a browser window open and dedicated to the RAID.


Click **OK** to delete the message from your desktop.

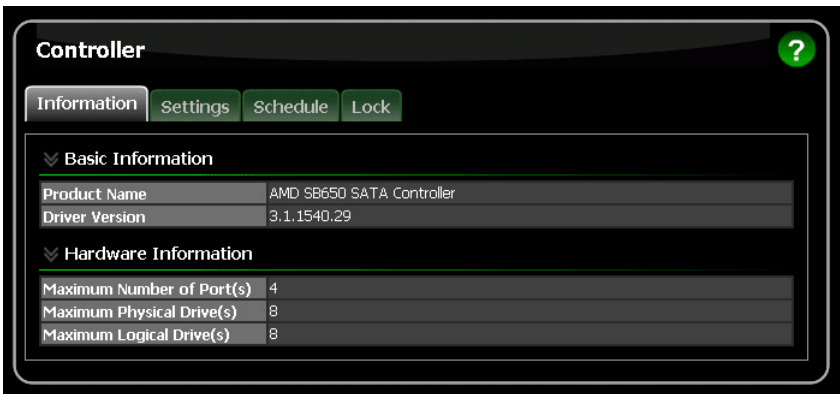
Controller

- Viewing Controller Information (below)
- Making Controller Settings (page 51)
- Viewing Controller Scheduled Activities (page 53)
- Locking the Controller (page 54)

The term Controller refers to the device that controls your RAID.

Viewing Controller Information

To view controller information, click **Controller**  in Tree View.



The Information tab displays with information about the controller.

- **Product Name** – The AMD product name for this controller.
- **Driver Version** – Version number of the controller's software driver.
- **Maximum Number of Ports** – The number of ports on the controller.
- **Maximum Physical Drives** – The maximum number of physical (disk) drives the controller can support.
- **Maximum Logical Drives** – The maximum number of logical drives (arrays) the controller can support.

Making Controller Settings

To make controller settings:

1. Click **Controller**  in Tree View.
2. Click the **Settings** tab in Management View.

3. Click the **Enable** or **Disable** options for each feature.

Controller ?

Information Settings Schedule Lock

View/Change Controller Parameter

Rebuild Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High
Media Patrol Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High
Migration/Expansion Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High
Initialization Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High
Synchronization Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High
Automatic Rebuild Status	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Automatic Rebuild Policy	<input checked="" type="radio"/> Free & Spare <input type="radio"/> Spare
Buzzer Status	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
S.M.A.R.T. Status	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
S.M.A.R.T. Check Polling Interval	120 Second(s)

Submit Reset Default

- **Rates** – Allocates system resources between the background activity such as Rebuild, Media Patrol, Migration/Expansion, Initialization, and Synchronization, and the data read/write activity.

A *High* setting assigns most of the system resources to background processes. The process will finished sooner but read/write requests are handled slower.

A *Medium* setting tries to balance system resources between the background processes and data input/output activity.

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 background processes take longer.

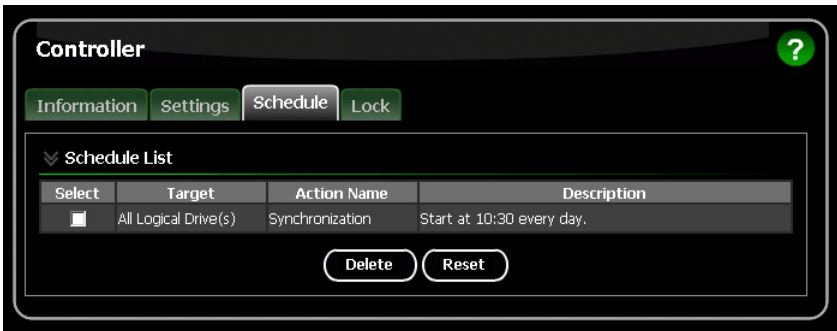
- **Automatic Rebuild Status** – When enabled, and a hot spare drive is available, a critical or degraded logical drive will rebuild itself automatically. Automatic Rebuilding applies to RAID 1 and 5 logical drives only.
- **Automatic Rebuild Policy** – Selects which physical drives to use as hot spares: Spare drives and Free drives or designated Spare drives only.
- **Buzzer** – When enabled, the SATA controller's buzzer will sound to report a problem.

- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the physical drive software. When enabled, the SATA controller polls the physical drives for SMART information and reports it to you.
 - **S.M.A.R.T. Check Polling Interval** – The interval of time in seconds when the SATA controller polls the physical drives for SMART information. 120 seconds is the default.
4. Click the **Submit** button.
Your settings take effect immediately.

Viewing Controller Scheduled Activities

To view scheduled background activities:

1. Click **Controller**  in Tree View.
2. Click the **Schedule** tab in Management View.



The Schedule tab displays all scheduled background activity, such as Media Patrol, Migration, Rebuild, Synchronization, Redundancy Check, and Initialization.


Add a Scheduled Activity

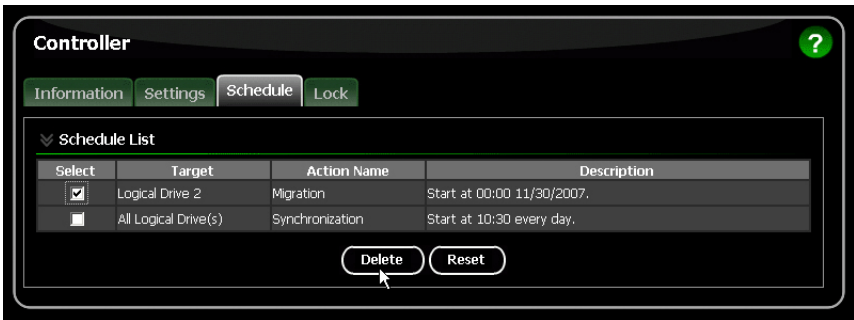
To add a schedule for these activities, see:

- “Running Media Patrol – One Physical Drive” on page 60
- “Migrating a Logical Drive” on page 73
- “Rebuilding a Logical Drive” on page 77
- “Synchronizing a Logical Drive” on page 81
- “Initializing a Logical Drive” on page 84

Deleting a Scheduled Activity

To delete a scheduled background activity:

1. Click **Controller**  in Tree View.
2. Click the **Schedule** tab in Management View.
3. Check the box to the left of the process you want to delete.
4. Click the **Delete** button.




5. In the Confirmation box, click the **OK** button.

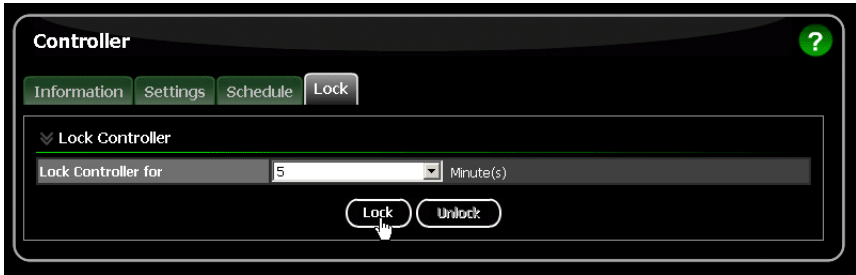
You can also go to the tab where the background activity is scheduled and click the **Disable** option.

Locking the Controller

The Lock tab displays lock status and enables you to lock or unlock a subsystem controller. The locking mechanism isolates the controller during maintenance operations and other periods when you want to avoid interruption from other users trying to access the logical drives under this controller.

To lock the Controller on the Host PC:

1. Click **Controller**  in Tree View.
2. Click the **Lock** tab in Management View.
3. From the dropdown menu, select a period of time to hold the lock.
The lock time range is 1 to 30 minutes.
4. Click the **Lock** button to set the lock.
The lock will release itself automatically at the end of the period you specified.



5. To release the lock before the scheduled time, click the **Unlock** button.

Physical Drives

- Viewing Physical Drives (below)
- Merging a Physical Drive (page 57)
- Scheduling Media Patrol – All Physical Drives (page 57)
- Viewing Physical Drive Information (page 58)
- Making Physical Drive Settings (page 60)
- Running Media Patrol – One Physical Drive (page 60)
- Viewing the Physical Drive Bad Sector Log (page 62)
- Deleting Physical Drive Backup Information (page 63)

Viewing Physical Drives

To access Physical Drive View, click **Physical Drive View** in Tree View. From this window, you can click the links to access information and functions of individual physical drives and use the Merge feature.



Physical Drive View ?

Information Merge Media Patrol Schedule

Physical Drive Overview

Drive Model	Port Number	Capacity	Status
WDC WD360GD-00FNA0	1	37.01 GB	Functional
Maxtor 6Y080MD	2	81.96 GB	Functional
Maxtor 6Y080MD	3	81.96 GB	Functional
Maxtor 6B300S0	4	90.00 GB	Functional

Graphic View

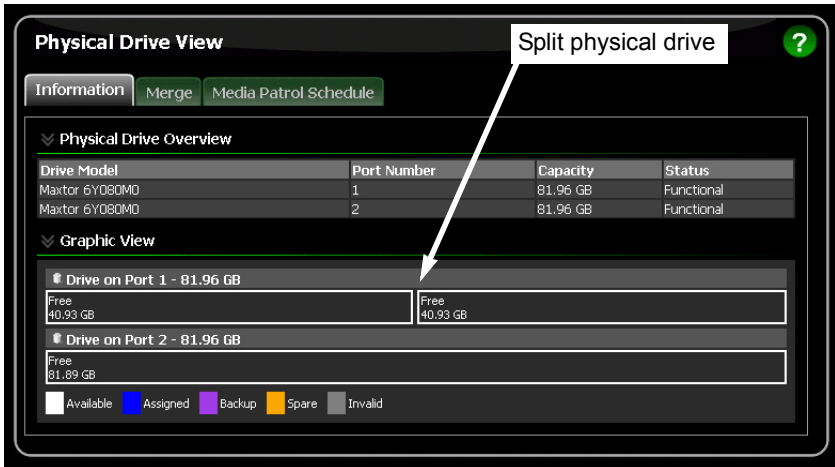
- Drive on Port 1 - 37.01 GB
 - Assigned LD 1-01: 36.95 GB
- Drive on Port 2 - 81.96 GB
 - Assigned LD 2-01: 81.89 GB
- Drive on Port 3 - 81.96 GB
 - Assigned LD 2-02: 81.89 GB
- Drive on Port 4 - 90.00 GB
 - Global Spare: 89.93 GB

Legend: Available (white), Assigned (blue), Backup (purple), Spare (orange), Invalid (grey)

Merging a Physical Drive

A physical drive is logically split when its capacity is divided between two assignments, such as two different logical drives. When the logical drives are deleted, the split remains. The action of merging a physical drive reunites the two portions of a split drive back into a single physical drive.

The Merge function is not available when either or both portions of the physical drive are assigned to a logical drive. The physical drive is identified by the port number to which it is attached.



To merge a physical drive:

1. Click **Physical Drive View** in Tree View.
2. Click the **Merge** tab in Management View.
3. Check the box to the left of the physical drive you want to merge.
4. Click the **Submit** button.

Click **Physical Drive View** again to see the results of your merge operation.

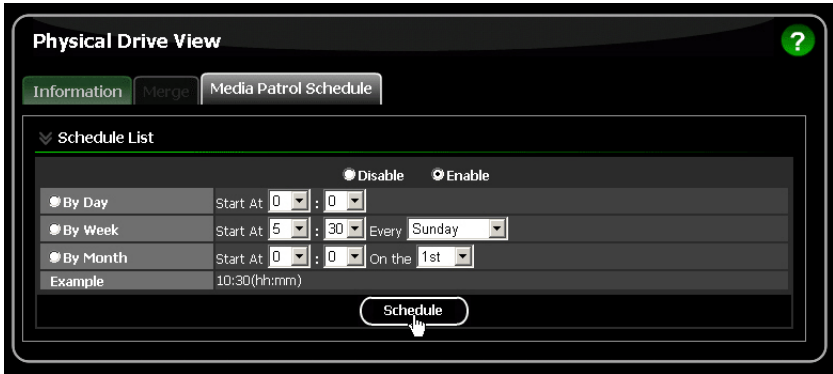
Scheduling Media Patrol – All Physical Drives

The Physical Drive View–Media Patrol tab allows you to start Media Patrol on all physical drives. For more information, see “Media Patrol” on page 107. You can also run Media Patrol on individual physical drives, see page 60.

To schedule Media Patrol:

1. Click **Physical Drive View** in Tree View.
2. Click the **Media Patrol Schedule** tab in Management View.

3. Click the **Enable** option.
4. Click the **by Day**, **by Week** or **by Month** option.
5. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.
Start time is based on a 24-hour clock.
6. Click the **Schedule** button.



Canceling a Schedule

To cancel the scheduled Media Patrol operation:

1. Click **Physical Drive View** in Tree View.
2. Click the **Media Patrol Schedule** tab in Management View.
3. Click the **Disable** option.

