Sonnet Web Management Tool User's Guide

for Fusion Fibre Channel Storage Systems

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1.0 Getting Started

Discovering the IP address

The Fusion RX1600Fibre is initially configured with DHCP enabled. It is best if you have access to a DHCP server.

1. Work from the computer attached to the RX1600Fibre's Ethernet port. From the CD supplied with your RX1600Fibre, run the **QuickNav Utility QuickNAV-windows.exe** for Windows or **QuickNAV-Mac** for Mac OS X.

2. Locate the RX1600Fibre with the serial number recorded earlier.

3. Highlight the serial number.

4. Click **Next**. If a DHCP server is available on your network, an address is assigned automatically by the server. Note the assigned address. If you do not have a DHCP server, get an IP address and subnet mask from your network administrator, type it into the area provided, and click **Next**. See **Figure 1** on page 2.

5. Click **Launch Browser**. Your browser points to the Sonnet Web Management Tool splash screen.

Optional - Setting up Internet Explorer

If you use Internet Explorer as a browser, you must configure it to work with the Sonnet Web Management Tool. If not, continue on to Beginning Initial Configuration.

1. Open your browser.

2. Select **Internet Options**.

3. In the **Internet Options** screen, select the **Security** tab.

4. Click the **Trusted Sites** icon.

5. Click the **Sites** button.

6. In the text box **Add this Web site to the zone**, add the IP address of the controller. You may use wild cards.

7. Click **Add**.

8. Uncheck the **Require server verification** checkbox.

9. Click **OK**.

10. At the bottom of the **Internet Options** box, click **OK** and close the box.

Beginning Initial Configuration

1. The Sonnet Web Management Tool interface splash screen appears. Click **Enter Here**. See **Figure 2** on page 2.

2. Type in the user name and password.

Note: *The default values are user name **root** and password* **Password**. *The user name is case insensitive and the password is case sensitive. **It is best practice to change the default user name and password**. Refer to Changing the Current User Name, Password on page 17.*

3. If the Fusion RX1600 was shipped from Sonnet with hard drives preinstalled, the **Health and Status Monitor** page appears. Otherwise, the **Initial Setup** page appears. Continue to Ensure Drive Integrity on page 3.

1.0 Getting Started

Using the QuickNav application to find the IP address for the RX1600Fibre

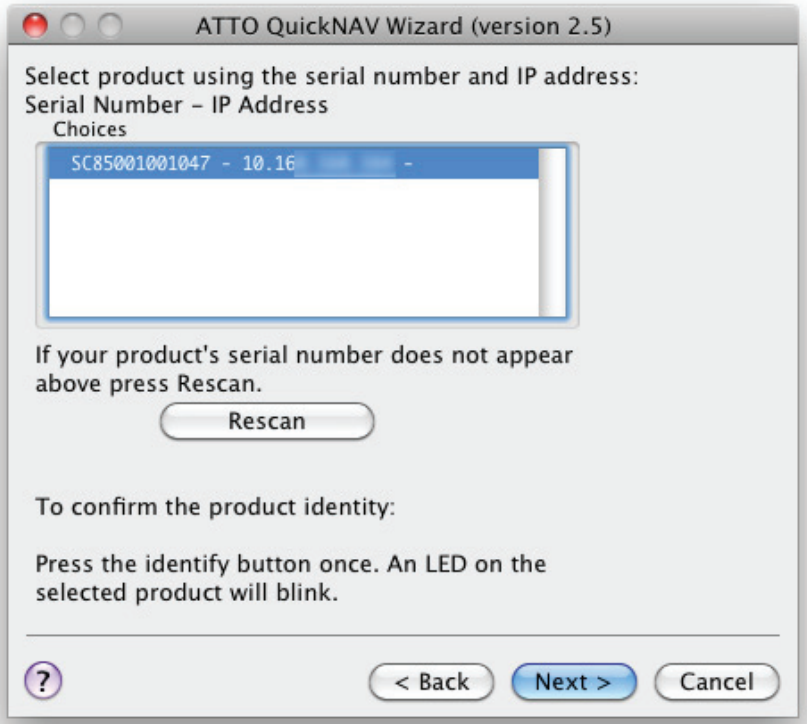

Figure 1

The Sonnet ExpressNav Storage Manager splash screen with login

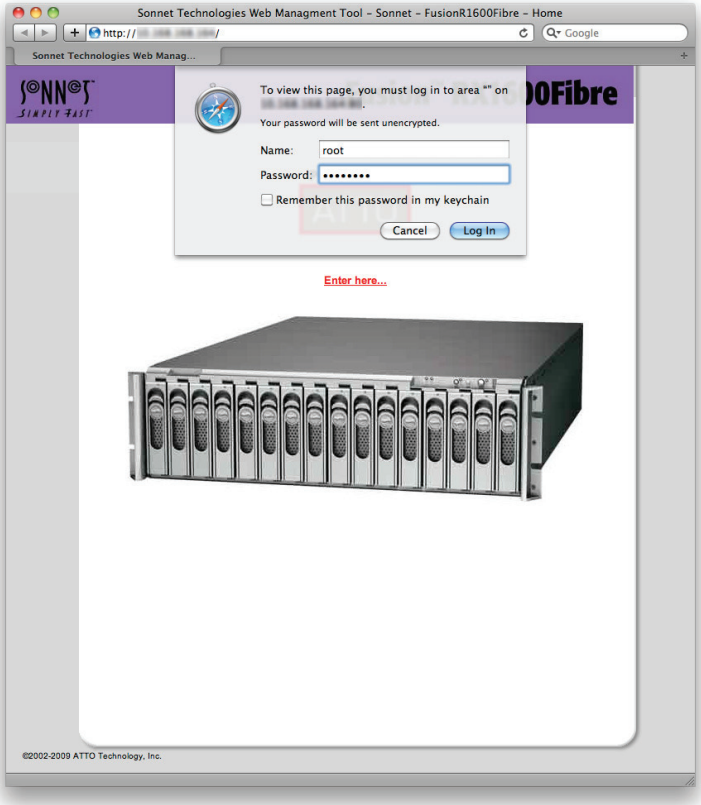

Figure 2

1.1 Ensure Drive Integrity

Support Note: In Fusion RX1600 systems shipped from Sonnet with hard drives installed, the drives are formatted Mac OS Extended (Journaled), configured as a single RAID 6 RAID group, and ready for use with Mac OS X-based systems. If you need to change the configuration, delete the existing RAID group (see Deleting RAID Groups on page 31), and use the Sonnet Web Management Tool and the operating system software tools to reformat and reconfigure the drives. See Appendix D for Quick Drive Reformat instructions for Mac OS and Windows users.

The ATTO FastStream "Initialize and Verify Drives" feature discovers and remaps bad sectors on drives, providing reliable media for your RAID groups.

WARNING: Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

Before creating any RAID group you should initialize and verify the drives you want in the RAID group to ensure drive integrity. When selected, the FastStream writes a pattern to the entire drive, verifying the drive's readiness and reliability.

During initialization and verification, the FastStream collects performance measurements. Performance data is available once initialization begins. You may view it from the **Drive Performance and Health** page accessible from the **Diagnostics** menu. This performance data is lost when the controller is powered off.

If you do not want to initialize or verify drives now, continue on to Configure Storage Into RAID Groups on page 7.

Check drive integrity after you have created RAID groups on drives which you wish to add to your FastStream configuration. This can be accomplished by using the Initialize and Verify Drives procedure or a read-only scan of drives.

The **Read-Only Drive Test** performs a nondestructive scan over the entire surface of each drive to identify bad areas and determine their read performance. It may be run while data is passing through the FastStream. Running this test may negatively impact performance.

Once the Read-Only Drive Test has completed, system operation returns to normal.

Before Creating RAID Groups

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then click OK.

2. Select **Initialize and Verify Drives**.

3. Click **Next**.

4. Select **Initialize and Verify Drives**. All eligible drives are highlighted in green; the system only initializes highlighted drives. See **Figure 3** on page 5.

5. Click **Commit**.

6. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.

WARNING: Do not restart the RX1600Fibre or disconnect or power cycle drives during drive initialization and verification, or you must start the verification process from the beginning.

7. When the process is complete, the **Drive Performance and Health** page appears. The drive(s) selected are now initialized and verified.

All data on the highlighted drives has been erased and you may continue with Configure Storage Into RAID Groups on page 7.

1.1 Ensure Drive Integrity

After Creating RAID Groups

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**

2. Click the **Diagnostics** button on the left side of the window.

3. Choose **Initialize and Verify Drives** to test newly added drives that are not part of a RAID group. Choose **Read-Only Drive Test** to nondestructively test any drives.

4. Click **Next**.

5. If no drives appear, click **System Scan** in the **Drives** box. If drives are available, click the drives you wish to verify, initialize or test; the drives are highlighted. See **Figure 4** on page 5.

6. Click **Commit**.

7. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.

WARNING: Do not restart the RX1600Fibre or disconnect or power cycle drives during Drive Initialization and Verification or you must start the verification process from the beginning.

8. The **Drive Performance and Health** page appears showing what tests are running and their results. You may select other tests to run or continue on to other tasks. See **Figure 5** on page 6.

1.1 Ensure Drive Integrity

Drives selected for initialization and verification when the Initialize and Verify Drives page is displayed