Viewing Physical Drive Information

To access information about a physical drive:

1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive** whose setting you want to view.
The Information tab appears in Management View.

Physical Drive Information ?

Information Settings Media Patrol BSL Backup Information

Basic Information

Drive Model	Maxtor 6Y080MD
Serial Number	Y24219LE
Firmware Version	YAR51EWD
Port Number	2
Target ID	1

Drive Information

Drive Status	Functional
Background Activity	Idle
Capacity	81.96 GB
S.M.A.R.T. Status	Healthy
Write Cache Status	Enable
SATA	1.5 Gb/s
Command Queue	None

Graphic View

Drive on Port 2 - 81.96 GB

Assigned LD 1-02 36.95 GB	Free 44.94 GB
------------------------------	------------------

Available Assigned Backup Spare Invalid

The Information tab displays the following information:

- **Drive Model** – The physical drive manufacturer’s model name or number.
- **Serial Number** – The serial number of this physical drive.
- **Firmware Version** – The version number of the firmware on this physical drive.
- **Port Number** – The number of the SATA port on the motherboard to which this drive is connected.
- **Target ID** – The target ID number of this physical drive.
- **Drive Status** – The operational status of this physical drive. Functional means normal. Others include Offline.
- **Background Activity** – The current background activity affecting this physical drive. Idle means no activity. Others include Initializing and Rebuilding.
- **Capacity** – The data capacity of this physical drive in GB.
- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the physical drive software. When this

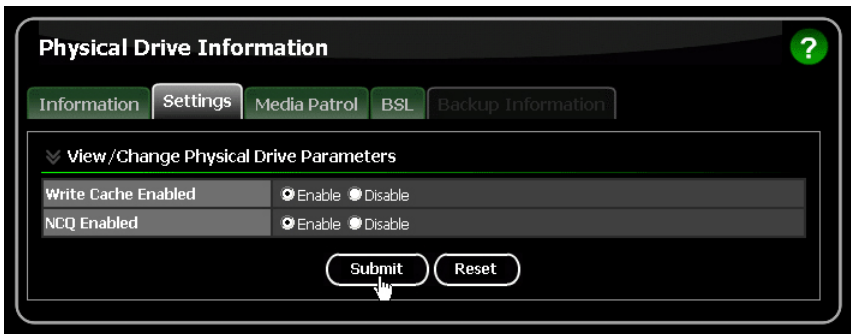
feature is supported, the drive will pass SMART information to the SATA controller when it polls the physical drives.

- **Write Cache Status** – Indicates whether the physical drive’s write cache is Enabled or Disabled. You can change this status under the Settings tab (see below).
- **SATA** – The SATA data rate of the physical drive, 1.5 Gb/s or 3Gb/s.
- **Command Queue** – Shows NCQ (Native Command Queuing) if supported by this physical drive.

Making Physical Drive Settings

Physical Drive Settings allows you to enable or disable the Write Cache on an individual physical drive. To access the physical drive setting:

1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive** on which you want to make settings.
3. Click the **Settings** tab in Management View.
4. Click the **Enable** or **Disable** options.
The options appear that the physical drives supports.
5. Click the **Submit** button.



Running Media Patrol – One Physical Drive

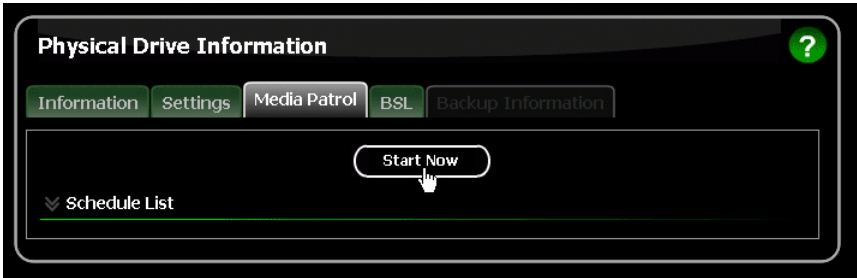
The Physical Drive–Media Patrol tab allows you to start Media Patrol on an individual physical drive. You can also run Media Patrol on all physical drives at the same time, see page 57.

For more information, see “Media Patrol” on page 107.

On Demand

To start Media Patrol immediately:

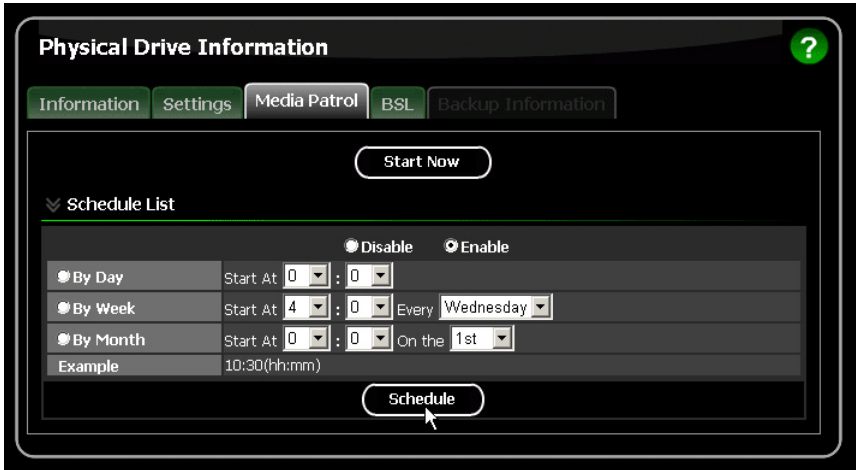
1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive** on which you want to run Media Patrol.
3. Click the **Media Patrol** tab in Management View.
4. Click the **Start Now** button.



Scheduled

To schedule Media Patrol to run at a later time:

1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive**.
3. Click the **Media Patrol** tab in Management View.
4. Click the Enable option.
5. Click the **by Day**, **by Week** or **by Month** option.
 From the dropdown menus, select a start time and a day of the Week or Month, if applicable.
 Start time is based on a 24-hour clock.
6. Click the **Schedule** button.



Canceling a Schedule

To cancel the scheduled Media Patrol operation:

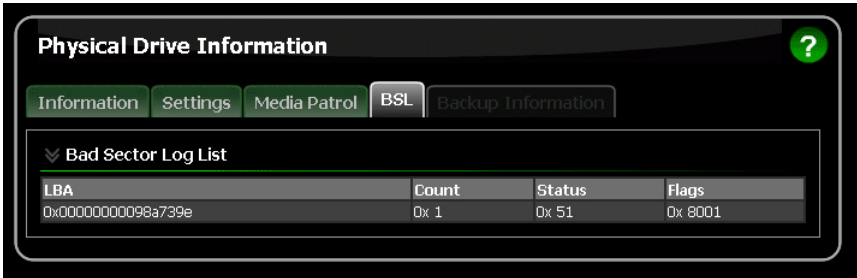
1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive** whose schedule you want to cancel.
3. Click the **Media Patrol** tab in Management View.
4. Click the **Disable** option.

Viewing the Physical Drive Bad Sector Log

On occasion, an error can arise with the media on a physical drive. RAIDXpert keeps track of bad sectors in order to inform you of the condition of individual physical drives.

To access a physical drive's bad sector log:

1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive** whose bad sector log you want to view.
3. Click the **BSL** tab in Management View.



If any bad sectors are found, they are listed here. RAIDxpert informs you by popup and email messages when a bad sector error is logged (see page 38).

After 10 bad sectors have been discovered on a physical drive, RAIDxpert issues a warning to replace the drive.

After 20 bad sectors have been discovered:

- On fault-tolerant (RAID 1, 5, or 10) logical drives, the RAID controller will set down the physical drive (take it offline) and the logical drive will go critical. Replace the physical drive and rebuild your logical drive.
- On non-fault-tolerant (RAID 0 or RAID Ready) logical drives, the physical drive remains online. Backup your data, replace the physical drive, create a new logical drive and copy your data to it.

See “Rebuilding a Logical Drive” on page 77 and “Managing a Critical or Offline Logical Drive” on page 86.

See your system *User Manual* for more information about replacing a physical drive.

Deleting Physical Drive Backup Information

When you make a backup of your RAID Ready logical drive, the physical drive used for the backup becomes a RAID 1 mirrored pair with the RAID Ready drive. See “Backing up a RAID Ready Logical Drive” on page 71.

To make the physical drive available for use in other logical drives or as a spare, you must delete the backup information.

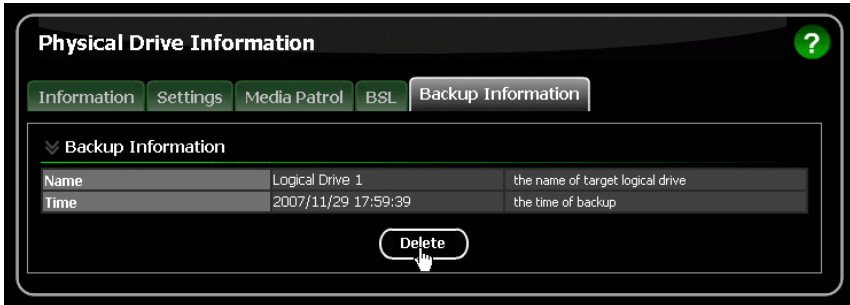


Important

When you delete a backup drive, you delete all data on the backup drive. This operation does not affect the data on the RAID Ready logical drive.

To delete backup information from a physical drive:

1. Click **Physical Drive View** in Tree View.
2. Click the **Physical Drive** marked as a backup drive.
3. Click the **Backup Information** tab in Management View.
4. Click the **Delete** button.



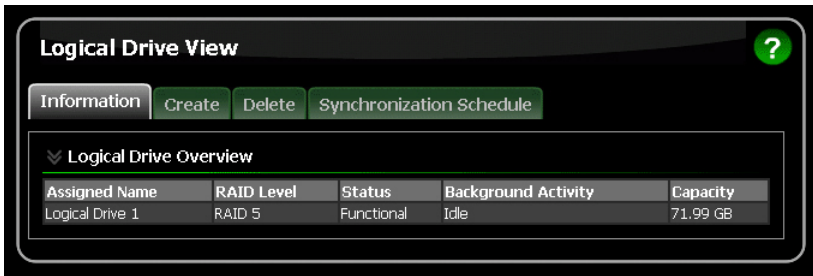
5. In the Confirmation box, click the **OK** button.
The backup information is removed and the physical drive is ready for use in a logical drive or as a spare drive.

Logical Drives

- Viewing Logical Drives (below)
- Creating a Logical Drive (page 65)
- Deleting a Logical Drive (page 70)
- Viewing Logical Drive Information (page 70)
- Making Logical Drive Settings (page 71)
- Backing up a RAID Ready Logical Drive (page 71)
- Migrating a Logical Drive (page 73)
- Rebuilding a Logical Drive (page 77)
- Synchronizing All Logical Drives (page 80)
- Synchronizing a Logical Drive (page 81)
- Initializing a Logical Drive (page 84)
- Logical Drive Activation (page 84)
- Managing a Critical or Offline Logical Drive (page 86)

Viewing Logical Drives

Logical Drive View provides a list of all logical drives currently on the Host PC. To see a list of your logical drives, click **Logical Drive View** in Tree View.



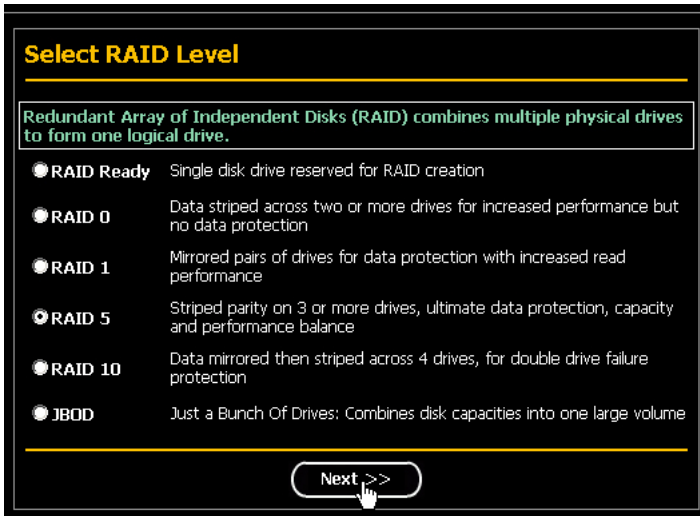
From this screen, you can click the links to access information and functions of individual logical drives and use the Create and Delete features.

Creating a Logical Drive

A logical drive is a collection of physical drives in a RAID.

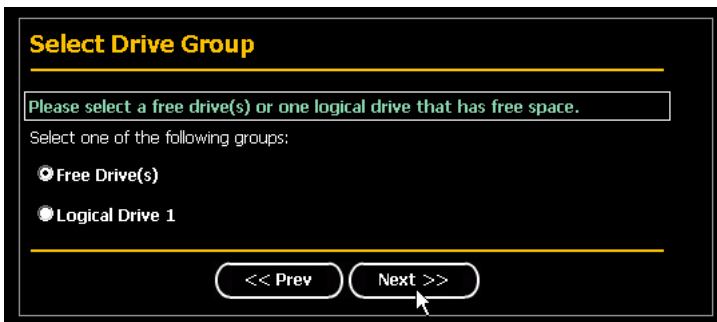
To create a new logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Create** tab in Management View.
The Select RAID Level screen appears.
3. Select the option beside the RAID level you want for your logical drive.
RAIDXpert displays the RAID levels you can use with the available physical drives. See page 100 for information about the available RAID levels.



4. In the Select Drive Type screen, click the option for one of the following:
 - **Free Drives** – Select all Free (unassigned) physical drives
 - **Logical Drive** – Select the Free portion of physical drives whose other portion is assigned to a Logical Drive

The available choices depend on the RAID level you selected and the physical drives available.



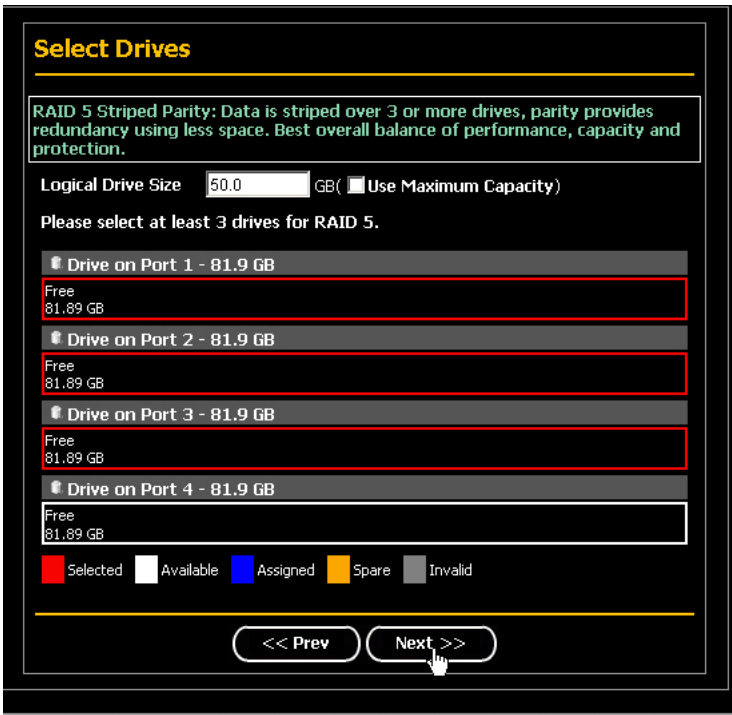
5. Click the **Next** button.
The Select Drives screen appears.
6. If you want to split the capacity of your physical drives between two logical drives, enter the capacity for the first logical drive in the Logical Drive Size field.

Or, to use the maximum capacity of the physical drives, check the Use Maximum Capacity box.

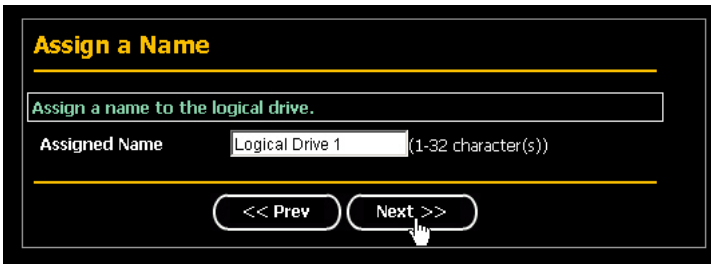
For RAID Ready and JBOD, the system will check the Use Maximum Capacity Box automatically.



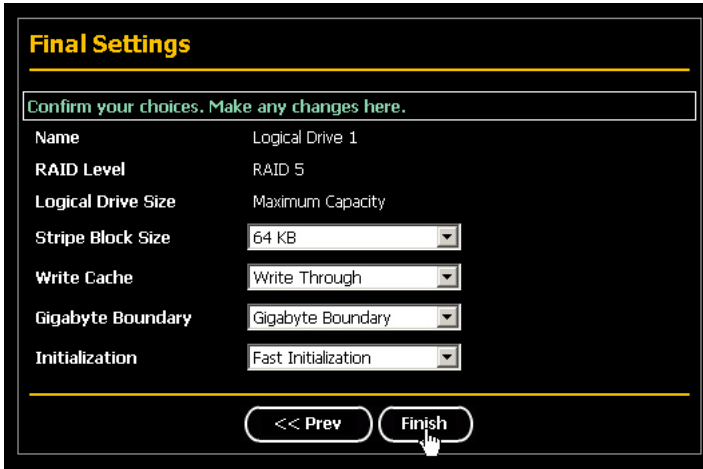
- Click the physical drives to select them.
Available drives have a white frame. Selected drives have a red frame.
For RAID Ready, select only one physical drive.



- Click the **Next** button.
The Assign a Name screen appears.
- Enter a name for the logical drive in the field provided.



10. Click the **Next** button.
The Final Settings screen appears.
11. RAID 0, 5, and 10. Choose a Stripe Block Size from the dropdown menu.
The choices are 64 and 128 KB. For more information, see “Choosing Stripe Block Size” on page 103.
The Write Cache policy is Write Through. You cannot change this setting.
12. Choose a Gigabyte Boundary policy from the dropdown menu.
 - **Gigabyte Boundary** – Rounds the size of the logical drive down to the nearest whole gigabyte. This is the default. For more information, see “Gigabyte Boundary” on page 103.
 - **None** – No Boundary function.
13. Choose an Initialization policy from the dropdown menu.
 - **Fast Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.
 - **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. RAID 1, 5, and 10.
 - **None** – No initialization. This choice is not recommended.



14. Click the **Finish** button.

If there are physical drives available, the Select RAID Level screen appears again, where you can create an additional logical drive.

Click the **Logical Drive** in Tree View to see all of the information about your new logical drive.



Before you can use your new logical drive, you must partition and format the logical drive using your PC's operating system. See "Appendix B: Partition and Format" on page 111 for more information.

Deleting a Logical Drive

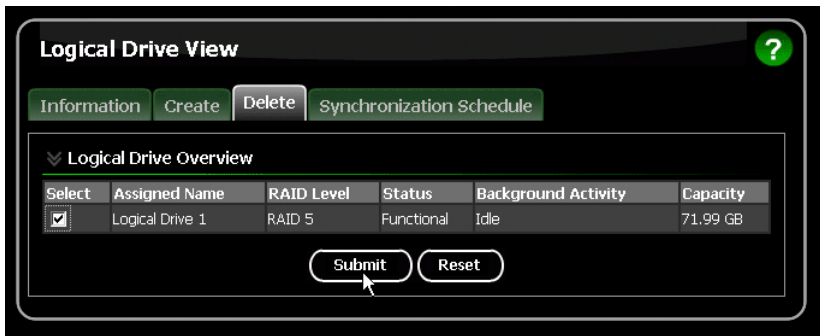


Warning

When you delete a logical drive, you delete all data on the logical drive. Be sure to backup any important data before you delete a logical drive!

To delete a logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Delete** tab in Management View.
3. Check the box to the left of the logical drive you want to delete.
4. Click the **Submit** button.



5. In the Confirmation box, click the **OK** button.
6. In the Warning box, click the **OK** button.
The selected logical drive is deleted.

Viewing Logical Drive Information

Logical Drive View provides a list of all logical drives currently on the Host PC. To access Logical Drive View:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to view.

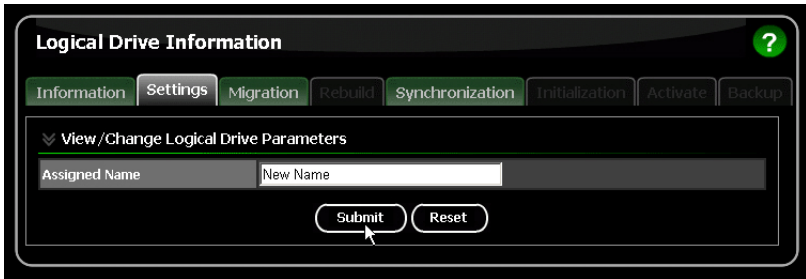
From this screen, you can click the links to access the Settings, Migration, Rebuild, Synchronization, Initialization, and Activation features. The features that

apply to this logical drive have green tabs. Features that do not apply have blackened tabs.

Making Logical Drive Settings

Logical Drive Settings enables you to change the name of a logical drive. To access logical drive settings:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** whose name you want to change.
3. Click the **Settings** tab in Management View.



4. Enter a name in the Assigned Name field.
5. Click the **Submit** button.

Backing up a RAID Ready Logical Drive

This feature enables you to create and maintain a mirror of your RAID Ready logical drive. The two drives appear to your system as a RAID 1 logical drive.

If you write data to your RAID Ready drive without the backup drive in your system, RAIDXpert will automatically update the data on the backup drive when you insert it the next time.

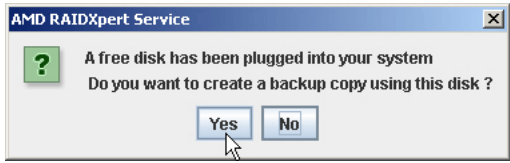
You can set up your RAID Ready backup drive in one of two ways:

- By clicking a popup box
- By selecting a physical drive

Set up by Clicking a Popup Box

This option must be enabled. See “Making Controller Settings” on page 51.

When you plug an unformatted physical drive into your system, RAIDXpert displays a popup box:



Click the **Yes** button to make a backup of your RAID Ready logical drive to the physical drive that you just plugged into your system.

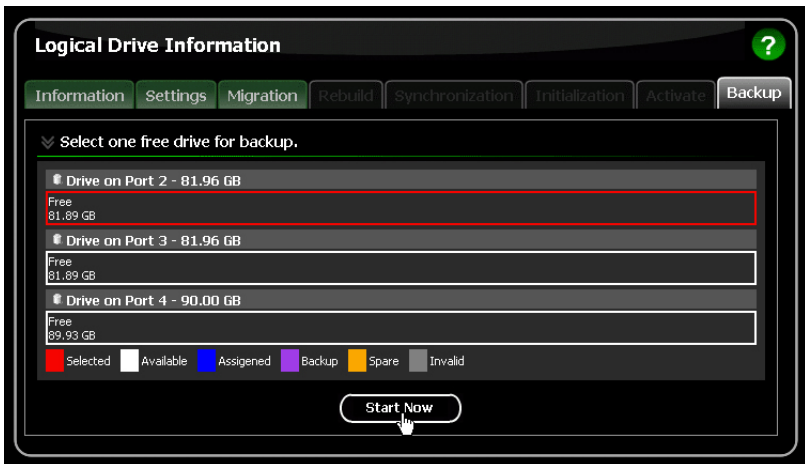
Set up by Selecting a Physical Drive

This option requires one unassigned physical drive connected to the AMD Controller.

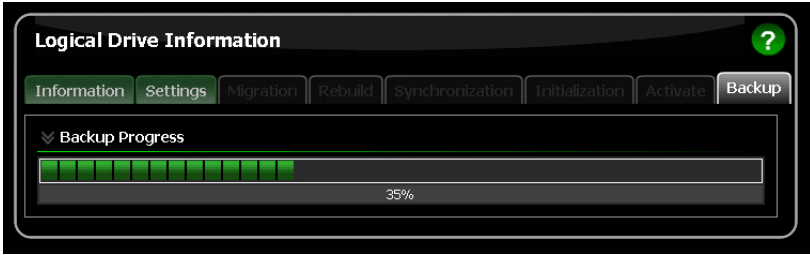
To backup your RAID Ready by selecting a drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** whose name you want to change.
3. Click the **Backup** tab in Management View.
4. Click a physical drive to select it as the backup drive.
Available drives have a white frame. Selected drives have a red frame.
5. Click the **Start Now** button.

The data on your RAID Ready drive is copied to the backup drive.



Click the **Backup** tab to monitor the progress of the backup operation.



Backup Drive Features

There is no pause or resume button for the backup. However, if you reboot your system with the backup drive still attached, the backup function will continue automatically after the reboot is completed.

When the backup is finished, the backup drive is an exact duplicate of your RAID Ready logical drive. If your RAID Ready was a bootable drive, your backup drive will be bootable also. Your system can boot from either drive.

If you leave the backup drive in your system and you reboot the system, the RAID Ready and backup drive will appear as a RAID 1 mirrored logical drive.

To use your backup drive in a different logical drive, you must delete the backup information. See "Deleting Physical Drive Backup Information" on page 63.

Migrating a Logical Drive

The Logical Drive–Migration tab enables you to:

- Change the RAID level of an existing logical drive
- Add more physical drives to a logical drive while keeping the same RAID level. This action is also called *Expansion*

You can change the RAID level of a logical drive with certain combinations of RAID level and number of physical drives, as described in the table below.