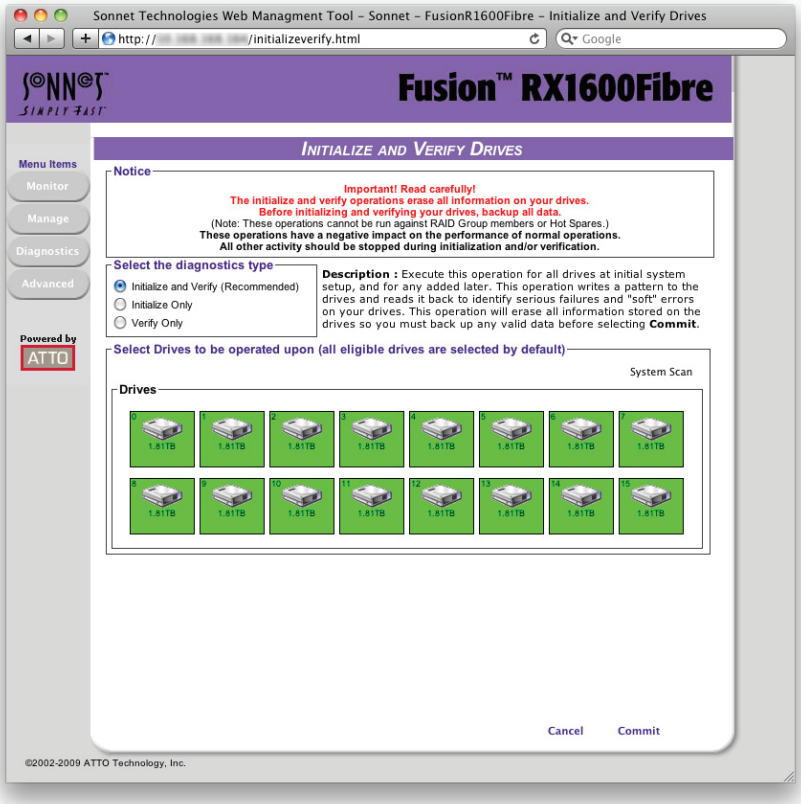

Figure 3

Read-Only Drive Test page before drives selected

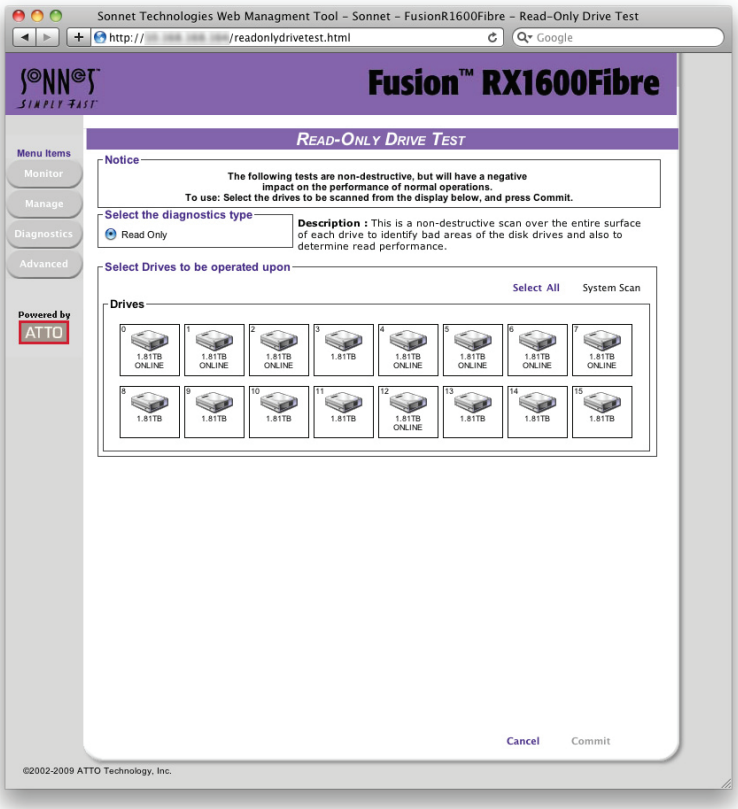

Figure 4

1.1 Ensure Drive Integrity

Drive Performance and Health Page Drive Info tab

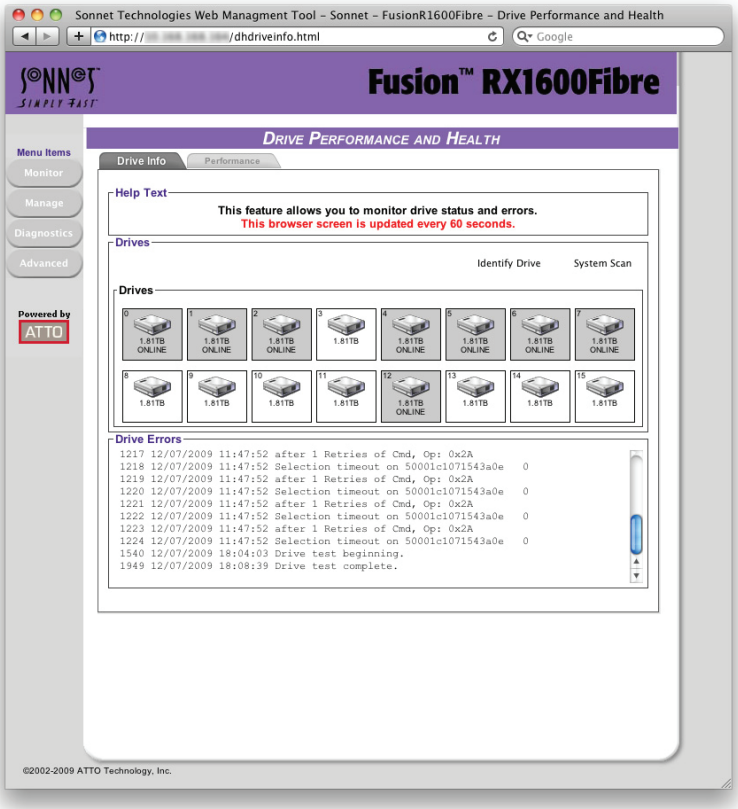

Figure 5

1.2 Configure Storage into RAID Groups

Support Note: In Fusion RX1600 systems shipped from Sonnet with hard drives installed, the drives are formatted Mac OS Extended (Journaled), configured as a single RAID 5 RAID group, and ready for use with Mac OS X-based systems. If you need to change the configuration, delete the existing RAID group (see Deleting RAID Groups on page 31), and use the Sonnet Web Management Tool and the operating system software tools to reformat and reconfigure the drives. See Appendix D for Quick Drive Reformat instructions for Mac OS and Windows users.

The Fusion RX1600Fibre enables configuration of storage into JBOD, RAID Level 0, 1, 1+0, 4, 5, 6, or DVRAID RAID groups with the ability to create multiple partitions.

RAID is a storage configuration which uses multiple drives to increase capacity, performance, and/or reliability. The RX1600Fibre can automatically set up an application-ready RAID configuration. Also, you may custom design a RAID configuration, or combine a custom and an automatic configuration. The RX1600Fibre uses all available drives when you select **Quick Digital Video**, **General Digital Video**, **Audio**, **General IT**, or **Database**. Available drives include those which are on-line and not currently configured for RAID or Hot Spares.

If you wish to have more than one type of RAID group in your system, you have several options:

- Set up a customized RAID group (refer to Creating a Custom Setup on page 9), then return to the main menu and select a particular application to use the remainder of your attached storage.
- Attach only the storage you want using an automated setup (refer to Selecting a Quick Storage Configuration on page 8), then attach more storage and use either the custom or specific user processes outlined in this chapter.
- Set up storage now using any of the processes in this chapter, then modify or add to storage using the procedures listed in Modify Storage on page 31.

WARNING: Before creating any RAID group you should initialize and verify the drives you want in the RAID group. Refer to Ensure Drive Integrity on page 3.

Configuration of drives in protected RAID groups improves data accessibility and reliability during normal operations. However, you still need a good backup strategy for long-term protection of data.

When you have created RAID groups, you may use, monitor and modify the storage as needed. Refer to Monitor Storage, Configurations on page 19, Modify System Values on page 17 Manage Sonnet Devices, Configurations on page 43, and Modify Storage on page 31.

Features You May Choose

Depending on the application you choose, the number of drives you choose and several other factors, you may have other choices to customize your RX1600Fibre to your particular needs. Some features are customized by you only if you use the custom setup. Refer to Creating a Custom Setup on page 9.

Auto-Rebuild

When Auto-Rebuild is enabled and an existing RAID group member becomes faulted, the RX1600Fibre's controller initiates a rebuild using an available unallocated drive. If no drives are available, the rebuild is initiated only after you replace the faulted drive and initiate a system scan to discover the drive. Hot Spares will be used first, regardless of the Auto-Rebuild setting. Various outcomes are available when Auto-Rebuild is enabled.

- If an existing RAID group member becomes faulted or unavailable, such as when a drive is pulled out from an array, the controller initiates a rebuild using an available unallocated drive.
- If the RX1600Fibre boots up with drives missing or faulted, it tries to switch them out automatically.
- If no unallocated drive is available, you must replace the faulted drive and a rebuild will begin. Hot Spares are not required, allowing the maximum number of drives for data storage.

However, if you require maximum fault tolerance, it is best practice to have a Hot Spare available to supply the unallocated drive for immediate use. Refer to Adding or Removing Hot Spares on page 34.

Fault Tolerance

Choose either **Standard Fault Tolerance** (no Hot Spare drives) or **Maximum Fault Tolerance** (which adds Hot Spares to the system) when creating parity RAID Groups. Refer to Adding or Removing Hot Spares on page 34 for details.

Initialization

If you have not already initialized your drives as outlined in Ensure Drive Integrity on page 3, you may choose to use the **Advanced Initialization** for new drives to erase and verify drive media and correct some soft drive errors. The RAID Group is unavailable until the operation completes.

Choose **Express Initialization** to perform a quick background initialization if you have already completed a full initialize and verify operation. You may also choose Express Initialization to change the configuration of drives in RX1600 storage systems shipped from Sonnet with pre-installed drives. The RAID Group being initialized is available for use during express initialization.

1.2 Configure Storage into RAID Groups

Selecting a Quick Storage Configuration

After initializing drives or setting up new storage, select an application from the **Initial Setup** page or via the **Manage** page. The Fusion RX1600Fibre finds all available drives and creates the appropriate setup using those drives.

The most flexible choice is to use **Custom Setup**, but you must understand your needs and your system well to use this option. Refer to Appendix B - RAID Group Designs for more information about RAID configurations.

Preliminary Steps

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**

2. If you have not performed the steps detailed in Ensure Drive Integrity on page 3 or created other RAID groups, the **Initial Setup** menu appears. If you have initialized your storage or created other RAID configurations,
   a. From the selections at the left, select **Manage**.
   b. Click **RAID Groups** inside the Select User Process box.
   c. Click **Create RAID Group**.
   d. Click **Next**.

3. Select one of the listed quick storage configurations, click **Next**, and then continue using the directions in each specific section. See **Figure 6** on page 12.

   - **Quick Digital Video**: provides parity RAID protection (DVRAID) and optimized performance for digital video (sequential access) configurations.

Note: *DVRAID is only available using the Quick Digital Video setup wizard.*

   - **General Digital Video**: provides parity RAID protection for digital applications for configurations using three or more drives.

   - **Audio**: audio track streaming technology provides parity RAID protection while managing latency to enable high-speed availability to support up to 192 tracks of 16-bit audio or 96 tracks of 24-bit audio in a single editing session. You must have only 4, 6, 8 or 12 drives available in the system.

   - **General IT**: provides parity RAID protection optimized for random access applications using three or more drives.

   - **Database**: provides parity RAID protection for database applications (small transfer, random access) for configurations using more than three drives.

Quick Digital Video

1. After choosing **Quick Digital Video**, the **Setup Wizard** page appears. See **Figure 7** on page 12.

2. Select your operating system, click **Yes,** and then the system restarts.

3. If all your drives do not appear in the **Find Drives** box, click **System Scan**; this setup requires exactly 6, 12 or 24 drives to appear as available on the screen after the scan. Physically add or disconnect drives as needed and rescan.

4. Click **Next**.

5. Choose an **Initialization** method (refer to Initialization on page 7).

6. Choose an **Auto-Rebuild** option (refer to Auto-Rebuild on page 7).

7. Select a **Fault Tolerance** (refer to Fault Tolerance on page 7).

8. Click **Commit**.

9. A warning box appears. If you want to continue click **Yes**. The configuration completes and the **Health and Status Monitor** page appears. If you wish to start over, click **No**. The **Setup Wizard** page appears.

10. *Every RAID group must finish initializing, and be formatted by your computer's operating system software before it becomes available for use*; Mac users will use Disk Utility, Windows users will use Disk Management. For more information on drive formatting, see Mac OS Drive Formatting or Windows Drive Formatting on page 11.

Audio

1. After choosing **Audio**, the **Audio Setup Wizard** page appears. See **Figure 8** on page 13. Choose to use the same or a different node name for each host Fibre Channel port.

   - If you know you want all drives to be available or unavailable to all Fibre Channel ports, select **Yes** or **No**. If you do not know, select **Not Sure**.

   - If you select **Not Sure**, you will be asked a series of questions to determine the correct configuration for your needs and setup.

   - Several definitions are listed in a grey box at the bottom of the **Audio Setup Wizard** screen which may help you determine answers to the setup questions.

2. Click **Next**.

Note: *Depending on your choice and your current system, the controller may need to restart.*

1.2 Configure Storage into RAID Groups

Audio (continued)

3. If all your drives do not appear in the **Find Drives** box, click **System Scan**. This setup requires 4, 6, 8 or 12 drives. Add or disconnect drives as needed to ensure you have 4, 6, 8 or 12 drives appearing on the screen after the scan.

4. Click **Next**.

5. Choose an **Initialization** method (refer to Initialization on page 7).

6. Choose an **Auto-Rebuild** option (refer to Auto-Rebuild on page 7).

7. Select the number of users for this system.

8. Depending on the number of users and the number of drives you have in your system, you may be asked choose a **Fault Tolerance** (refer to Fault Tolerance on page 7).

9. Click **Commit**.

10. A warning box appears. If you want to continue click **Yes**. The configuration completes and the **Health and Status Monitor** page appears. If you wish to start over, click **No**. The **Setup Wizard** page appears.

11. *Every RAID group must finish initializing, and be formatted by your computer's operating system software before it becomes available for use*; Mac users will use Disk Utility, Windows users will use Disk Management. For more information on drive formatting, see Mac OS Drive Formatting or Windows Drive Formatting on page 11.

General Digital Video, General IT or Database

1. After choosing **General Digital Video, General IT or Database**, the **Setup Wizard** page appears. See **Figure 9** on page 13. Choose an **Initialization** method (refer to Initialization on page 7).