From	To	Result
RAID Ready: 1 drive	RAID 0: 2, 3, or 4 drives	Increased capacity
	RAID 1: 2 drives	Adds redundancy
	RAID 5: 3 or 4 drives*	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	

From	To	Result
RAID 0: 2 drives	RAID 5: 3 or 4 drives*	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	
RAID 0: 3 drives	RAID 5: 4 drives*	Increased performance and capacity, adds redundancy
RAID 1: 2 drives	RAID 5: 3 or 4 drives*	Increased performance and capacity
	RAID 10: 4 drives	
RAID 10: 4 drives	RAID 5: 4 drives*	Increased capacity
* Only the AMD SB650 and SB750 Controllers support RAID 5.		

You can add physical drives while keeping the same RAID level, as described in the table below.

From	To	Result
RAID 0: 2 drives	RAID 0: 3 or 4 drives	Increased capacity
RAID 0: 3 drives	RAID 0: 4 drives	Increased capacity
RAID 5: 3 drives	RAID 5: 4 drives	Increased capacity
JBOD: 2 drives	JBOD: 3 or 4 drives	Increased capacity
JBOD: 3 drives	JBOD: 4 drives	Increased capacity

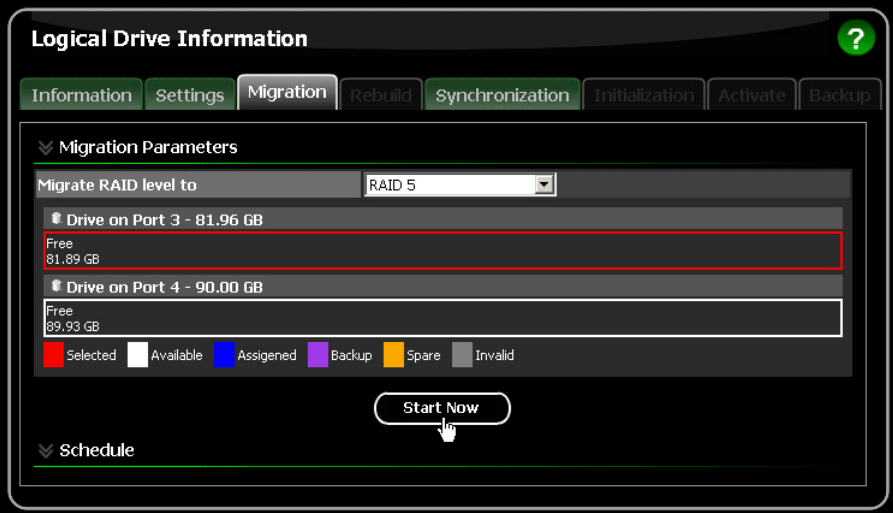
For more information, see “Migration” on page 104.

You can set up a Migration to begin immediately (on demand) or schedule a Migration for a time when there is less demand on the RAID system.

On Demand

To migrate a logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to migrate.
3. Click the **Migration** tab in Management View.
4. From the Migrate RAID Level to dropdown menu, choose the target RAID level for your logical drive.
5. If your intended action requires additional physical drives, click a free physical drive to select it.
Available drives have a white frame. Selected drives have a red frame.
6. Click the **Start Now** button.



Logical Drive Information ?

Information Settings **Migration** Rebuild Synchronization Initialization Activate Backup

Migration Parameters

Migrate RAID level to RAID 5

Drive on Port 3 - 81.96 GB

Free 81.89 GB

Drive on Port 4 - 90.00 GB

Free 89.93 GB

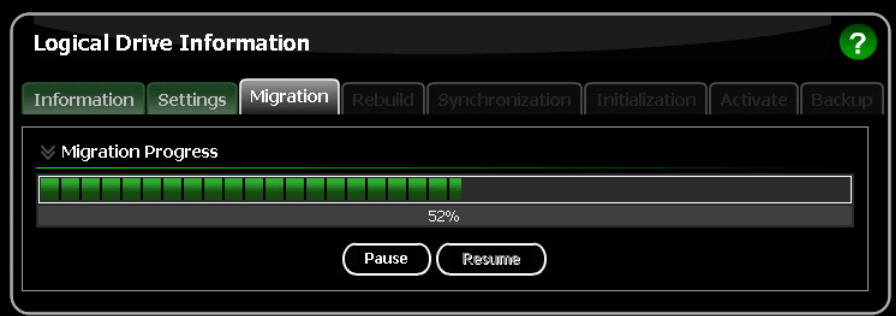
Selected Available Assigned Backup Spare Invalid

Start Now

Schedule

Detailed description: This screenshot shows the 'Migration' tab in the 'Logical Drive Information' interface. The 'Migrate RAID level to' dropdown is set to 'RAID 5'. Two drives are listed: 'Drive on Port 3 - 81.96 GB' with 81.89 GB free, and 'Drive on Port 4 - 90.00 GB' with 89.93 GB free. A legend below the drives identifies colors for Selected (red), Available (white), Assigned (blue), Backup (purple), Spare (yellow), and Invalid (grey). A 'Start Now' button is highlighted with a mouse cursor, and a 'Schedule' section is partially visible at the bottom.

You can monitor Migration progress on the Logical Drive Migration tab. Click the respective buttons to pause and resume the Migration.



Logical Drive Information ?

Information Settings **Migration** Rebuild Synchronization Initialization Activate Backup

Migration Progress

52%

Pause Resume

Detailed description: This screenshot shows the 'Migration' tab with the 'Migration Progress' section expanded. A progress bar is filled with green segments, indicating 52% completion. Below the progress bar are 'Pause' and 'Resume' buttons.

Scheduled

To schedule a Migration:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to migrate.
3. Click the **Migration** tab in Management View.
4. From the Migrate RAID Level to dropdown menu, choose the target RAID level for your logical drive.
5. Click a free physical drive to select it.
Available drives have a white frame. Selected drives have a red frame.
6. Click the **Enable** option.
7. From the dropdown menus, select a start time.
Start time is based on a 24-hour clock.
8. Click in Start At field to display a popup calendar.
9. Click the start date in the calendar or enter a date manually.
10. Click the **Schedule** button.

The screenshot displays the 'Logical Drive Information' window with the 'Migration' tab selected. The 'Migration Parameters' section shows 'Migrate RAID level to' set to 'RAID 5'. Two physical drives are listed: 'Drive on Port 3 - 81.96 GB' (Free, 81.89 GB) and 'Drive on Port 4 - 90.00 GB' (Free, 89.93 GB). The 'Drive on Port 3' drive is highlighted with a red border, indicating it is selected. A legend below the drives shows 'Selected' (red), 'Available' (white), 'Assigned' (blue), 'Backup' (purple), 'Spare' (yellow), and 'Invalid' (grey). A 'Start Now' button is located below the drives. The 'Schedule' section has 'Enable' selected. The 'Start At' field is set to '22:30' on '11/15/2008'. An 'Example' shows '10:30 09/21/2004(hh:mm MM/dd/yyyy)'. A 'Schedule' button is at the bottom, with a mouse cursor pointing to it.

Canceling a Schedule

If you want to cancel the scheduled Migration, do the following:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** whose schedule you want to cancel.
3. Click the **Migration** tab in Management View.
4. Click the **Disable** option.

Rebuilding a Logical Drive

Rebuild refers to the process of repairing a logical drive by reconstruction the data on one of its physical drives. This feature only applies to logical drives with redundancy: RAID 1, 5, and 10.

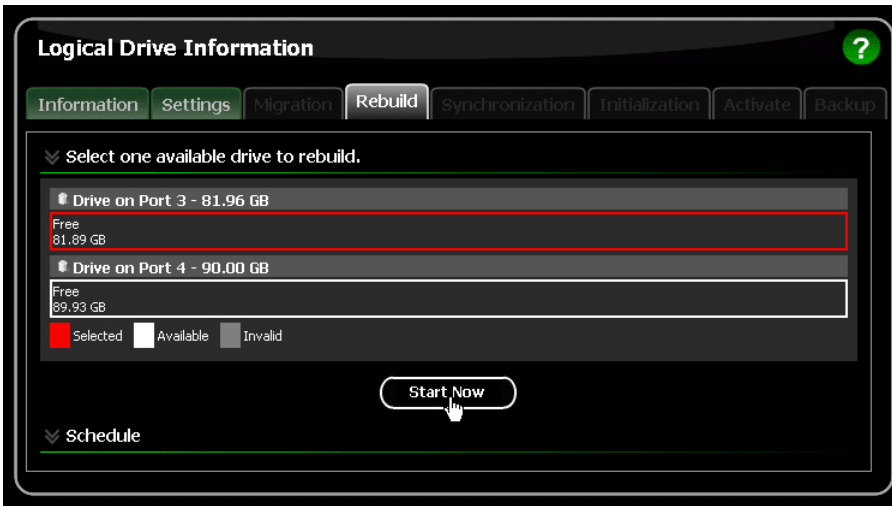
You can set up a Rebuild to:

- Begin immediately (on demand)
- Schedule a Rebuild for a time when there is less demand on the RAID system
- Begin automatically when a logical drive goes critical. See page 79.

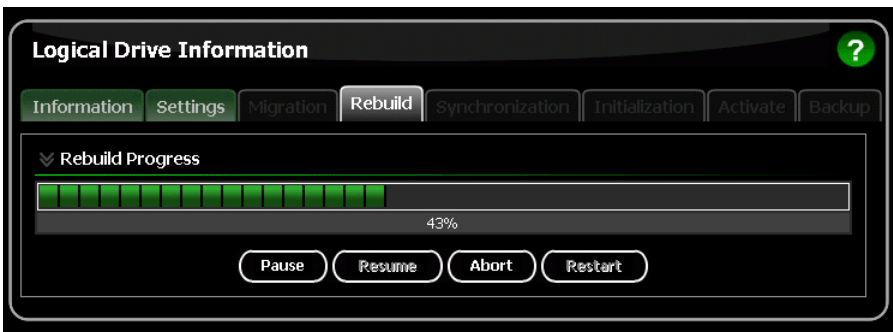
On Demand

To rebuild a logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to rebuild.
3. Click the **Rebuild** tab in Management View.
4. Select the physical drive you want to use as a replacement drive.
Available drives have a white frame. Selected drives have a red frame.
5. Click the **Start Now** button.



You can monitor Rebuild progress on the Logical Drive Rebuild tab. Click the respective buttons to pause and resume the Rebuild.

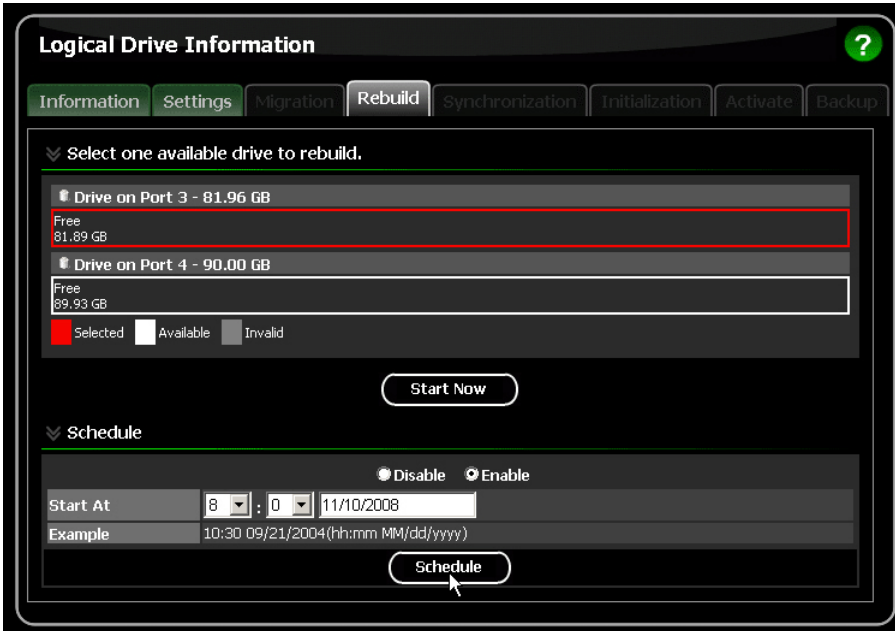


Scheduled

To schedule a Rebuild:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to rebuild.
3. Click the **Rebuild** tab in Management View.
4. Select the physical drive you want to use as a replacement drive.
Available drives have a white frame. Selected drives have a red frame.
5. Click the **Enable** option.

6. From the dropdown menus, select a start time.
Start time is based on a 24-hour clock.
7. Click in Start At field to display a popup calendar.
8. Click the start date in the calendar or enter a date manually.
9. Click the **Schedule** button.



Canceling a Schedule

If you want to cancel the scheduled Rebuild, do the following:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** whose schedule you want to cancel.
3. Click the **Rebuild** tab in Management View.
4. Click the **Disable** option.

Automatic Rebuilding

Automatic rebuilding of a logical drive is possible under the following conditions:

- The logical drive is a RAID 1 or a RAID 5 with 3 physical drives.
See “Creating a Logical Drive” on page 65.
- There is a spare drive present in the RAID system.
See “Creating a Spare Drive” on page 90.

- Automatic Rebuild Status is enabled in the Controller Settings. See “Making Controller Settings” on page 51.

If the three above conditions are met, a logical drive will replace a faulty physical drive and rebuild itself automatically. RAIDXpert will report the critical logical drive and automatic rebuild in its user interface as well as via popup messages. Depending on your Event Notification settings (see page 38), RAIDXpert can also notify you via email message.

When the automatic rebuild operation is completed, you must remove and replace the faulty physical drive with a new one.

See “Replace the Failed Physical Drive” on page 88 and your system *User Manual* for more information on replacing a physical drive.

Synchronizing All Logical Drives

The Logical Drive View–Synchronization Schedule tab enables you to synchronize all logical drives. You can also synchronize an individual logical drive, see page 81.

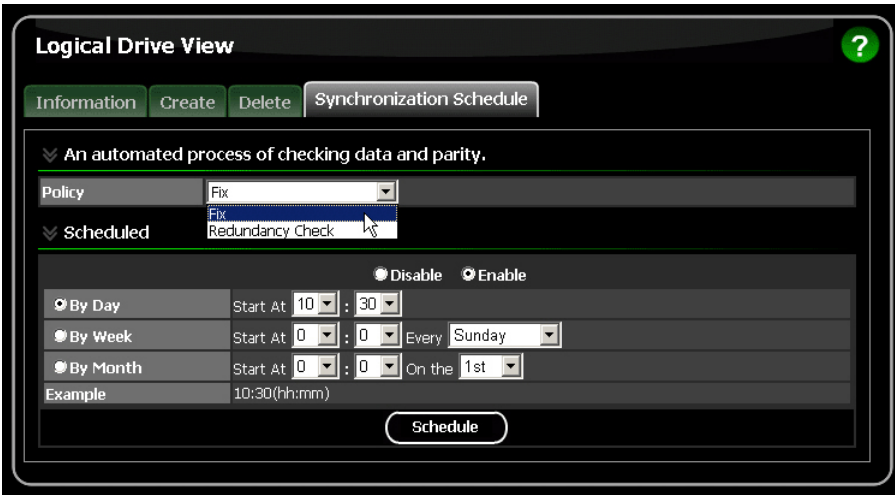
- **Synchronization** – An automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation.
- **Redundancy Check** – An automated process of checking data and parity but it only reports and does not correct, any inconsistencies that it finds.

Synchronization and Redundancy Check apply to RAID 1, 5, and 10 logical drives. To perform a Synchronization or Redundancy Check immediately (on demand), see “Synchronizing a Logical Drive” on page 81.

Scheduled

To schedule Synchronization for all logical drives:

1. Click **Logical Drive View** in Tree View.
2. Click the **Synchronization Schedule** tab in Management View.
3. In the Policy dropdown menu, choose:
 - **Fix** – If you want Synchronization
 - **Redundancy Check** – If you do *not* want to correct inconsistencies
4. Click the **Enable** option.
5. Click the **by Day, by Week** or **by Month** option.
6. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.
Start time is based on a 24-hour clock.
7. Click the **Schedule** button.



Canceling a Schedule

If you want to cancel the scheduled Synchronization, do the following:

1. Click **Logical Drive View** in Tree View.
2. Click the **Synchronization Schedule** tab in Management View.
3. Click the **Disable** option.

Synchronizing a Logical Drive

The Logical Drive Synchronization tab enables you to synchronize an individual logical drive. You can also synchronize all logical drives at the same time, see page 80.

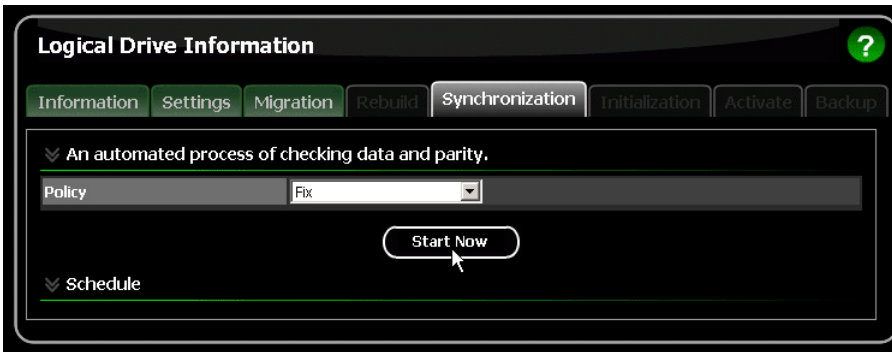
- **Synchronization** – An automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation.
- **Redundancy Check** – An automated process of checking data and parity but it only reports and does not correct, any inconsistencies that it finds.

Synchronization and Redundancy Check apply to RAID 1, 5, and 10 logical drives. You can set up a Synchronization or Redundancy Check to begin immediately (on demand) or schedule them for a time when there is less demand on the RAID system.

On Demand

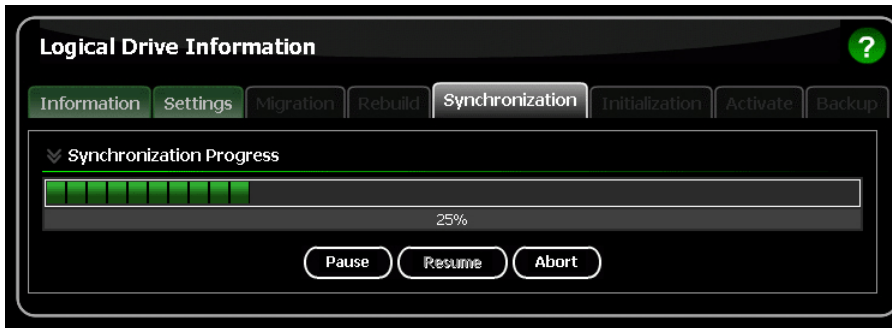
To Synchronize or Redundancy Check a logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to synchronize.
3. Click the **Synchronization** tab in Management View.
4. In the Policy dropdown menu, choose:
 - **Fix** – If you want Synchronization
 - **Redundancy Check** – If you do *not* want to correct inconsistencies
5. Click the **Start Now** button.



You can monitor Synchronization or Redundancy Check progress on the Synchronization tab.

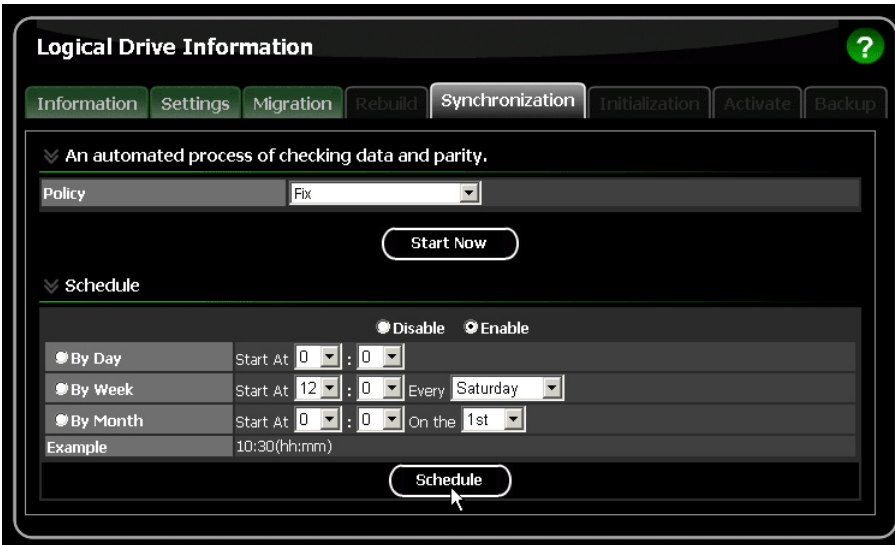
Click the respective buttons to pause, resume, or abort the Synchronization or Redundancy Check.



Scheduled

To schedule a Synchronization or Redundancy Check:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to synchronize.
3. Click the **Synchronization** tab in Management View.
4. In the Policy dropdown menu, choose:
 - **Fix** – If you want Synchronization
 - **Redundancy Check** – If you do *not* want to correct inconsistencies
5. Click the **Enable** option.
6. Click the **by Day, by Week** or **by Month** option.
7. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.
Start time is based on a 24-hour clock.
8. Click the **Schedule** button.



Canceling a Schedule

If you want to cancel the scheduled Synchronization or Redundancy Check, do the following:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** whose schedule you want to cancel.
3. Click the **Synchronization** tab in Management View.

4. Click the **Disable** option.

Initializing a Logical Drive

When logical drive is first created, you can select one of three choices for initialization:

- **Fast Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.
- **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. RAID 1, 5, and 10 only.
- **None** – No initialization. This choice is not recommended.

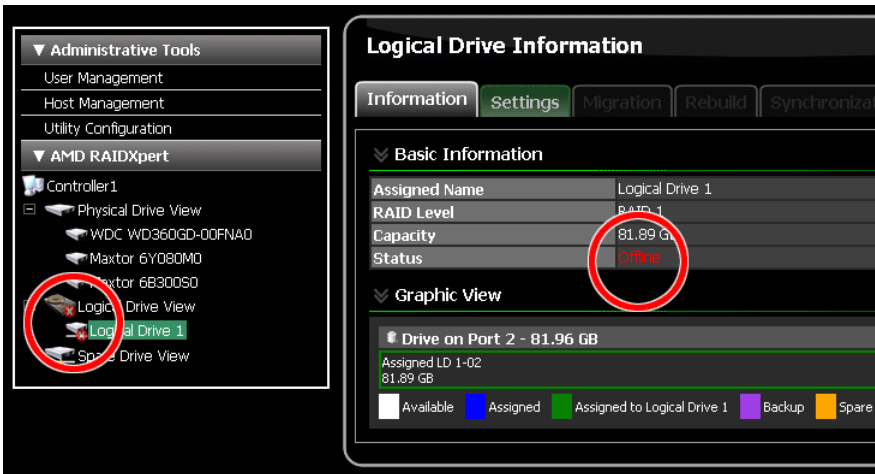
When you select full initialization, the process takes some time, depending on the size of the physical drives selected for the logical drive. The Initialization tab enables you to pause the initialization process so that more of the controller's resources are available for other operations. When the other operations are done, you can resume the initialization of your new logical drive.

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** whose initialization you want to view, pause, resume, or abort.
3. Click the **Initialization** tab in Management View.
4. Optional. Click the **Pause**, **Resume**, or **Abort** button.
5. Optional, Abort only. In the Confirmation box, click the **OK** button.

Logical Drive Activation

The Activation feature enables you to hot-plug a RAID 1 logical drive.

When you disconnect both physical drives from a RAID 1 logical drive, the logical drive goes *Offline*. If you then reconnect both physical drives, the array returns to *Functional* status. But if you only reconnect one of the physical drives, the logical drive remains *Offline*.



Activation changes the logical drive status from *Offline* to *Critical*. You can then access the data on the logical drive and rebuild the logical drive using a spare or unassigned physical drive.

To activate an offline RAID 1 logical drive:

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to activate.
3. Click the **Activation** tab in Management View.
4. Click the **Activate** button.



In a few moments, the logical drive status goes from *Offline* to *Critical*. Critical status allows you to access your data and rebuild the logical drive. See “Rebuilding a Logical Drive” on page 77.

The screenshot shows the RAIDXpert interface. On the left is a navigation pane with 'Administrative Tools' and 'AMD RAIDXpert' sections. Under 'AMD RAIDXpert', 'Logical Drive 1' is selected and circled in red. The main panel is titled 'Logical Drive Information' and has tabs for 'Information', 'Settings', 'Migration', 'Rebuild', and 'Synchroniz'. The 'Basic Information' section contains a table with the following data:

Assigned Name	Logical Drive 1
RAID Level	RAID 1
Capacity	81.89 GB
Status	Critical
Background Activity	Idle

The 'Status' field is circled in red. Below this is a 'Graphic View' section for 'Drive on Port 2 - 81.96 GB', showing 'Assigned LD 1-02' and '81.89 GB'. A legend at the bottom indicates drive states: Available (white), Assigned (blue), Assigned to Logical Drive 1 (green), Backup (purple), and Spare (yellow).

Managing a Critical or Offline Logical Drive

A fault-tolerant logical drive—RAID 1, 5, or 10—goes *Critical* when a physical drive is removed or fails. Due to the fault tolerance of the logical drive, the data is still available and online. However, once the logical drive goes critical, it has lost its fault tolerance and performance may be adversely affected.

If the fault was caused by a failed physical drive that was removed, the drive must be replaced by another drive, either identical or larger, in order for the RAID system to rebuild and restore optimal configuration.

A non-fault tolerant logical drive—RAID 0 or JBOD—goes *Offline* when a physical drive is removed or fails. A RAID Ready logical drive, which has only one physical drive, disappears from the interface if the physical drive is removed or fails. Since these logical drives are not fault tolerant, the data stored in the logical drive is no longer accessible.