2. Choose an **Auto-Rebuild** option (refer to Auto-Rebuild on page 7).

3. If all your drives do not appear in the **Find Drives** box, click **System Scan**.

4. Click **Commit**.

5. A warning box appears. If you want to continue click **Yes**. The configuration completes and the **Health and Status Monitor** page appears. If you wish to start over, click **No**. The **Setup Wizard** page appears.

6. *Every RAID group must finish initializing, and be formatted by your computer's operating system software before it becomes available for use*; Mac users will use Disk Utility, Windows users will use Disk Management. For more information on drive formatting, see Mac OS Drive Formatting or Windows Drive Formatting on page 11.

Creating a Custom Setup

If the quick storage configurations do not suit your needs, you may use **Custom Setup** to configure the FastStream.

1. After clicking **Custom Setup**, the **RAID Setup Wizard** page appears. See **Figure 10** on page 14. Click **Next**.

2. Decide if all drives are to be available to all ports; the choice you make establishes the access for all RAID groups attached to this FastStream.

   - If you select **Yes**, the same node name is assigned to all ports.

   - If you select **No**, different node names are assigned to each FC port.

3. Select a RAID level (refer to Appendix B - RAID Group Designs). See **Figure 11** on page 14.

4. Type a unique name for your RAID group in the box provided on the page under the **Step 3** heading.

5. Click **Next**.

6. If your Fusion RX1600Fibre or attached Fusion RX1600 Expansion has drives associated with it, choose a method for selecting drives from the following:

   a. Use all drives in an enclosure for your RAID Group.

Support Note: Due to the configuration its components, a Fusion RX1600Fibre enclosure's drives will be displayed as being spread across two enclosures (eight in each). When you intend to use all 16 drives in a RAID group, be sure to select drives from both "enclosures", otherwise only eight drives will be selected.

   b. Use all drives in an enclosure for your RAID Group plus one for a Dedicated Hot Spare.

   c. Select your own drives.

7. If necessary, click **System Scan** to discover the drives available for RAID configuration.

8. When the scanned drives box is populated, click the boxes representing the drives for the RAID group named in Step 4. See **Figure 12** on page 15.

1.2 Configure Storage into RAID Groups

Creating a Custom Setup (continued)

9. Click **Next**.

10. Choose the number of partitions for the RAID group. See **Figure 13** on page 15.

    - A RAID group may have several Terabytes of total data capacity because of the size of the included drives. Partitions allow you to break up large RAID groups into smaller, more manageable groups.

    - Most host systems can address only 2TB per LUN. Partitioning increases storage efficiency by providing more LUNs without using lower capacity RAID groups.

    - Partitioning allows the creation of multiple logical volumes.

Note: *If you don't want to use partitions, click the **All Unallocated** button.*

    a. Click **Create One Partition**, or enter the desired partition size for the first partition from the available RAID group capacity.

    b. Click **Create**.

    c. If you have created more than one partition, repeat entering the partition size and clicking **Create** as often as you need to partition the remaining capacity. Whenever you have completed designating partitions, click **All Unallocated** to put all the remaining capacity into one partition.

11. Click **Next**. The storage capacity is allocated.

12. RAID partitions are mapped onto the Fibre Channel network as FC LUNs (SCSI-FCP LUNs). Select the method you wish to use to map the partitions. See **Figure 14** on page 16.

    - If you select **Auto**, all mapping for all RAID groups attached to the RX1600Fibre is changed, destroying any previous mapping.

    - If you do not wish to change the mapping of your other RAID groups, select **Manual**. Manual mapping allows you to make LUN assignments for each RAID partition in the selected RAID group.

    a. From the RAID Configuration page presented, under **Select the mapping method**, click the **Manual** radio button.

    b. Click any partition to map that partition to a Port and LUN.

13. Choose an **Initialization** method (refer to Initialization on page 7).

14. Choose the **Interleave** by clicking the drop-down box and selecting a value. See **Figure 15** on page 16.

Support Note: The interleave value chosen when creating a RAID group makes a significant impact on performance. Fusion RAID storage systems shipped from Sonnet with pre-installed hard disk drives are now optimized for use with video editing (larger files) applications, typically with an interleave value of 512KB or 1MB selected. If you intend to use your storage system primarily for storage of smaller files (database, office documents, etc.), choose a smaller interleave value of 64KB or 128KB.

15. Select a **Sector Size**. The RAID group sector size must be evenly divisible by the sector size of any member disk.

    - 512 bytes is the default size for most operating systems.

    - For **Windows XP (32-bit support)** select 4KB sectors to enable large volume support (greater than 2TB, up to 16TB).

16. Select a **SpeedRead** feature. SpeedRead looks ahead during reads and stores the data in cache memory. The optimum setting depends on your actual I/O and storage. You may adjust this setting later.

    - Enabling **SpeedRead** may boost performance when you are running video playback and other applications which access data sequentially.

    - Disabling **SpeedRead** is a better choice for audio applications.

    - **SpeedRead Auto** is usually the best choice for database applications.

17. Choose a **Prefetch** option. The number of extra stripes that are read when the SpeedRead setting is set to enabled or auto.

18. Choose an **Auto-Rebuild** feature if it is available for your RAID configuration (refer to Auto-Rebuild on page 7).

19. Choose a **Rebuild Priority** level. Rebuild Priority allows you to determine whether rebuild or I/O transactions take precedence during rebuild operations. If you choose low priority, for example, rebuilds take longer but the rebuild has minimal impact on performance.

Support Note: Rebuild priority affects the performance of your Fusion storage system when a drive is replaced and a degraded RAID group is rebuilt. Selecting Low rebuild priority enables you to continue working at the best performance level possible, but the RAID group will take much longer to rebuild.

1.2 Configure Storage into RAID Groups

20. Click **Next**.

21. A chart showing the setup you have selected appears. If everything is the way you want it, click **Commit** to save your configuration.

22. For RAID types that rebuild, a warning box tells you that all data on the attached disks is to be destroyed during the rebuild process. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.

23. The RX1600Fibre configures the storage (the process will likely take several hours). Upon clicking **Yes**, the **Health and Status Monitor** page appears.

24. *Every RAID group must finish initializing, and be formatted by your computer's operating system software before it becomes available for use*; Mac users will use Disk Utility, Windows users will use Disk Management. For more information on drive formatting, see Mac OS Drive Formatting or Windows Drive Formatting below.

Mac OS Drive Formatting

1. Depending on how you configure your setup, a *Disk Insertion* window stating that there is an unreadable volume will appear at some point during the RAID group creation process; click Initialize, and then Disk Utility will open.

2. In the *Disk Utility* window, each RAID group you created using the ATTO Configuration Tool will appear as a single volume. Select the volume, and then click the Erase tab at the top of the window.

Support Note for Power Mac G5 Users: When creating RAID groups 16TB or larger, uncheck the Install Mac OS 9 Drivers checkbox; OS 9 drivers do not support volumes greater than 16TB.

3. Click the Erase button; a window will appear asking you to approve your choice; click Erase.

4. Repeat steps 2 and 3 for each remaining unformatted RAID group, and then close Disk Utility.

5. Depending on how you configured the RAID groups, the volumes may already be mounted and present on the desktop. If you created a DVRAID, RAID 4, RAID 5, or RAID 6 RAID group, configuration will take much longer. You may check on the process by clicking the Monitor button to the left of the window.

6. Once all the RAID groups have been formatted and finish building, they are ready to use.

Windows Drive Formatting

1. Select Start > Control Panel > Administrative Tools from the Windows Start menu. In the *Administrative Tools* window, double-click Computer Management.

2. In the *Computer Management* window, click Storage on the left, and then double-click Disk Management.

3. When the *Initialize Disk* window appears, click OK.

4. In the *Disk Management* window, each RAID group you created will appear (listed as "unallocated") as a single volume. Right-click where the word "unallocated" appears, and then select New Simple Volume.

5. When the Welcome to the *New Simple Volume Wizard* window appears, click next to start the process.

6. Follow the remaining steps to complete the process.

Note: *If you do not select the quick format option, formatting will take much longer to complete.*

7. Repeat steps 4–6 for each remaining "unallocated" disk.

8. Depending on how you configured the RAID groups, the volumes may already be mounted and present on the desktop. If you created a DVRAID, RAID 4, RAID 5, or RAID 6 RAID group, configuration will take much longer. You may check on the process by clicking the Monitor button to the left of the window.

9. Once all the RAID groups have been formatted and finish building, they are ready to use.

1.2 Configure Storage into RAID Groups

Initial Setup page before a storage configuration has been selected

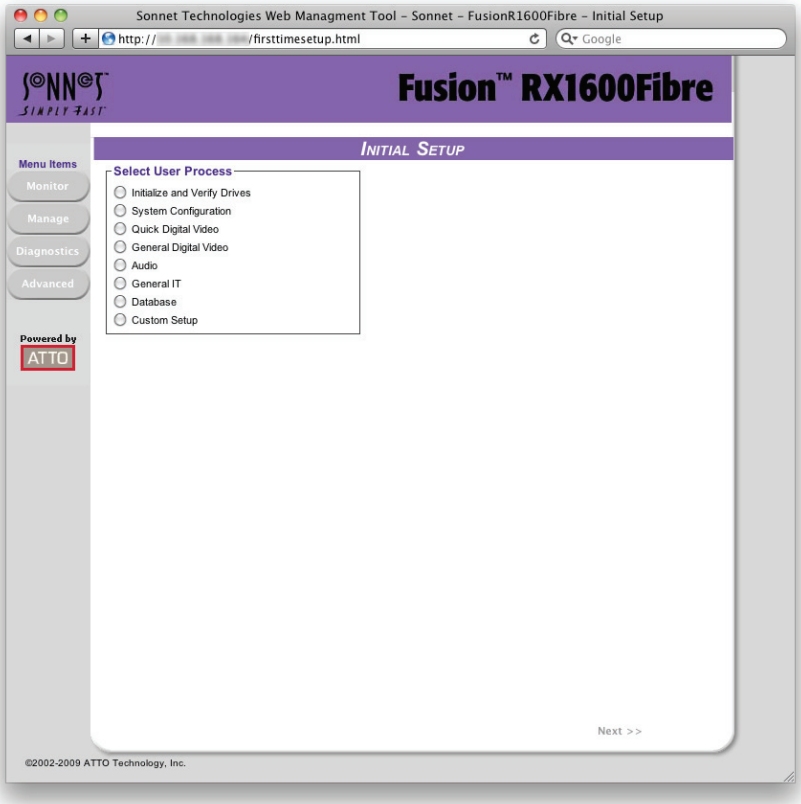

Figure 6

Quick Digital Video Setup Wizard start page

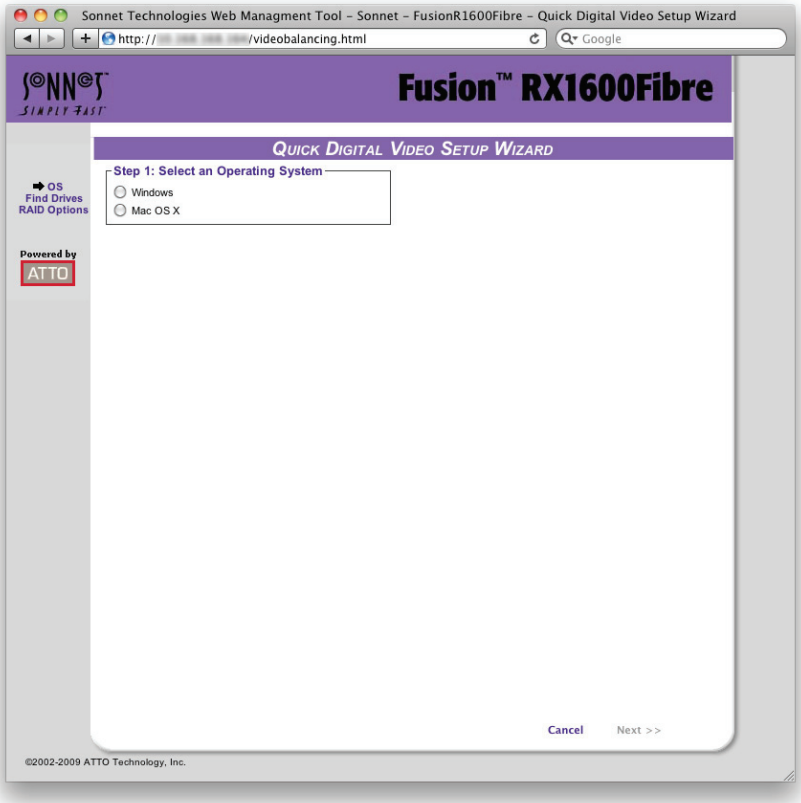

Figure 7

1.2 Configure Storage into RAID Groups

Audio Setup Wizard start page

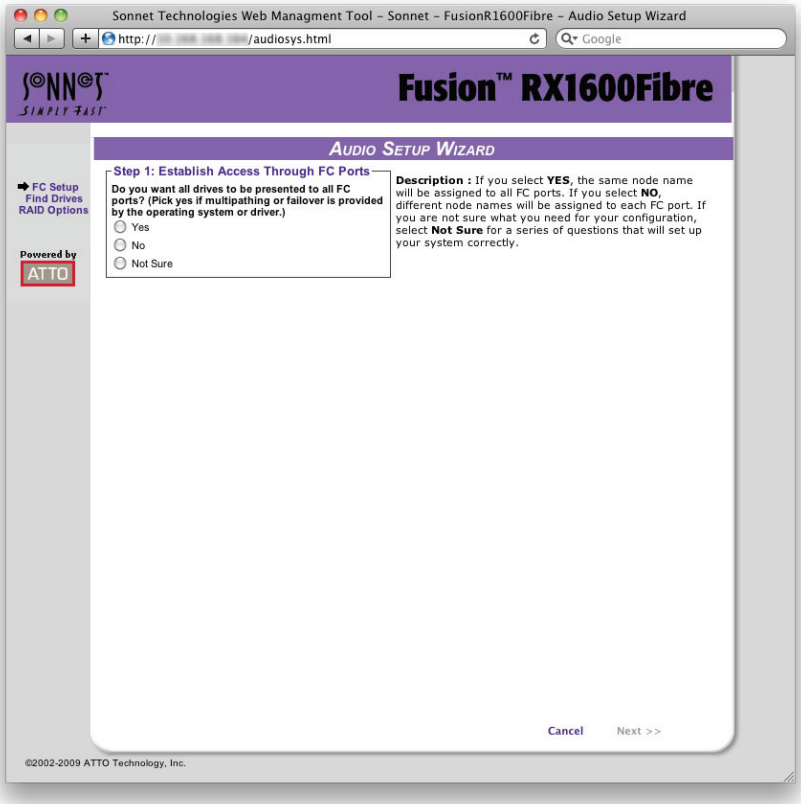

Figure 8

General Digital Video Setup Wizard start page with all drives selected for RAID group

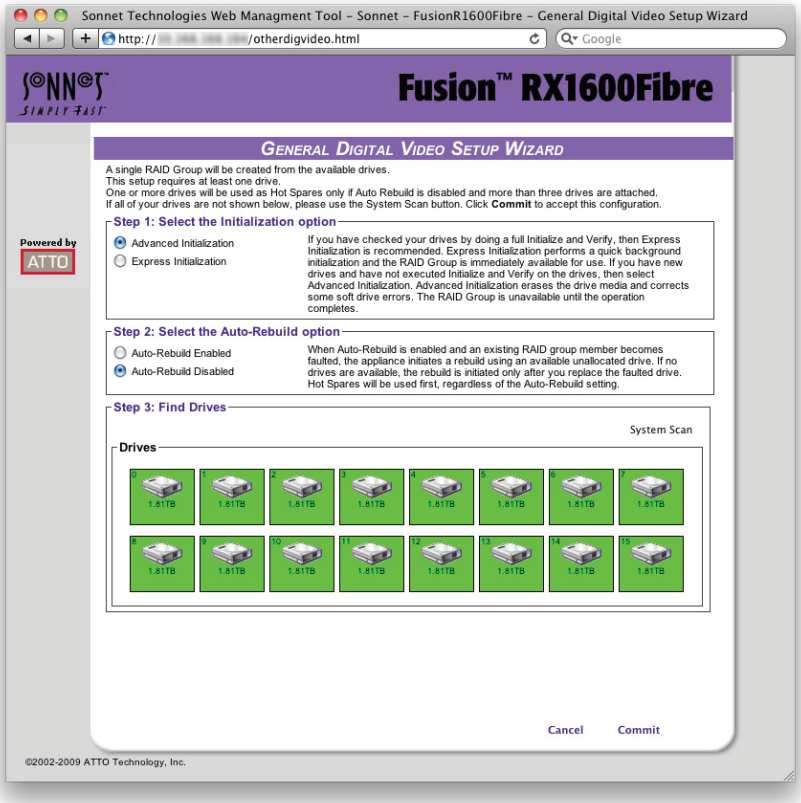

Figure 9

1.2 Configure Storage into RAID Groups

Custom RAID Setup Wizard start page

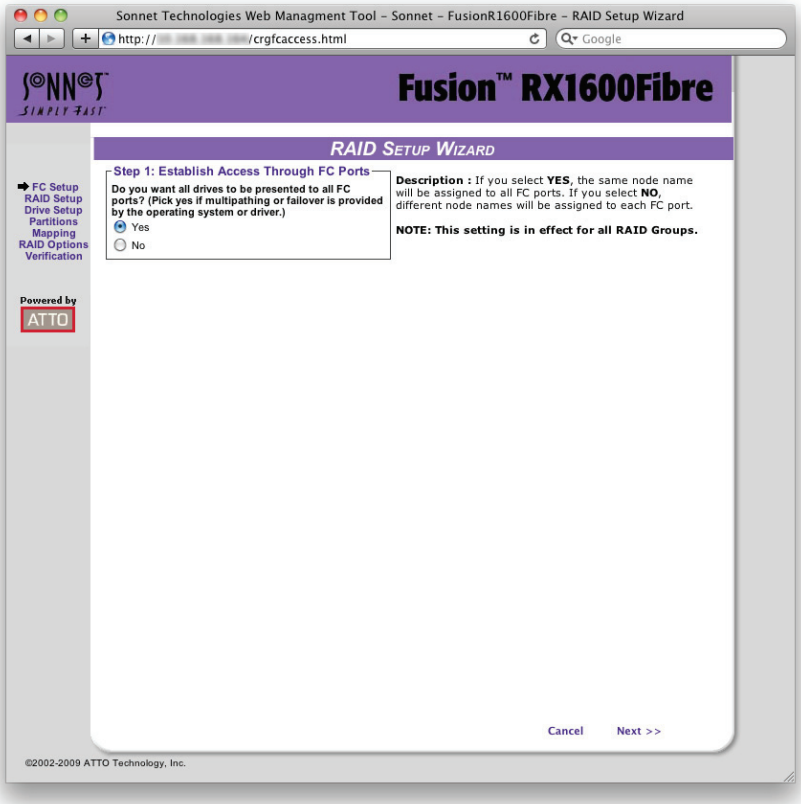

Figure 10

Selecting the RAID level and RAID group name using the custom RAID Setup Wizard

Figure 11

1.2 Configure Storage into RAID Groups

Creating a RAID group comprised of eight drives using the custom RAID Setup Wizard

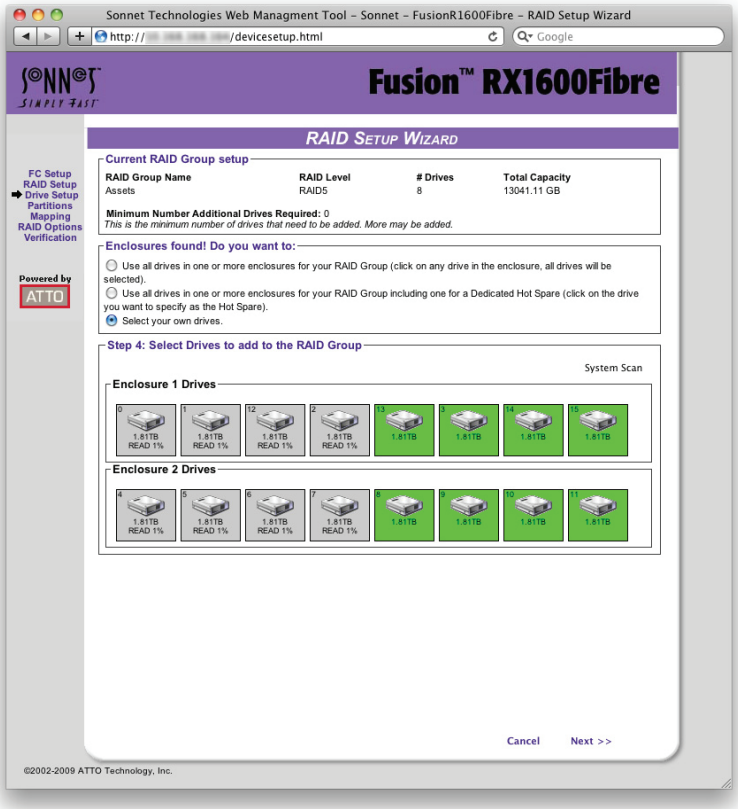

Figure 12

Creating a RAID 5 RAID group comprised of a single partition using the custom RAID Setup Wizard

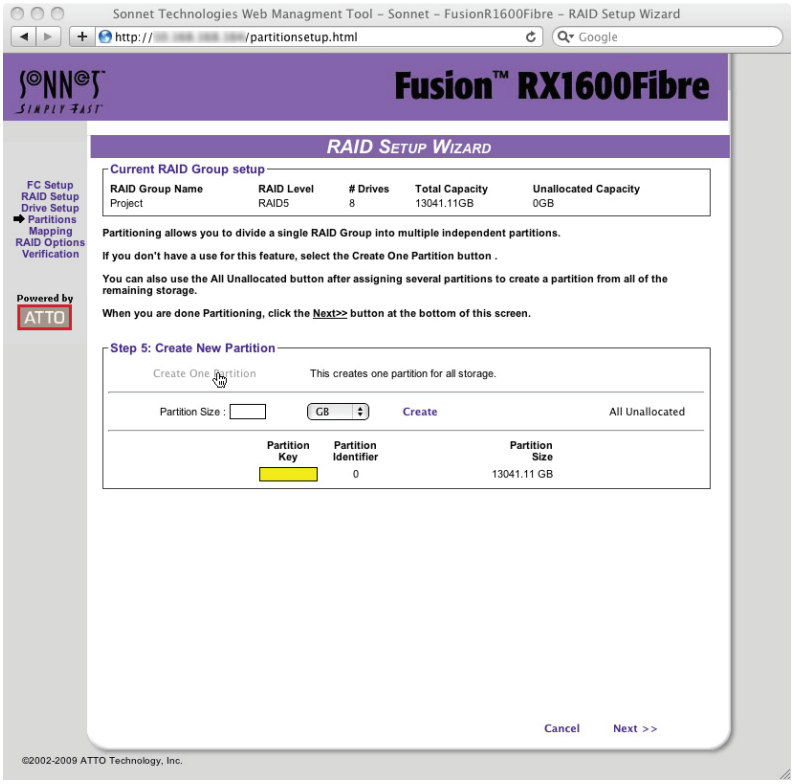

Figure 13

1.2 Configure Storage into RAID Groups

Selecting automatic SCSI-FCP LUN mapping for RAID partitions using the custom RAID Setup Wizard

Figure 14

Selecting the RAID group options using the custom RAID Setup Wizard

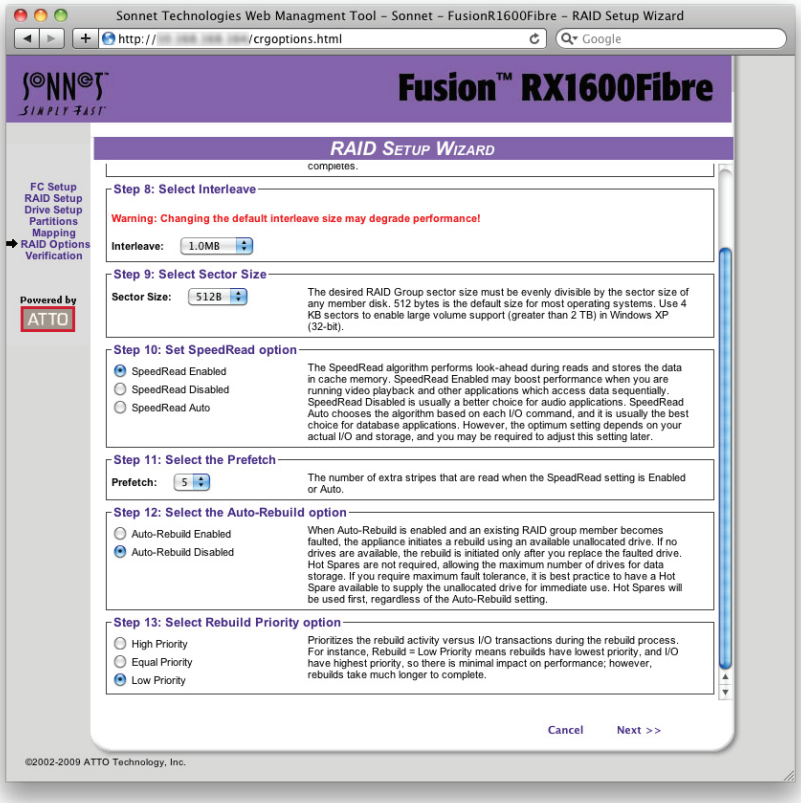

Figure 15

1.3 Modify System Values

Default values are appropriate for most configurations, but may be modified for your needs using the Sonnet Web Management Tool.