If one physical drive fails, all of the data on the logical drive is lost. You must replace the failed drive. Then, if the logical drive had more than one physical drive, delete the logical drive, and re-create it. Restore the data from a backup source.



If you created a backup drive for your RAID Ready logical drive, the use the backup drive to restore the data. See “Backing up a RAID Ready Logical Drive” on page 71.

When a Physical Drive Fails

The following will occur when a physical drive fails or goes offline:

- The Controller's audible alarm, if enabled, will sound
- RAIDExpert reports the condition in Tree View, with popup messages and, if Event Notification is set up, email messages
- If you have a RAID 1 or 5 logical drive with a hot spare drive properly configured, the logical drive will automatically rebuild itself using the spare drive

The screenshot displays the RAIDExpert interface. On the left, the 'AMD RAIDExpert' tree view shows 'Logical Drive 1' with an amber warning icon. The main panel, titled 'Logical Drive Information', has tabs for 'Information', 'Settings', 'Migration', 'Rebuild', and 'Synchroniz'. Under the 'Basic Information' section, the 'Status' is 'Critical' and 'Background Activity' is 'Idle'. A red circle highlights the 'Critical' status. The 'Graphic View' section shows a bar chart for 'Drive on Port 2 - 81.96 GB' with a legend for Available, Assigned, Assigned to Logical Drive 1, Backup, and Spare.

In the example above, amber ! icons appear over the Logical Drive View  and Logical Drive  icons. Click **Logical Drive View** or the **Logical Drive** to verify the condition of the logical drive.

In this example, the Status is *Critical* and Background activity is *Idle*. This condition indicates that there is no automatic rebuild, so you must take action to restore the logical drive:

1. Identify the failed physical drive.
2. Replace the failed physical drive.
3. Rebuild your logical drive.

Identify the Failed Physical Drive

1. Click **Physical Drive View** in Tree View.
2. Look for a missing physical drive.

A physical drive that used to be present but is suddenly absent is the failed physical drive.

The screenshot shows the 'Physical Drive View' interface. At the top, there are tabs for 'Information', 'Merge', and 'Media Patrol Schedule'. Below this is a 'Physical Drive Overview' table:

Drive Model	Port Number	Capacity	Status
Maxtor 6Y080MD	1	81.96 GB	Functional
Maxtor 6Y080MD	2	81.96 GB	Functional
Maxtor 6B300SD	4	90.00 GB	Functional

Below the table is a 'Graphic View' section showing three drive slots:

- Drive on Port 1 - 81.96 GB (Assigned LD 1-01, 81.89 GB)
- Drive on Port 2 - 81.96 GB (Assigned LD 1-02, 81.89 GB)
- Drive on Port 4 - 90.00 GB (Free, 89.93 GB)

At the bottom, there is a legend for drive states: Available (white), Assigned (blue), Backup (purple), Spare (yellow), and Invalid (grey). A question mark icon in the top right corner of the interface points to the missing Port 3 entry in the table and the empty slot in the graphic view.

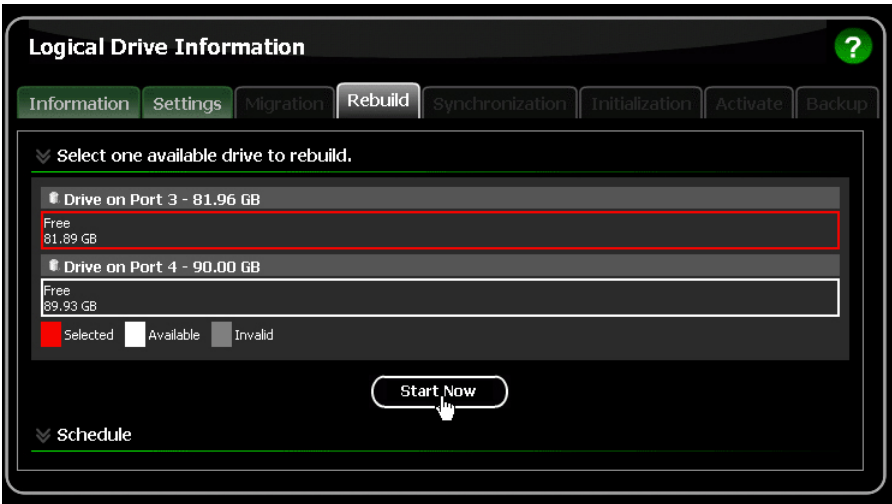
In this example, there were four physical drives connected to the AMD motherboard. Notice that there is no drive on Port 3. That is the failed drive.

Replace the Failed Physical Drive

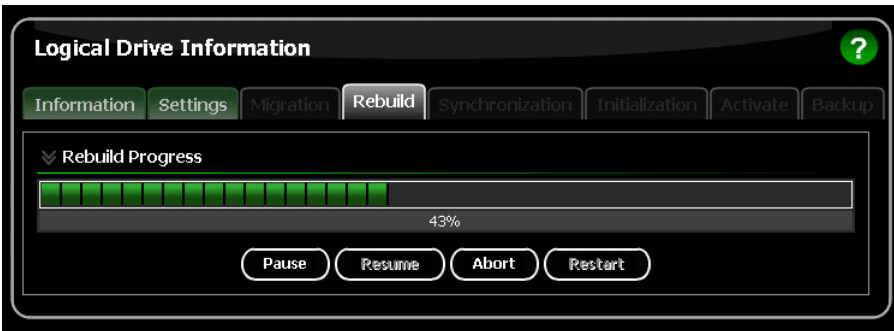
Replace the failed physical drive with a new one of equal or greater capacity. Then rebuild the logical drive. See your system *User Manual* for more information about replacing a physical drive.

Rebuild Your Logical Drive

1. Click **Logical Drive View** in Tree View.
2. Click the **Logical Drive** you want to rebuild.
3. Click the **Rebuild** tab in Management View.
4. Click the physical drive in the interface representing the drive that you just replaced.
5. Click the **Start Now** button.



You can monitor Rebuild progress on the Rebuild tab. Click the respective buttons to pause and resume the Rebuild. When the Rebuild is finished, your logical drive will be Functional again.



Spare Drives

- Viewing Spare Drives (below)
- Creating a Spare Drive (page 90)
- Deleting a Spare Drive (page 91)

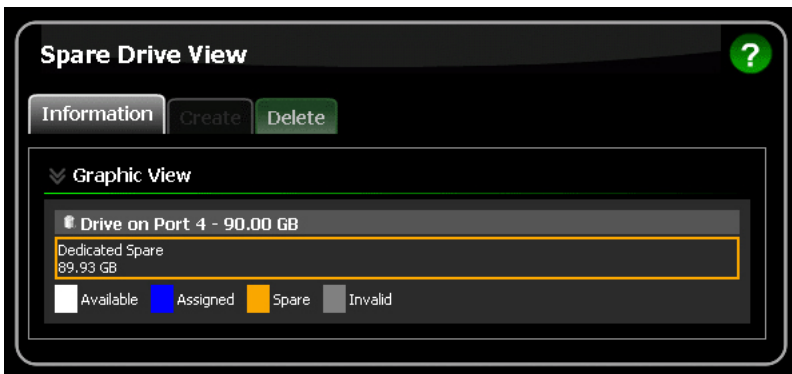
A spare drive is a physical drive designated to function as a hot spare drive. A hot spare drive automatically replaces a failed physical drive.

You can also set the Controller to rebuild a logical drive from a Free physical drive. See “Making Controller Settings” on page 51 and “Rebuilding a Logical Drive” on page 77 for more information on how spare drives work.

Viewing Spare Drives

Spare Drive View provides a list of all spare drives currently on the Host PC.

To see a list of your spare drives, click **Spare Drive View** in Tree View.



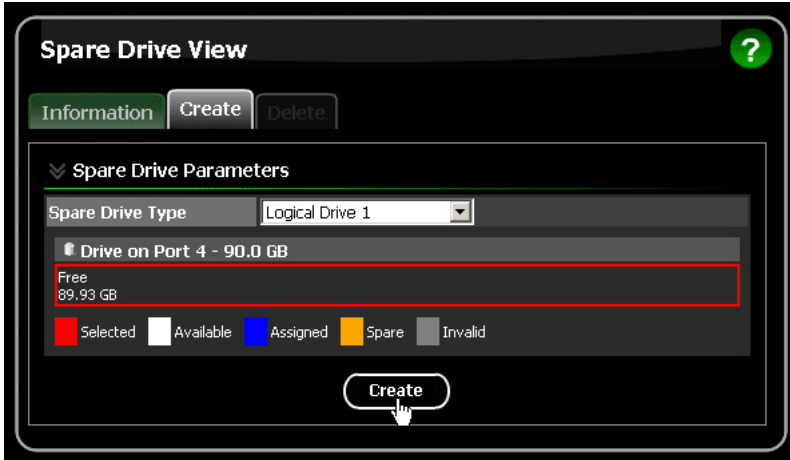
From this screen, you can view the current Spare Drives and click the tabs to access the Create and Delete features.

Creating a Spare Drive

To create a spare drive:

1. Click **Spare Drive View** in Tree View.
2. Click the **Create** tab in Management View.
3. From the Spare Drive dropdown menu, choose one of the following options.
 - **Global Spare** – This spare drive can be used by any logical drive.
 - **Logical Drive** – The name of the logical drive to which this spare drive will be assigned or dedicated.

- Click a physical drive to select it.
Available drives have a white frame. Selected drives have a red frame. Drives with a blue frame are assigned to a logical drive.
You cannot select for a spare drive a split physical drive, where part of the physical drive currently supports a logical drive.
- Click the **Create** button.

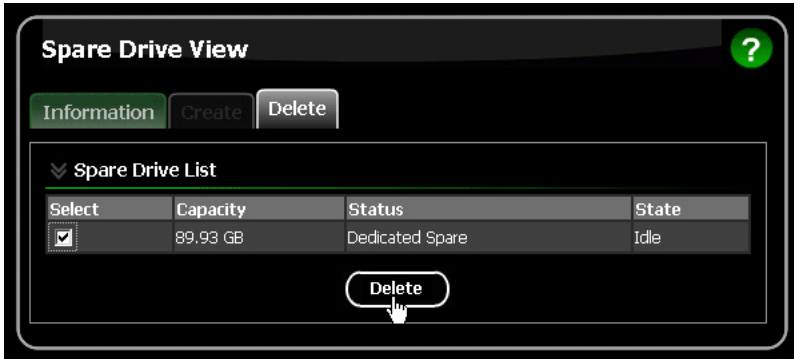


The new Spare Drive appears under Physical Drive View and Spare Drive View.

Deleting a Spare Drive

To delete a spare drive:

- Click **Spare Drive View** in Tree View.
- Click the **Delete** tab in Management View.
- Check the box to the left of the spare drive you want to delete.
- Click the **Delete** button.



5. In the Confirmation box, click the **OK** button.
The selected spare drive is deleted.

Chapter 6: Technology Background

- Introduction to RAID (below)
 - Choosing a RAID Level (page 100)
 - RAID Ready – Single Drive (page 98)
 - Choosing Stripe Block Size (page 103)
 - Gigabyte Boundary (page 103)
 - Initialization (page 103)
 - Hot Spare Drive(s) (page 104)
 - Partition and Format the Logical Drive (page 104)
 - Migration (page 104)
 - Media Patrol (page 107)
-

Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple physical drives to be combined together in a logical drive. The operating system sees the logical drive as a single storage device, and treats it as such. The RAID software and/or controller handle all of the individual drives on its own. The benefits of a RAID can include:

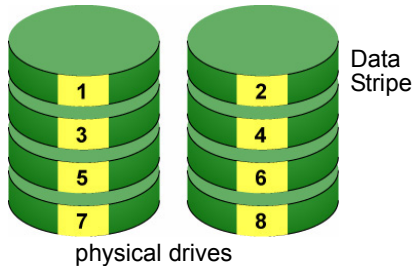
- Higher data transfer rates for increased server performance
- Increased overall storage capacity for a single drive designation (such as, C, D, E, etc.)
- Data redundancy/fault tolerance for ensuring continuous system operation in the event of a hard drive failure

Different types of logical drives use different organizational models and have varying benefits. Also see Choosing RAID Level on page 100. The following outline breaks down the properties for each type of RAID logical drive:

RAID 0 – Stripe

When a logical drive is striped, the read and write blocks of data are interleaved between the sectors of multiple physical drives. Performance is increased, since the workload is balanced between drives or “members” that form the logical drive. Identical drives are recommended for performance as well as data storage efficiency.

Figure 1. RAID 0 interleaves data across two physical drives



The logical drive's data capacity is equal to the number of drive members multiplied by the smallest logical drive member's capacity. For example, one 100 GB and three 120 GB drives will form a 400 GB (4 x 100GB) logical drive instead of 460 GB.