It is best practice to change the default user name and password to a user name and password important to you. Other configurations may also be changed; however, use extreme caution when changing default values.

Changing the Current User Name, Password

It is best practice to change the user name and password on all Telnet, FTP and Sonnet Web Management Tool sessions. Refer to the CLI commands UserName and Password in Appendix A.

1. Open a Command Line Interface session either using Telnet or the serial port as described in Interface Options on page 47, or use the Advanced CLI page in a Sonnet Web Management Tool session as described in Advanced CLI Page on page 35.

2. Type **set UserName [name]**.

3. Press **Return (Enter)**.

4. Type **set Password**.

5. Press **Return (Enter)**.

6. Follow the onscreen instructions to confirm your old and new passwords.

Note: *The user name is case insensitive and password is case sensitive. The user name and password for all Telnet, FTP and Sonnet Web Management Tool sessions is changed.*

Creating a Read-Only User Name, Password

You may wish to set up a read-only user name and password to prevent changes to storage and Sonnet Web Management Tool settings. Refer to the CLI commands ReadOnlyPassword and ReadOnlyUsername in Appendix A.

1. Open a Command Line Interface session either using Telnet or the serial port as shown in Interface Options on page 47.

2. Type **set ReadOnlyUsername [name]**.

3. Press **Return (Enter)**.

4. Type **set ReadOnlyPassword**.

5. Press **Return (Enter)**.

6. Follow the onscreen instructions to confirm the read-only password; the read-only user name and read-only password for all user interface sessions is changed.

Changing System Variables - System Configuration

You may change several system configurations to suit your needs.

1. If you are not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser, click **Enter Here** on the splash screen, then type in your user name and password in the box provided. Click OK.

2. Click the **Manage** button on the left side of the window.

3. Click **Fusion RX1600Fibre** inside the Select User Process box.

4. Click **System Configuration**.

5. Click **Next**. The **System Configuration** page appears. See **Figure 16** on page 18.

6. Make any changes:

   - **Appliance name**: the appliance name is a unique 8-character identifier which is displayed at the top of each screen. You may find this useful if you are managing multiple ATTO controller-based devices from a single workstation.

   - **Time and date**: use a remote time server to set the time and time zone, or manually set the time and date. Refer to Date, Time, TimeZone in Appendix A.

   - **Fibre Channel configuration**: change the data rate or the connection mode for each FC port. Refer to FCDataRate and FCConnMode in Appendix A.

   - **Hard address assignment**: refer to FCHard and FCHardAddress in Appendix A.

   - **Establish access through FC Ports**: change whether all drives are to be available to both ports, creating one node name for all ports, or if different node names should be created for each port.

   - **Ethernet management port**: change whether or not you use DHCP for an IP address, subnet mask and gateway, or manually change these parameters and set a DNS server address. Refer to IPDHCP in Appendix A.

7. When you have completed your changes, click **Commit**.

1.3 Modify System Values

System Configuration page

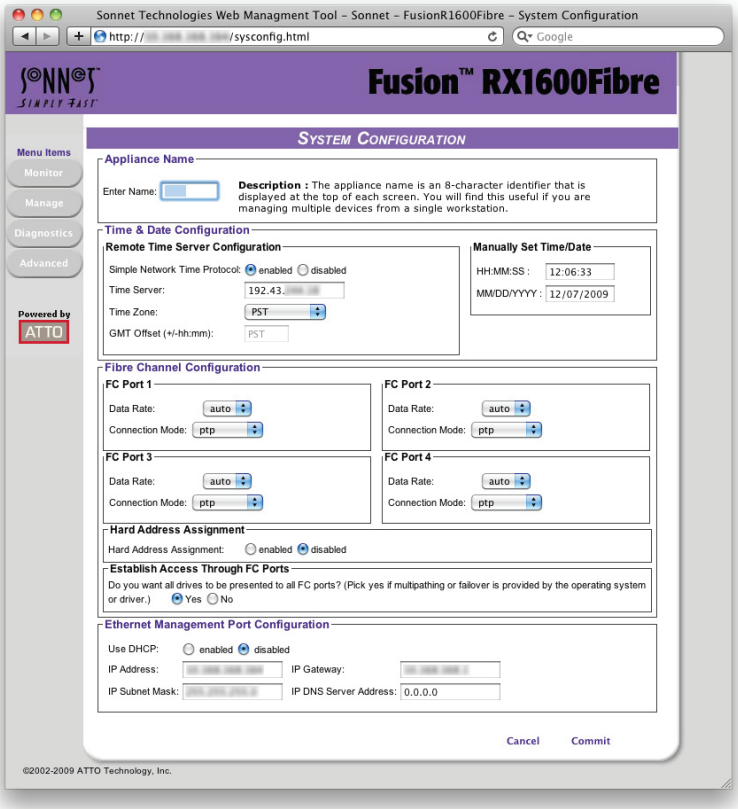

Figure 16

1.4 Monitor Storage, Configurations

You may determine the performance of drives in the Fusion RX1600Fibre or attached RX1600 Expansion systems using various displays and tests in the Sonnet Web Management Tool.

The following instructions assume you have already set up at least one RAID group. The ATTO FastStream controller in the RX1600Fibre collects various metrics to measure performance for physical drives during normal system operation and drive initialization and verification.

Note: *New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Exit the Sonnet Web Management Tool completely whenever you need maximum performance.*

Health and Status Monitor Page

The **Health and Status Monitor** page is the first page you see when you open the Sonnet Web Management Tool after completing the configuration of at least one RAID group. You may return to it at any time by clicking the **Monitor** button on the left side of the window. See **Figure 17** on page 20.

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then click OK.

2. The **Health and Status Monitor** page appears. If you click **Details**, additional information about each parameter appears on the **Configuration Display** page.

Configuration Display Page

Clicking **Details** from the **Health and Status Monitor** page brings up the **Configuration Display** page. See **Figure 18** on page 20. Click the following links to view detailed information:

- **RAID groups**: RAID group names, RAID status, available Hot Spares, number of faulted drives, RAID level, number of partitions, interleave and total capacity of each RAID group

- **Partitions**: RAID group name, partition ID, capacity and block size

- **Drives**: Drive configuration by port, including drive size and status

- **Interfaces**: Ethernet management port link status and Fibre Channel port link, speed, connection mode, node name and port name

SCSI Enclosure Services (SES)

Fusion RX1600Fibre and Fusion RX1600 expansion enclosures feature a SCSI Enclosure Processor which indicates enclosure health status, drive identification and drive fault identification.

Use SES to identify individual drives, all the drives in the same enclosure, all the drives in a single RAID group, or faulted drives. Clicking **Details** in the Enclosure Status section on the **Health and Status Monitor** page brings up the SES Monitor page. Refer to SCSI Enclosure Services (SES) on page 27.

1.4 Monitor Storage, Configurations

The Health and Status Monitor page during a RAID group initialization operation

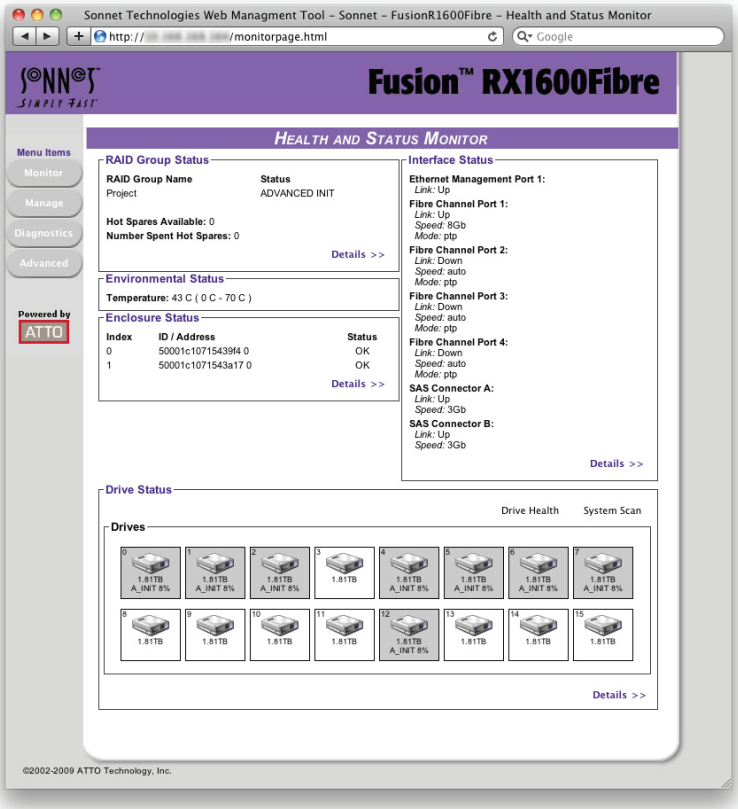

Figure 17

Fusion RX1600Fibre configuration and status information displayed on the Configuration Display page

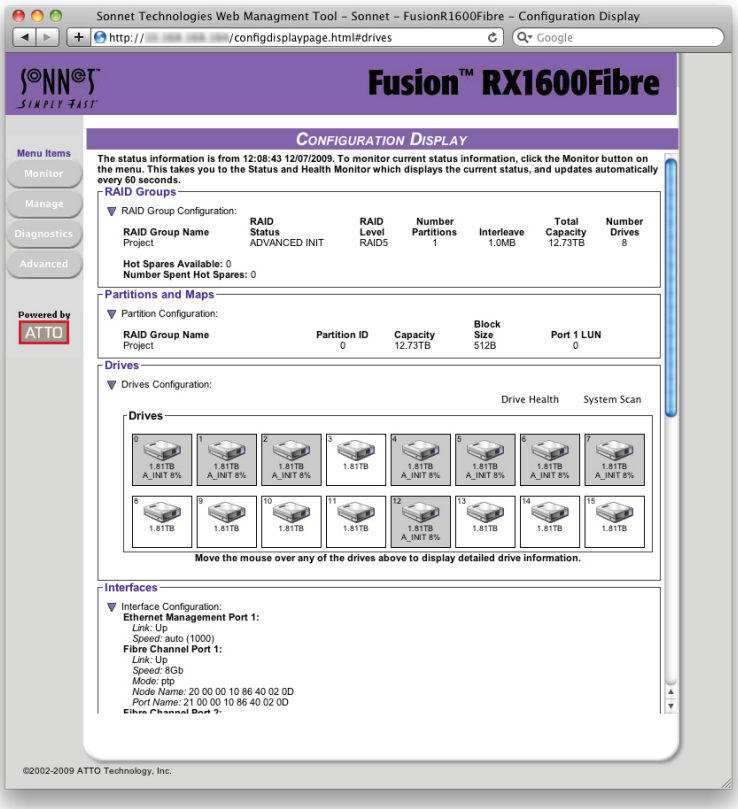

Figure 18

1.5 Remote System Monitoring

You may set up the Fusion RX1600Fibre to send notifications using Email when certain events occur.

You may set up the RX1600Fibre to send notifications using the Sonnet Web Management Tool's **Error Notifcation** page when certain events occur. You designate the person or people receiving notification of conditions and the level of severity which prompt Email notification.

Types of Errors
- Device/drive errors such as medium error, aborted command and hard error
- Device/drive transitions from online to offline
- Critical and warning temperature conditions
- Critical and warning voltage conditions
- Power recycle/power failure conditions
- Enclosure issues

Warning messages
- Device down
- Medium error
- Abort command

Message Severity Levels
- **Critical**: critical event Emails
- **Warning**: warnings and critical event Emails are sent
- **Informational**: information which you may want to know but which probably does not require action: only information messages are sent
- **All**: warnings, critical events and informational messages
- **None**: no Emails are sent

Email Notification Setup

Phone home Email notification enables the RX1600Fibre to send an Email message to you, a network administrator or other users when certain events occur with the storage system.

Messages about serious errors are sent immediately, while messages for less serious errors are sent every 15 minutes. You may send messages to up to five Email addresses and designate which conditions prompt each Email notification. For example, a recipient set to receive only critical severity level messages receives critical messages and not warning or informational messages.

When an event occurs that warrants Email notification, the RX1600Fibre sends the message; *it cannot respond to a rejection by a server for an invalid address*. **Ensure all Email addresses typed in are valid**. Each Email is time stamped when it is sent as part of the SMTP header information.

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**
2. The **Health and Status Monitor** page appears. Click the **Manage** button on the left side of the window.
3. The **Manage** menu page appears. Click Fusion RX1600Fibre.
4. Click the **Set Up Error Notification** button.
5. Click **Next**. The **Error Notification** page appears. See **Figure 19** on page 22.
6. Click the **Enabled** radio button for Notification Configuration.
7. Type in the sender address or use the default. (Emails show this name in the **From** field).
8. Type or use the default SMTP Server (the Email server) IP address or the name of the SMTP server and, if required, the user name and password used to log into the server.
9. Type in up to five Email addresses.
10. Choose **All**, **Critical**, **Warning**, **Informational** or **None** for each Email address.
11. When all information is typed in, click **Commit**.
12. A warning box appears. In the warning box, verify that you want to complete the notification procedure including a restart of the RX1600Fibre by clicking **Yes**. Clicking **No** ends the procedure without making a change.
13. Your settings are displayed. You may change or disable Email notification at any time from the Error Notification page.

1.5 Remote System Monitoring

Error Notification setup page

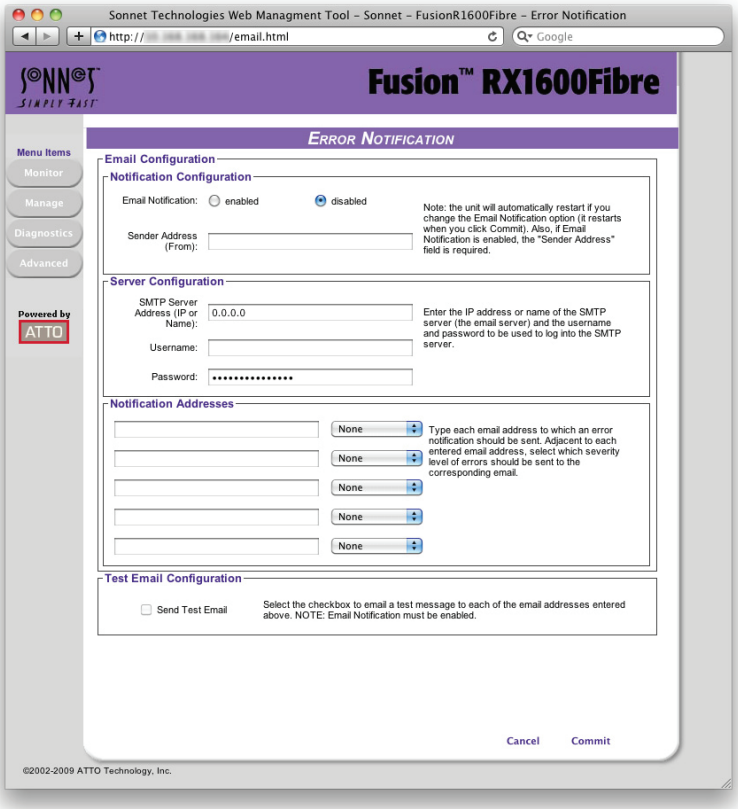

Figure 19

1.6 Drive Diagnostics

You may determine the performance of drives in the Fusion RX1600Fibre and attached RX1600 Expansion systems using various displays and tests in Sonnet Web Management Tool.

The following instructions assume you have already set up at least one RAID group. The RX1600Fibre collects various metrics to measure performance for physical drives during normal system operation and drive initialization and verification. New performance data is updated every 60 seconds, which impacts performance slightly, even if you minimize the browser window. **Exit the ExpressNAV Storage Manager completely whenever you need maximum performance**.

Note: *Initialize and Verify Drives is Described in Section x.x, Ensure Drive Integrity on page 3.*

Preliminary Steps

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click **Enter Here**. In the box provided, type in your user name and password, and then click OK.

2. The **Health and Status Monitor** page appears.

3. Click the **Diagnostics** button on the left. The **Diagnostics Menu** page appears. See **Figure 20** on page 25.

4. Select the operation you wish to perform.

Read-Only Drive Test

The **Read-Only Drive Test** performs a nondestructive scan over the entire surface of each drive to identify bad areas of the disk drives and determine read performance. It may be run while data is passing through the RX1600Fibre.

Running this test may negatively impact performance. Once the Read-Only Drive Test has completed, system operation returns to normal. To fix errors on disks, use the **Initialize and Verify Drives** process as described in Ensure Drive Integrity on page 3.

1. Follow the instructions in Preliminary steps above.

2. Click the **Read-Only Drive Test** button.

3. Click **Next**. The **Read-Only Drive Test** page appears. See **Figure 21** on page 25.

4. If no drives appear in the information box, click the **System Scan** button. If drives are available, click the drives you wish to test; the drives are highlighted.

5. Click **Commit**.

6. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change. If you chose to do a **Read-Only Drive Test**, the **Drive Performance and Health** page appears showing what tests are running and their results. You may select other tests to run or continue on to other tasks.

Drive Performance and Health Test

Another way to determine your drives' status is to follow the instructions in Preliminary Steps on this page, and click the **Drive Performance and Health** menu item.

1. Follow the instructions in Preliminary Steps on this page.

2. Click the **Drive Performance and Health** menu item.

3. The **Drive Performance and Health** page appears. See **Figure 22** on page 26.

4. Click the Start or Stop buttons next to individual drives to start or stop drive performance and health testing. Alternatively, you may click Start All Metrics to test all the drives.

   - Click **Show Help Text and Drives** for an alternative view of the test progress.

   - During testing the **Time Remaining** box tells you how much time remains until the verification process is complete. The representation of each drive in the **Drives** box shows the percentage of verification completed.

   - Drive performance is displayed in the **Drive Metrics** section.

   - Drive errors are displayed in the **Drive Errors** section.

5. When the test is complete, click each drive to see its information highlighted in the **Drive Metrics** window. If you close the browser or navigate away from this page, you may re-access these results by clicking the **Diagnostics** button and choosing the **Drive Performance and Health** option. Results are available until the FastStream is restarted.

1.6 Drive Diagnostics

Identifying a Drive

WARNING: Executing this command adversely impacts performance and throughput for the time that the LED is illuminated. The preferred method to identify SES elements as described in Identifying SES Elements on page 27.

You may want to physically identify a drive in the RX1600Fibre or attached RX1600 Expansion systems. This method will work even if SES is unavailable.

1. Follow the instructions in Preliminary Steps on page 23.
2. Click **Identify Drive**. The **Identify SES Elements** page appears. See **Figure 23** on page 26.
3. Click the box representing the drive you wish to identify. Alternatively, you may click **Identify All** to select all the drives.
4. Click **Commit**. The drive activity LED(s) for the drive(s) in the Fusion drive enclosure illuminates for one minute.
5. To stop the operation, deselect the drive(s).