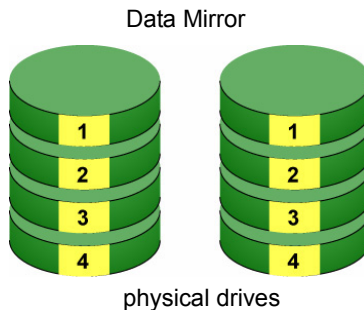
RAID 0 logical drives on the AMD SB6xx/SB7xx Controller consist of two or more physical drives.

RAID 1 – Mirror

When a logical drive is mirrored, identical data is written to a pair of physical drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first.

With RAID 1, if one physical drive fails or has errors, the other mirrored physical drive continues to provide fault tolerance. Moreover, if a spare drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive.

Figure 2. RAID 1 mirrors identical data across to two physical drives



Due to the data redundancy of mirroring, the capacity of the logical drive equals the size of the smallest physical drive. For example, two 100 GB physical drives which have a combined capacity of 200 GB instead would have 100 GB of usable storage when set up in a mirrored logical drive. Similar to RAID 0 striping, if physical drives of different capacities are used, there will also be unused capacity on the larger drive.

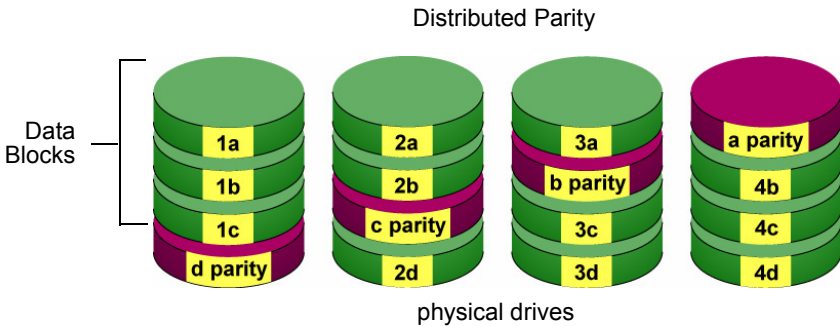
RAID 1 logical drives on the AMD SB6xx/SB7xx Controller consist of two physical drives. You can create multiple RAID 1 logical drives on the same Controller.

RAID 5 – Block Striping with Distributed Parity

RAID 5 stripes data and distributes parity information across the physical drives along with the data blocks. This organization increases performance by accessing multiple physical drives simultaneously for each operation, as well as fault tolerance by providing parity data. In the event of a physical drive failure, data can be re-calculated by the RAID system based on the remaining data and the parity information.

RAID 5 makes efficient use of hard drives and is the most versatile RAID Level. It works well for file, database, application and web servers.

Figure 3. RAID 5 Stripes all drives with data and parity information



The capacity of a RAID 5 logical drive is the smallest physical drive size multiplied by the number of physical drives, less one. Hence, a RAID 5 logical drive with four 100 GB physical drives will have a capacity of 300 GB. A logical drive with two 120 GB physical drives and one 100 GB physical drive will have a capacity of 200 GB.

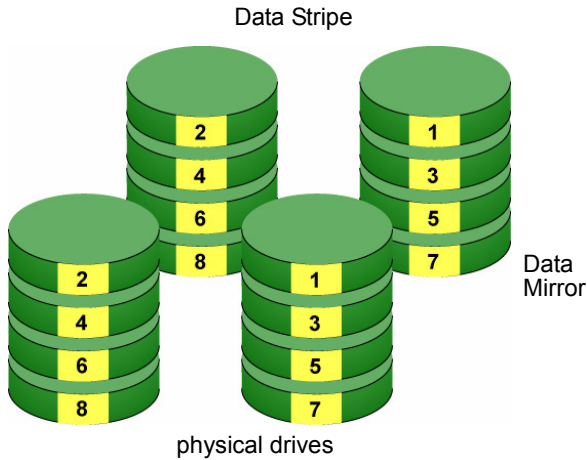
Only the AMD SB650 and SB750 Controllers support RAID 5.

RAID 5 logical drives on the AMD SB650/SB750 Controller consist of 3 or 4 physical drives.

RAID 10 – Mirror/Stripe

RAID 10 combines the properties of RAID 0 and RAID 1 logical drives. RAID 10 increases performance by reading and writing data in parallel while protecting data with duplication. Four physical drives are required for RAID 10. One drive pair is mirrored together then striped over a second drive pair.

Figure 4. RAID 10 mirrors data over one drive pair and stripes it over the other drive pair



The data capacity is similar to a RAID 1 logical drive, with half of the total storage capacity dedicated for redundancy. An added plus for using RAID 10 is that, in many situations, RAID 10 offers double fault tolerance. Double fault tolerance may allow your logical drive to continue to operate depending on which two physical drives fail.

RAID 10 logical drives on the AMD SB6xx/SB7xx Controller consist of four physical drives.

RAID Ready – Single Drive

RAID Ready arranges individual physical drives the same as if they were attached to the PC's motherboard controller. The advantage is that the AMD SB6xx/SB7xx Controller can accommodate up to four physical drives, more than most PC motherboards.

Figure 5. RAID Ready deals with individual physical drives



As a single physical drive, RAID Ready does not offer the performance or security advantages of other RAID logical drives. However, you can create a backup drive by:

- Inserting an unformatted physical drive
- Designating an installed physical drive

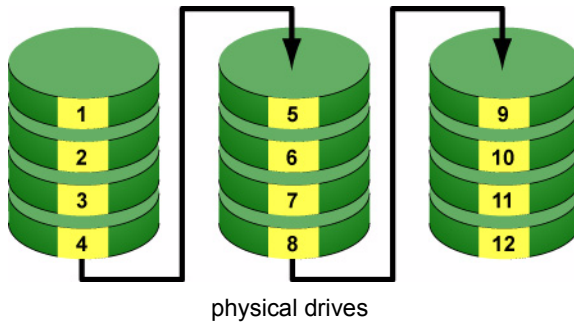
See “Backing up a RAID Ready Logical Drive” on page 71.

In RAIDXpert, you create, manage, and delete a RAID Ready the same as a logical drive. A RAID Ready logical drive has only one physical drive. You can designate from one to four of your physical drives as RAID Ready.

JBOD – Concatenation

JBOD stands for “Just a Bunch of Disks” and normally refers to one or more physical drives working independently. The AMD SB6xx and SB7xx Controllers offer the added feature of concatenation, where the capacity of multiple drives is added together. When one drive is full, the data is saved to the next drive automatically. By way of example, using this feature, three 500 GB physical drives concatenated together have the equivalent capacity of single 1.5 TB drive.

Figure 6. JBOD concatenates the capacity of multiple drives



As independent physical drives, JBOD does not offer the performance or security advantages of RAID logical drives. However, in RAIDXpert, you create, manage, and delete a JBOD the same as a logical drive.

You can designate from two to four physical drives with online capacity expansion.

If you attach a single physical drive that was previously partitioned, RAIDXpert will recognize it as a JBOD. However, RAIDXpert does not allow you to create a single-drive JBOD.

Choosing a RAID Level

There are several issues to consider when choosing the RAID Level for your logical drive. The following discussion summarizes some advantages, disadvantages, and applications for each choice.

RAID 0

Advantages	Disadvantages
Data is broken down into blocks and each block is written to a separate physical drive I/O performance is greatly improved by spreading the I/O load across multiple channels and drives No parity calculation overhead is involved	Not a true RAID because it is not fault-tolerant The failure of just one drive will result in all data in a logical drive being lost Should not be used in mission critical environments

Recommended Applications for RAID 0:

- Image Editing
- Pre-Press Applications
- Any application requiring high bandwidth

RAID 1

Advantages	Disadvantages
Simplest RAID storage subsystem design Can increase read performance by processing data requests in parallel since the same data resides on two different drives	Very high disk overhead - uses only 50% of total capacity

Recommended Applications for RAID 1:

- Accounting
- Payroll
- Financial
- Any application requiring very high availability

RAID 5

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate	Disk failure has a medium impact on throughput

Recommended Applications for RAID 5:

- File and Application servers
- WWW, E-mail, and News servers
- Intranet servers
- Most versatile RAID level

RAID 10

Advantages	Disadvantages
Implemented as a mirrored logical drive whose segments are striped logical drives High I/O rates are achieved thanks to multiple stripe segments	Very high disk overhead - uses only 50% of total capacity

Recommended Applications for RAID 10:

- Imaging applications
- Database servers
- General fileserver

RAID Ready

Advantages	Disadvantages
Easy management of multiple independent physical drives	No increase in performance, capacity or fault tolerance.

Recommended Applications for RAID Ready:

- Non-critical file storage
- Swappable data storage

When combined with a backup drive, RAID Ready is comparable to RAID 1. See "Backing up a RAID Ready Logical Drive" on page 71.

JBOD

Advantages	Disadvantages
Enables you to manage multiple physical drives from a single controller	The failure of just one drive will result in all data in all drives being lost Not suitable for mission critical environments

Recommended Applications for JBOD:

- Any application requiring large data capacity but where read/write speed or fault-tolerance are not important
- Applications were low-cost operation critical

Choosing Stripe Block Size

For RAID 0, 5 and 10 logical drives, the stripe block size value can be set to 64 KB or 128 KB. 64 KB is the default. Your choice will directly affect performance. There are two issues to consider when selecting the stripe block size.

- Choose a stripe block size equal to or smaller than the smallest cache buffer found on any physical drive in your logical drive. A larger value slows the logical drive down because physical drives with smaller cache buffers need more time for multiple accesses to fill their buffers.
- If your data retrieval consists of fixed-size data blocks, such as some database and video applications, choose that data block size as your stripe block size.

Generally speaking, email, POS, and webservers prefer smaller stripe block sizes. Video and database applications prefer larger stripe block sizes.

Gigabyte Boundary

The Gigabyte Boundary feature is designed for logical drives in which a drive has failed and the user cannot replace the drive with the same capacity or larger. Instead, the Gigabyte Boundary feature permits the installation of a replacement drive that is slightly smaller (within 1 gigabyte) than the remaining working drive (for example, an 80.5-GB drive would be rounded down to 80 GB). This can be helpful in the event that a drive fails and an exact replacement model is no longer available.

Gigabyte Boundary is available for all RAID levels. If you split the capacity of your physical drives between two logical drives, you can choose Gigabyte Boundary for the second logical drive. See “Creating a Logical Drive” on page 65.

Initialization

Initialization is the process of setting all of the data bits on all of the physical drives to zero. This has the effect of erasing any existing data from the drives. This action is especially helpful in creating accurate parity in logical drives with more than four drives.

Fast Initialization is available for all RAID levels and JBOD. Full Initialization is available for RAID 1, 5, and 10. See “Creating a Logical Drive” on page 65.

The Full Initialization process begins immediately after the logical drive is created and can take some time to finish, depending on the size of the physical drives in your logical drive. Your logical drive is available while initialization is in progress.

If any of the physical drives in your logical drive were previously used in other logical drives, or you are not sure, choose *Full Initialization*

Hot Spare Drive(s)

A hot spare is a physical drive that is connected to the logical drive system but is not assigned as a member of the logical drive. In the event of the failure of a drive within a functioning fault tolerant logical drive, the hot spare is activated as a member of the logical drive to replace a drive that has failed.

The AMD SB6xx/SB7xx Controller will replace a failing physical drive in a logical drive with an unassigned drive, if one is available. The unassigned drive is not part of any logical drive. Such a drive is called a *hot spare* drive. There are two types:

- **Global** – The spare drive is available to any logical drive on the Host PC.
- **Dedicated** – The spare drive can only be used by the specified logical drive.

The hot spare policy function lets you select whether a logical drive will access any unassigned physical drive or a designated drive in the event of physical drive failure. See “Rebuilding a Logical Drive” on page 77 and “Creating a Spare Drive” on page 90 for information.

The spare drive effectively takes the place of the failed drive and the RAID system immediately begins to rebuild data onto the spare drive. When the rebuild is complete, the logical drive returns to fault tolerant status.

Maintaining a hot spare drive is a good precaution to protect your logical drive integrity in the event of physical drive failure.

Partition and Format the Logical Drive

Like any other type of fixed disk media in your system, a RAID logical drive must also be partitioned and formatted before use. Use the same method of partitioning and formatting on a logical drive as you would any other fixed disk.

See “Appendix B: Partition and Format” on page 111.

Migration

Migration is the process of:

- Changing the RAID level of an existing logical drive
- Adding more physical drives to a logical drive while keeping the same RAID level

See “Migrating a Logical Drive” on page 73 for instructions how to migrate a logical drive.

You can change the RAID level of a logical drive with certain combinations of RAID level and number of physical drives, as described in the table below.

From	To	Result
RAID Ready: 1 drive	RAID 0: 2, 3, or 4 drives	Increased capacity
	RAID 1: 2 drives	Adds redundancy
	RAID 5: 3 or 4 drives*	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	
RAID 0: 2 drives	RAID 5: 3 or 4 drives*	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	
RAID 0: 3 drives	RAID 5: 4 drives*	Increased performance and capacity, adds redundancy
RAID 1: 2 drives	RAID 5: 3 or 4 drives*	Increased performance and capacity
	RAID 10: 4 drives	
RAID 10: 4 drives	RAID 5: 4 drives*	Increased capacity
* Only the AMD SB650 and SB750 Controllers support RAID 5.		