1.6 Drive Diagnostics

Diagnostics Menu page

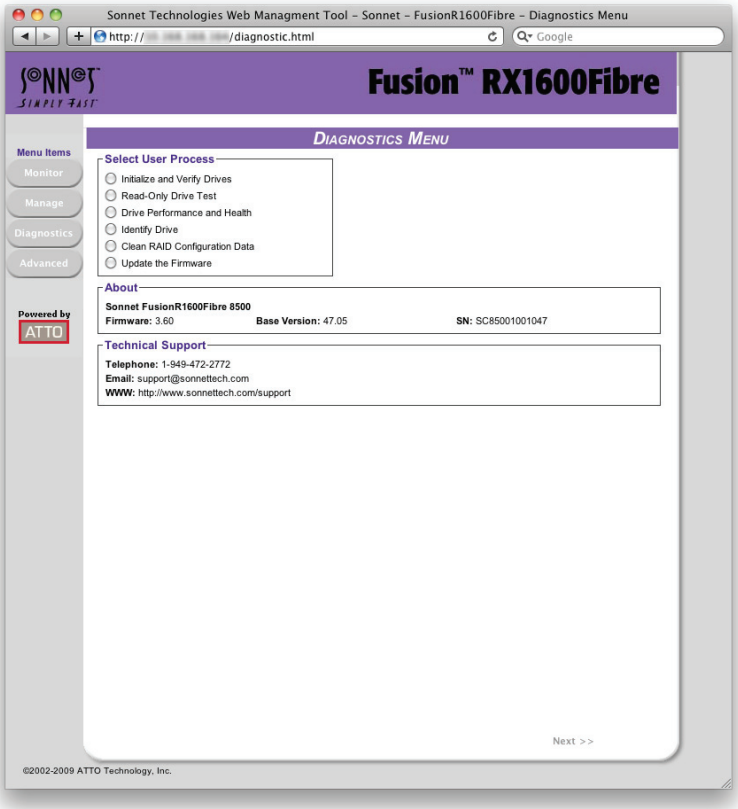

Figure 20

Drives selected for testing on the Read-Only Drive Test page

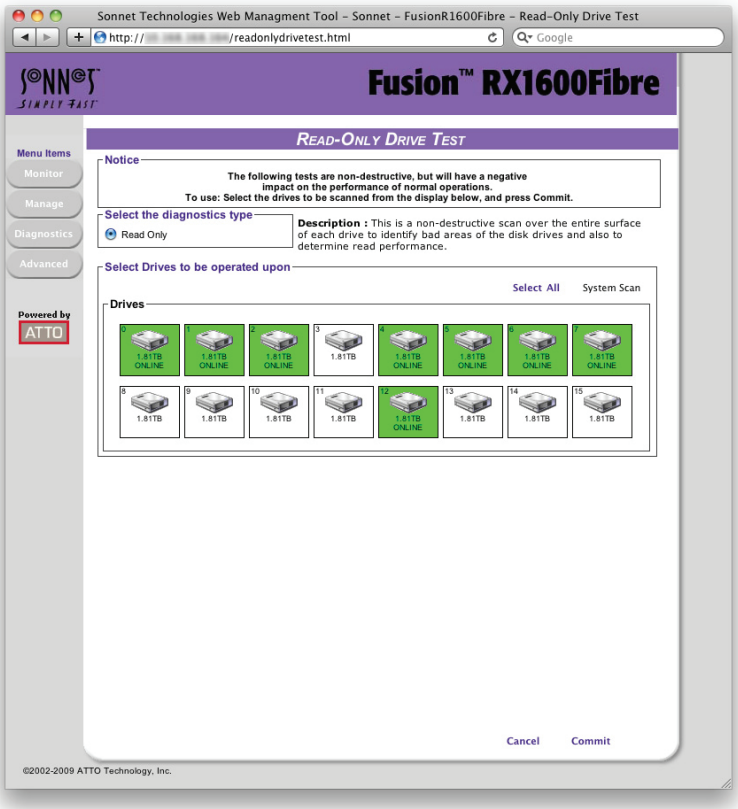

Figure 21

1.6 Drive Diagnostics

Drive Performance and Health page while a RAID group is tested

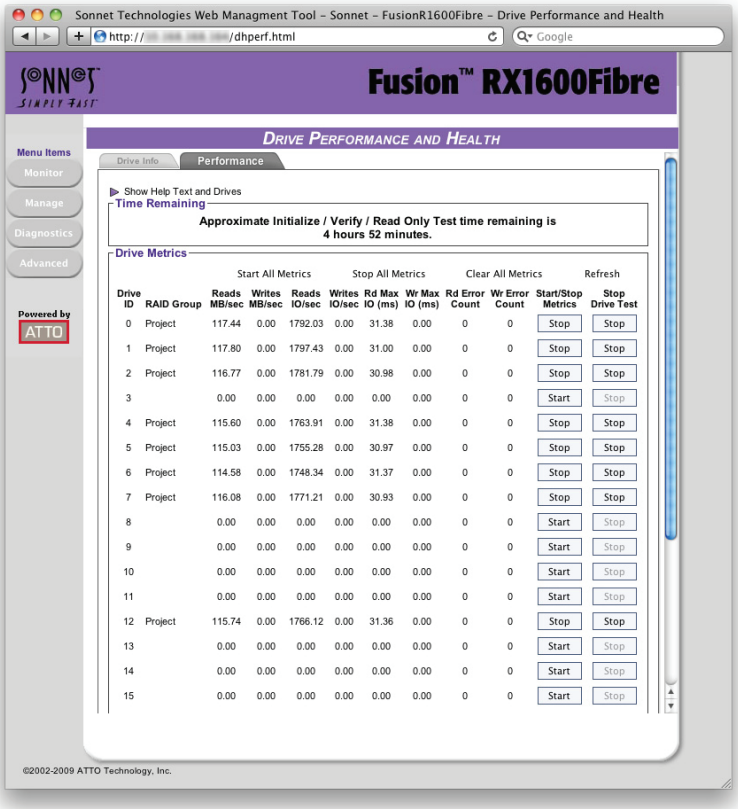

Figure 22

Identify enclosure, RAID group and drives, enclosure, RAID group, or individual drives using the Identify SES Elements page

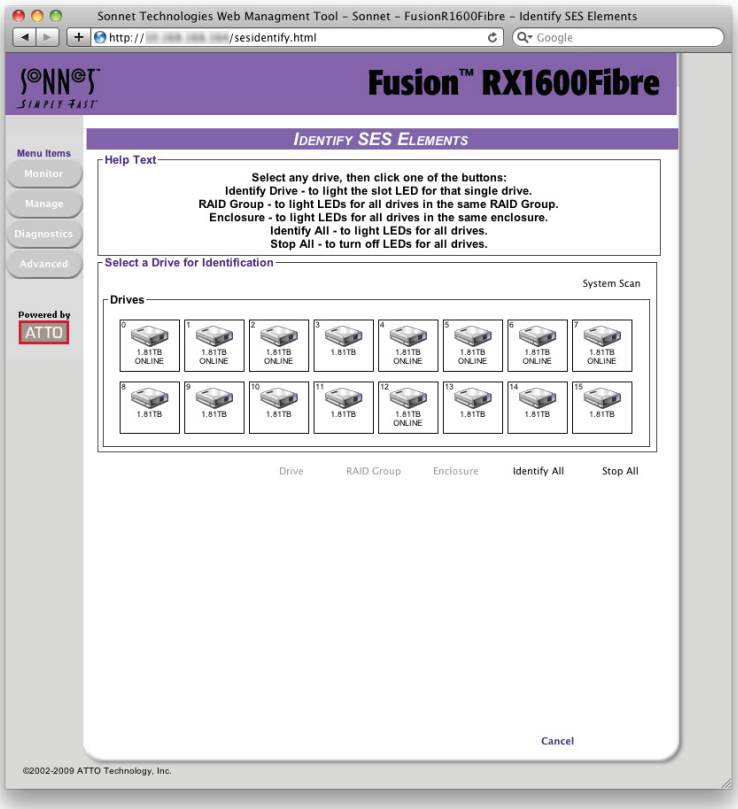

Figure 23

1.7 SCSI Enclosure Services (SES)

Fusion RX1600 drive enclosures have a SCSI Enclosure Processor which monitors enclosure health status, drive identification and drive faults.

You may use SES to identify individual drives, all the drives in the same enclosure, all the drives in a single RAID group, or faulted drives. SES also provides status on power supplies, fans and thermal sensors in the enclosures.

Setting up SES

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**

2. The **Health and Status Monitor** page appears. Click the **Manage** button on the left side of the window.

3. Select **Enclosure Services** in the Select User Process box.

4. Select **Manage Enclosure Services**.

5. Click **Next**. The **Manager Enclosure Services** page appears. See **Figure 24** on page 28.

6. Select the type of SES monitor and control you wish to use:

   - **Pass-Through**: the host application manages SES information.

   - **Monitor and Control by the Fusion RX1600Fibre**: the RX1600 controls SES services.

   - **SES Monitoring Disabled**: the host application does not receive any SES monitoring information.

7. If you enable enclosure services, select the amount of time in seconds that SES enclosures are asked (or polled) for their current status. The default is 60 seconds: you may choose an interval up to 60 minutes.

8. If you have elected to enable enclosure services, and you want the enclosure to sound an alarm if a drive becomes faulted, select the **Enable Faulted Drive Alarm** box.

9. Choose to test an enclosure's alarm or to mute alarms. You may also choose to have an occasional audible reminder of the alarm condition if it is supported by your enclosure.

10. If Email Notification is enabled (see Email Notification Setup on page 21), all SES status changes are sent via email.

Identifying SES Elements

The **SES Monitor** page found by clicking **Details** in the **Enclosure Status** section of the **Health and Status Monitor** page shows the RX1600Fibre and any attached RX1600 Expansion systems' SES information. If you would like information about specific drives of the RAID groups or enclosures of which they are members, use the **Identify SES Elements** page.

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**

2. The **Health and Status Monitor** page appears. Click the **Diagnostics** button on the left side of the window.

3. Click **Identify Drives**.

4. Click **Next**. The **Identify SES Elements** page appears. See **Figure 25** on page 28.

5. Move the cursor over any drive to display its information.

6. After choosing a drive, click its button, and then click Drive, RAID Group, Enclosure, or Identify All to identify enclosures or RAID groups associated with that drive. LEDs for the devices light up when selected.

7. Select **Stop All** to stop the LEDs from lighting.

Monitoring SES Elements Using the Health and Status Monitor

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then click **OK.**

2. The **Health and Status Monitor** page appears. In the **Enclosure Status** section, click **Details**.

3. The **Monitor Enclosure Services** page appears. See **Figure 26** on page 29.

1.7 SCSI Enclosure Services (SES)

Set SES monitor and control on the Manage Enclosure Services page

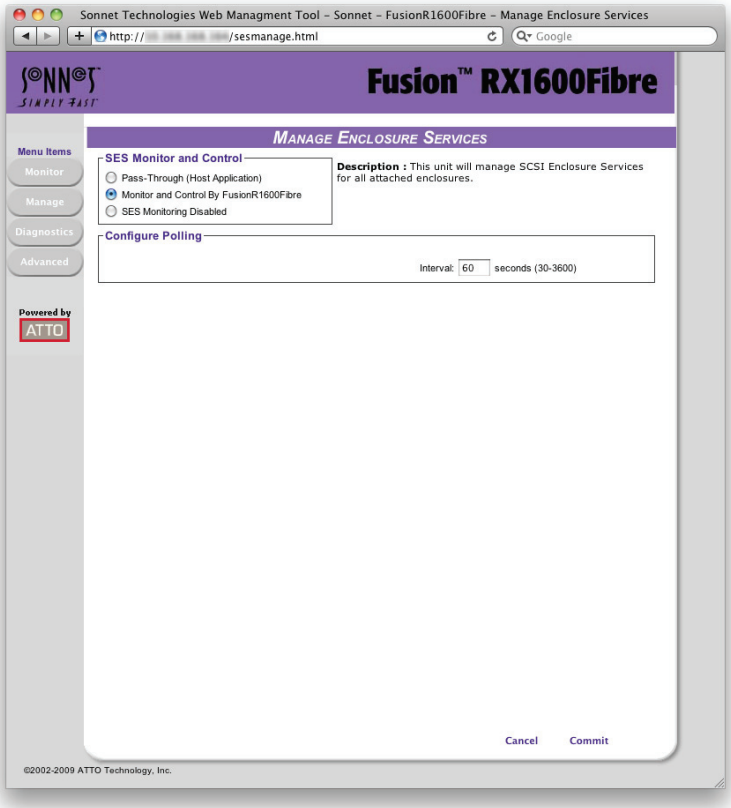

Figure 24

Identify enclosure, RAID group and drives, enclosure, RAID group, or individual drives using the Identify SES Elements page

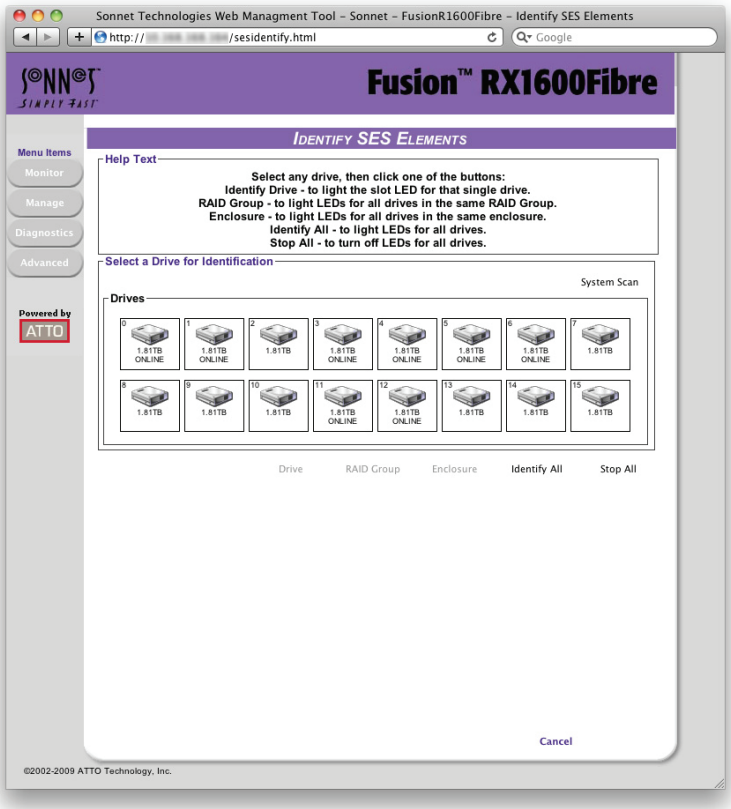

Figure 25

1.7 SCSI Enclosure Services (SES)

Expanded view of an enclosure's SES elements in the Monitor Enclosure Services page

Figure 26

1.8 Modify Storage

Use the Sonnet Web Management Tool to replace a failed drive, add new drives or change RAID configurations.

You may modify various aspects of storage using the **Manage** menu found by clicking the **Manage** button on the left side of the window. Be cautious when deleting storage or rearranging storage configurations because data could be compromised or lost.

The Sonnet Web Management Tool takes you step by step through many procedures which allow you to modify your storage and RAID configurations. Read all notes and warnings carefully as you go to ensure the best performance and use of your storage. When you initially set up the Fusion RX1600Fibre, replace a failed drive or add new drives to the system, perform drive initialization and verification. Refer to Ensure Drive Integrity on page 3.

Many of these procedures are only available on unallocated storage which is not currently part of a RAID group, not designated as a Hot Spare (refer to Adding or Removing Hot Spares on page 34), or has been designated as "Replaced" when you initially set up RAID configurations.

Preliminary Steps

Begin with these steps, then choose the process you wish to use.