You can add physical drives while keeping the same RAID level, as described in the table below.

From	To	Result
RAID 0: 2 drives	RAID 0: 3 or 4 drives	Increased capacity
RAID 0: 3 drives	RAID 0: 4 drives	Increased capacity
RAID 5: 3 drives	RAID 5: 4 drives	Increased capacity
JBOD: 2 drives	JBOD: 3 or 4 drives	Increased capacity
JBOD: 3 drives	JBOD: 4 drives	Increased capacity

See the important information on the following page.



Important

- The Target logical drive may require more physical drives than the Source logical drive
 - If the Target logical drive requires an EVEN number of physical drives but the Source logical drive has an ODD number, ADD a physical drive as part of the migration process
 - You cannot reduce the number of physical drives in your logical drive
 - You cannot migrate a logical drive when it is Critical or performing activities such as Synchronizing or Rebuilding
 - You cannot migrate a JBOD to a RAID or a RAID to a JBOD
-

Ranges of Logical Drive Migration

There are limitations to how large you can expand a logical drive, depending on the size of your current logical drive.

The Windows 2000 and Windows XP (32-bit) operating systems support a 10-byte LBA format. This means that a logical drive can have up to 4 billion address blocks or sectors. This limitation does not apply to Windows XP (64-bit), 2003 Server, Vista, and Linux OSES with the 2.6 kernel.

For Windows 2000 and Windows XP (32-bit), multiply the number of blocks by the sector size to find the capacity of a logical drive:

$4,000,000,000 \text{ blocks} \times 512 \text{ bytes per sector} = 2,048,000,000,000 \text{ bytes}$
of data for a 2TB drive.

Note that you cannot change the size of the sectors nor can you increase the number of address blocks above 4 billion.

As a result, there are range limits imposed upon logical drive migration as shown in the table above. For example:

- You can migrate a 2.5 TB logical drive up to 4 TB
- You can only migrate a 1.9 TB logical drive up to 2 TB

See the chart below.

Current LD Size	Maximum LD Migration Size	Sector Size
8 to 16 TB	16 TB	4096 bytes
4 to 8 TB	8 TB	2048 bytes
2 to 4 TB	4 TB	1024 bytes
0 to 2 TB	2 TB	512 bytes

You can direct RAIDXpert to migrate a logical drive beyond the maximum size. However, when migration is finished, your logical drive will be the maximum size listed in the table.

If you require a logical drive larger than the maximum migration size:

1. Backup the data from the current logical drive.
2. Delete the current logical drive.
3. Create a new logical drive with the desired capacity.
4. Restore the data to the new logical drive.

Media Patrol

Media Patrol is a routine maintenance procedure that checks the magnetic media on each physical drive, sector by sector. Media Patrol checks physical drives assigned to logical drives, spare drives, and currently unassigned physical drives that were once part of a logical drive or a spare. Media Patrol does not check new physical drives that have never been configured.

Unlike Synchronization and Redundancy Check, Media Patrol is concerned with the condition of the media itself, not the data recorded on the media. If Media Patrol encounters a suspect sector, it will attempt to regenerate the data and write to the suspect sector.

- If the write operation is successful, Media Patrol continues checking other sectors.
- If the write operation fails, Media Patrol reports the error to your PC's system log and to the physical drive's Bad Sector Log.

The error report to the physical drive's Bad Sector Log triggers a BSL update message and an email message if you enabled that option.

To schedule or run Media Patrol, see "Scheduling Media Patrol – All Physical Drives" on page 57 or "Running Media Patrol – One Physical Drive" on page 60.

See also "Setting up Event Notification" on page 38 and "Viewing the Physical Drive Bad Sector Log" on page 62.

Appendix A: Frequently Asked Questions

I tried to log into RAIDXpert but my browser showed the message “cannot be displayed.” What is the problem?

The browser decided prematurely that RAIDXpert was not responding. Click the **Refresh** button. This action usually brings up the login screen.

I can access the Host PC over my company’s intranet. But I can’t access it from an outside Internet connection. How do I make the Internet connection work?

This condition is not related to the Host PC or RAIDXpert, but is due to your firewall and network connection protocol. Contact your MIS Administrator.

Why do I have to use a different IP address when I access the Host PC over the network?

Computers on a TCP/IP network are identified by their IP addresses. When you work on the Host PC, you use 127.0.0.1, which is the IP address for “home” or “this computer”. When you access the Host PC from a different computer, you must enter the Host PC’s IP address as the network knows it, such as 192.168.1.33.



How can I be sure everything is working OK by using RAIDXpert?

One way to do this is through Event Notification. RAIDXpert will report events to you in the form of email and popup messages. You might only select Warning and Error events, so that you only receive messages when something is wrong. See “Setting up Event Notification” on page 38.

Another method is to periodically log into RAIDXpert and check the Status of your logical drives.

What happens if a logical drive goes critical?

This condition is caused by a failed physical drive. Depending on your Event Notification settings, RAIDXpert will send you an email message and display a popup message indicating the critical condition.

An amber ! icon will appear over the Logical Drive View  and Logical Drive  icons. The Event Log will post a logical drive critical entry.

If a spare drive is available, the logical drive will begin to rebuild automatically. If there is no spare drive, you must identify the failed physical drive and replace it.

See “Managing a Critical or Offline Logical Drive” on page 86. Also refer to your system *User Manual* for more information.

Why do the Rebuild, Synchronize, and Migrate operations take so long compared to moving data?

When data is moved, the operation consists of reading, writing, and checking one or more files. Rebuild, Synchronize, and Migrate involve reading, writing, and checking all the logical block addresses or individual data blocks on each physical drive. Plus, your logical drive remains available while these operations take place. These added requirements increase complexity and take more time.

Can I run RAIDXpert without a network connection?

Yes. You can run RAIDXpert without a network connection but only from the Host PC. See page 25.

Why can't I create a RAID 5 logical drive?

Only the AMD SB650 and SB750 Controllers support RAID 5. If your controller does not support RAID 5, choose a RAID 1 or a RAID 10 logical drive instead.

How can I keep my backup drive up-to-date with my RAID Ready logical drive?

Each time you plug-in your backup drive, the Fast Copy program finds all of the changes on the RAID Ready drive and updates the backup up drive automatically.

Appendix B: Partition and Format

In order for your operating system to recognize and work with the physical drives attached to your AMD SB6xx/SB7xx Controller, the drives must be partitioned and formatted.

- If your drives were previously partitioned and formatted they are ready to use and you can skip this procedure
- If your drives have not been partitioned and formatted, you must do that job before you can use them

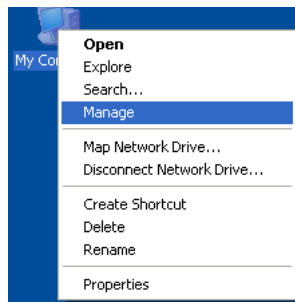
The actions of partitioning and formatting create a file structure on the physical drives with which your operating system can work. In the example below, we show how this is done in Windows.

A similar procedure is required for Linux PC's. However, partitioning and formatting in Linux is not automated, therefore please refer to your system documentation for the exact procedure.

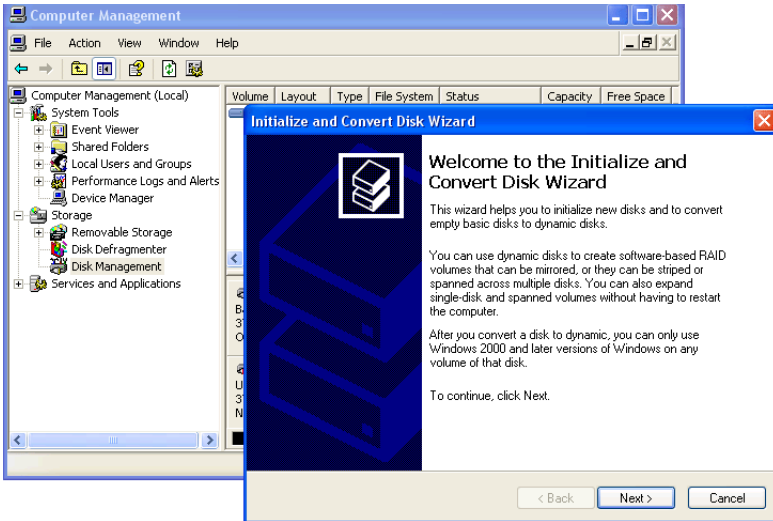


Note

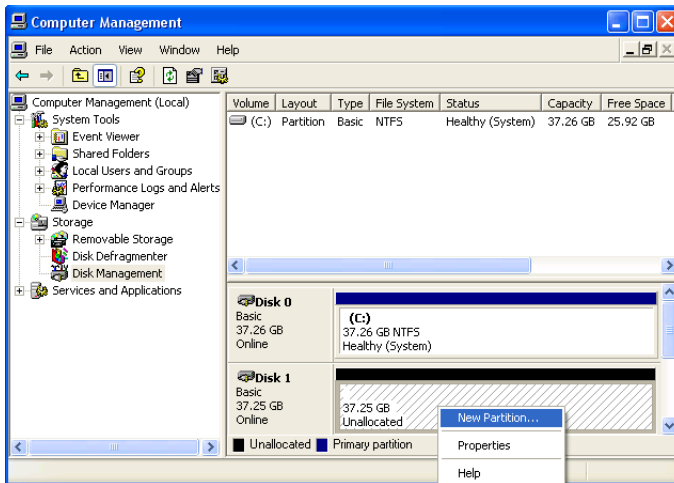
If you plan to boot your computer from this logical drive, the partitioning and formatting are done when you install the OS onto the logical drive. The instructions here are for data logical drives only.



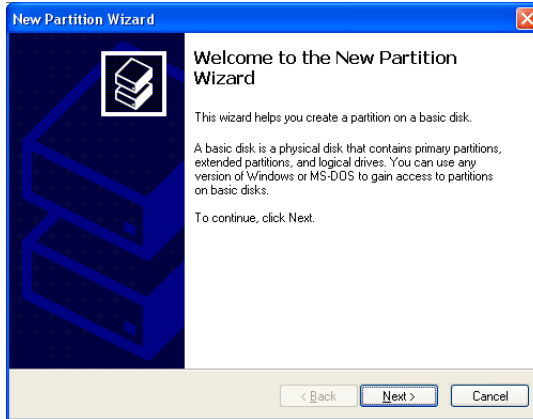
1. From the desktop, right-click the My Computer icon and choose *Manage* from the popup menu. The Computer Management window opens.
2. From the left menu, click **Disk Management**. The Disk Management window opens with your new logical drive identified as Disk 1. The Initialize Wizard appears automatically.



3. Click the **Next** button to start the Wizard.
4. In the following windows, choose Disk 1 to Initialize. Do not choose any disks to Convert. Click the **Finish** button to Initialize the logical drive.



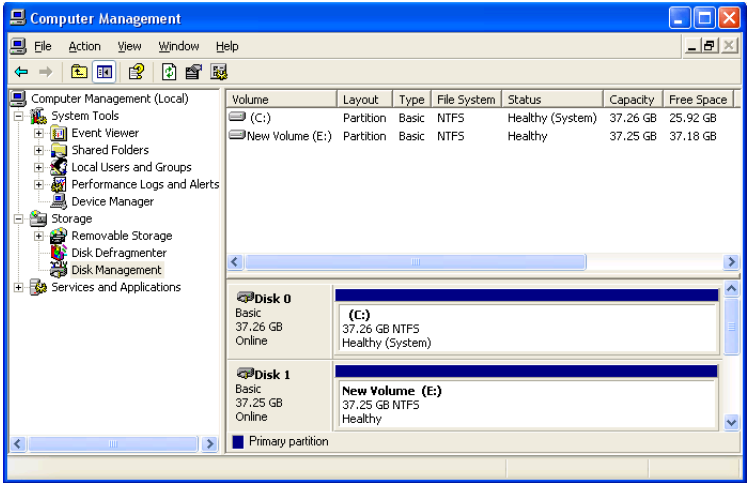
5. Right-click the Unallocated portion of Disk 1 and choose *New Partition...* from the popup menu. The New Partition Wizard appears.



6. Click the **Next** button to start the wizard.
7. In the following windows, do the following actions.
 - Choose *Primary Partition*
 - Specify the maximum available partition size in MB
 - Assign the available drive letter of your choice
 - Choose *Format this partition* with the following settings:
 - File system: NTFS
 - Allocation unit size: Default
 - Volume label: Enter your choice of name
 - Do not check "Perform a quick format" or "Enable file and folder compression"

Click **Next** to move to the next window.

8. Review your selections and click **Finish**. The New Partition Wizard will disappear while partitioning and formatting begin.
This process will take some time. The Disk Management window displays the progress.



When formatting is complete, your logical drive will appear as a hard disk drive in the Disk Management window (above) and the My Computer window (below).