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**
2. The **Health and Status Monitor** page appears.
3. Click the **Manage** button on the left side of the window.
4. The **Manage** menu page appears. From the **Select User Process** box, select the operation you wish to perform.

RAID Group Processes

You may create or delete RAID groups, change RAID group levels, rebuild RAID groups or modify RAID group mapping or partitions.

Creating RAID Groups

1. Follow the instructions in Preliminary Steps above, and then click the **RAID Groups** arrow in the **Select User Process** box.
2. Click **Create RAID Group**.
3. Follow the directions as found in Selecting a Quick Storage Configuration on page 8 or Creating a Custom Setup on page 9.

Deleting RAID Groups

1. Follow the instructions in Preliminary Steps on this page, and then click the **RAID Groups** arrow from the **Select User Process** box.
2. Click **Delete RAID Groups**.
3. Click **Next**. The **Delete RAID Groups** page appears. See **Figure 27** on page 36.
4. If you want to delete Hot Spares, click the appropriate radio button. (Refer to Adding or Removing Hot Spares on page 34.)
5. Click each RAID group to be deleted.
6. Click the **Delete** button.
7. When you have selected all the groups to be deleted, click **Commit**.
8. A warning box appears. If you want to continue click **Yes**. The configuration completes and the **Health and Status Monitor** page appears. If you wish to start over, click **No**.

Adding Drives to a RAID Group

Mac User's Support Note: Although this feature is supported by the ATTO utility, as of this writing, **Mac OS X does not support RAID group capacity expansion.**

You can increase the number of drives used by an existing RAID group by adding an unallocated drive to the group. The new drive is set up in a separate partition within the RAID group. You may have to add more than one drive depending on the RAID group setup.

WARNING: Adding drives to an existing RAID group may adversely impact performance. You cannot reverse this operation unless you delete the RAID group.

1. Follow the instructions in Preliminary Steps on this page and click the **RAID Groups** arrow from the **Select User Process** box.
2. Click **Add Drives to a RAID Group**.
3. Click **Next**. The **Add Drives to RAID Group** page appears. See **Figure 28** on page 36.
4. Select the RAID group you wish to add the drives to from the drop-down menu.
5. Click the drives you wish to add to your RAID group.
6. When you have completed your changes, click **Commit**.

1.8 Modify Storage

Adding Drives to a RAID Group (continued)

7. A warning box appears noting that information on the added drives is erased. Back up all data on the new disks before proceeding. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.

8. The **Health and Status Monitor** page appears.

9. Depending on how the drives are added, when the process completes, the added drives may be in a separate, new partition within the RAID group.

Adding Mirrors to a RAID Configuration

To increase data protection in RAID Level 1 groups, you may add additional mirrors from unallocated storage. Also known as *n-way mirroring*, adding mirrors can only be performed if no other Add Drives, Add Mirror or RAID Migration operations are being performed.

WARNING: Adding drives to an existing RAID group may adversely impact performance. You cannot reverse this operation unless you delete the RAID group.

1. Follow the instructions in Preliminary Steps on page 31 and click the **RAID Groups** arrow from the **Select User Process** box.

2. Click **Add Mirrors** to a RAID Group.

3. Click **Next**. The **Add Mirrors** page appears. See **Figure 29** on page 37.

4. Select the RAID Level 1 group you wish to add the mirror drive(s) to from the drop-down menu.

5. Select the drive(s) you wish to add.

6. When you have completed your changes, click **Commit**.

7. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.

8. The **Health and Status Monitor** page appears.

Changing RAID Configuration: RAID Migration

If you have unallocated drives, you can use them to change the RAID Level of certain existing RAID groups. The following migration levels are supported:

- JBOD to RAID Level 0
- JBOD to RAID Level 1
- RAID Level 0 to RAID Level 1 + 0
- RAID Level 1 to RAID 1 + 0

WARNING: Adding drives to an existing RAID group may adversely impact performance. You cannot reverse this operation unless you delete the RAID group.

1. Follow the instructions in Preliminary Steps on page 31 and click **RAID Groups** in the **Select User Process** box.

2. Click the **RAID Migration** button.

3. Click **Next**. The **RAID Migration** page appears. See **Figure 30** on page 37.

4. Follow the onscreen directions.

5. When you have made your changes, click **Commit**.

6. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.

7. The **Health and Status Monitor** page appears.

Modifying RAID Group Mapping

You may change the LUNs of drives manually or let the Sonnet Web Management Tool map drives for you.

WARNING: Changing RAID group mapping after data has been stored may make the data inaccessible to workstations in the SAN.

1. Follow the instructions in Preliminary Steps on page 31 and click the **RAID Groups** arrow from the **Select User Process** box.

2. Click the **Modify RAID Group Mapping** button.

3. Click **Next**. The **Mapping Page** page appears. See **Figure 31** on page 38.

4. Select the RAID group you wish to change from the drop-down box.

1.8 Modify Storage

Modifying RAID Group Mapping (continued)

5. Select the method you wish to use to map the partitions. Refer to Modifying RAID group partitions below.

   - If you select **Auto**, all mapping for all RAID groups attached to this FastStream is changed, destroying any previous mapping.

   - If you do not wish to change the mapping of your other RAID groups, select **Manual**.

   Click any partition to map that partition to a Port and LUN.

6. Click **Commit** to save the new mapping.

7. A warning box tell you some mapping configurations may impair performance. Complete the mapping change by clicking **Yes**. Clicking **No** ends the procedure without making a change.

8. The **Health and Status Monitor** page appears.

Modifying RAID Group Partitions

A RAID group may have several Terabytes of total data capacity because of the size of the included drives. Partitioning enables you to break up large RAID groups into smaller, more manageable groups. Most host systems can address only 2TB per LUN. Partitioning increases storage efficiency by providing more LUNs without using lower capacity RAID groups. Partitioning enables the creation of multiple logical volumes.

1. Follow the instructions in Preliminary Steps on page 31 and click the **RAID Groups** arrow from the **Select User Process** box.

2. Click the **Modify RAID Group Partitioning** button.

3. Click **Next**. The **Partition Page** appears. See **Figure 32** on page 38.

4. Select the **RAID Group Name** from the drop-down menu.

5. Using the graphic and drop-down boxes, choose to either merge or split existing partitions or to assign different values for the partition sizes.

6. Click **Commit**.

7. A warning box tell you some mapping configurations may impair performance. Complete the mapping change by clicking **Yes**. Clicking **No** ends the procedure without making a change.

8. The **Health and Status Monitor** page appears.

Rebuilding RAID Groups

When RAID groups become compromised in some fashion, you must rebuild them. If you have previously enabled Auto-Rebuild and unallocated drives or Hot Spares are available, one of those drives is substituted for the failed drive and a rebuild takes place automatically.

Refer to step 18 under Creating a Custom Setup on page 10 for information on Auto-Rebuild, and to Adding or Removing Hot Spares on page 34 for information on Hot Spares.

Hot Spares, if available, are used first, regardless of the Auto-Rebuild setting. If you have not enabled Auto-Rebuild and no Hot Spares are available, use this procedure to rebuild the faulted RAID group.

1. Follow the instructions in Preliminary Steps on page 31 and click the **RAID Groups** arrow from the **Select User Process** box.

2. Click the **Rebuild RAID Groups** button.

3. The Click **Next**.**RAID Rebuild** page appears. See **Figure 33** on page 39.

4. Select the RAID group you wish to rebuild.

5. If you have enabled RAID 6, choose to rebuild one or two drives at the same time.

6. Follow the on-screen directions, ending by clicking **Commit**.

7. A warning box tell you some mapping configurations may impair performance. Complete the mapping change by clicking **Yes**. Clicking **No** ends the procedure without making a change.

8. The Health and Status Monitor page appears.

Modifying RAID Options

You may change Auto-Rebuild, SpeedRead and Prefetch configurations. Refer to Creating a Custom Setup on page 9 for details on these features.

1. Follow the instructions in Preliminary steps on page 31 and click the **RAID Groups arrow** from the **Select User Process** box.

2. Click the **Modify RAID Options** button.

3. Click **Next**. The **Modify RAID Options** page appears. See **Figure 34** on page 39.

4. Select the RAID group from the drop-down box.

5. Select the options you wish to change.

6. Click **Commit**.

1.8 Modify Storage

Adding or Removing Hot Spares

If a member of a RAID group becomes degraded or faulted, lose some redundancy is lost in the RAID group until a new member is rebuilt into it. However, Hot Spare drives may be designated as replacements for faulted drives without intervention by you or a host. You may set up a pool of Hot Spare drives of different capacities appropriate for your RAID groups.

Hot Spares may be set up by the Fusion RX1600Fibre automatically depending on the choices made during initial setup. There are two types of Hot Spares:

- **Dedicated**: Hot Spares that are dedicated solely for use with a specific RAID group and may not be used by any other RAID group
- **Global**: Hot Spares that may be used by any RAID group

Support Note: Drives in the Hot Spare pool should be of appropriate size to the RAID group so that smaller drives are not replaced by much larger Hot Spare drives, thus wasting storage capacity.

Drives will be searched for in this order:

a. Search for Dedicated Hot Spare
b. Search for Global Hot Spare (Smallest available drive of sufficient size)

When the RX1600Fibre detects a faulted device:

- The RX1600Fibre replaces the faulted device with the device from the Hot Spare pool.
- The RX1600Fibre begins an automatic rebuild of the RAID group(s).

Support Note: A RAID group rebuild may take several hours to complete, depending on the operating system, drive capacities, and RAID configuration.

1. Follow the instructions in Preliminary Steps on page 31 and click **Fusion RX1600Fibre** in the **Select User Process** box.
2. Click **Add/Remove Hot Spares**.
3. Click Next. The **Add/Remove Hot Spares** page appears. See **Figure 35** on page 40.
4. Select **Designated** or **Global Hot Spares**.
5. If **Designated** is selected, you will be prompted to select the RAID Group.
6. Select the drive(s) to be added or removed from the Hot Spare pool by clicking the boxes representing those drives.
7. When you have completed your changes, click **Commit**.
8. A warning box tell you some mapping configurations may impair performance. Complete the mapping change by clicking **Yes**. Clicking **No** ends the procedure without making a change.
9. The **Health and Status Monitor** page appears.

Removing RAID Configuration Data

If you move single drives between Fusion storage systems without erasing the drives, you should clean stale RAID configuration data from them, permanently removing the drive from the RAID group. This operation can be performed on drives that belong to a RAID group now or have once belonged to a RAID group and are labeled Replaced after system scans.

WARNING: Continue with extreme caution: data is lost on the drive when it is cleaned of RAID information.

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**
2. Click the **Diagnostics** button on the left side of the window.
3. Click **Clean RAID Configuration Data** in the **Select User Process** box.
4. Click **Next**. The **Clean RAID Configuration Data** page appears. See **Figure 36** on page 40.
5. Click the drives you wish to update; the drives are highlighted.
6. Click **Commit**.
7. A warning box appears. In the warning box, verify that you want to complete the configuration by clicking **Yes**. Clicking **No** ends the procedure without making a change.
8. When the process is complete, the **Health and Status Monitor** screen appears.

1.8 Modify Storage

Advanced CLI Page

Changes to various parameters may be made using the Advanced CLI page.

WARNING: Do not use this page unless you are directed to by a Sonnet technician. Changing parameters may cause loss of data and/or disruption to the performance and reliability of the Fusion storage system.

Note: *The Sonnet Web Management Tool is the preferred method to manage the Fusion storage system.*

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**

2. Click the **Advanced** button on the left side of the window.

3. The **Advanced CLI Configuration** page appears. See **Figure 37** on page 41.

4. Wait for the Ready prompt, then type in the CLI command in the text box provided. Refer to CLI Provides an ASCII-based Interface on page i of Appendix A.

5. Click the **Submit** button: this is equivalent to typing in the CLI command into a Telnet or serial port CLI session.

A text field beneath the box lists the most recent commands issued to the FastStream through this page. If you enter an incorrect parameter, the CLI help text is displayed, showing the parameters available. An asterisk next to the Ready prompt indicates you must type SaveConfiguration restart in the text box for changes to take effect.

1.8 Modify Storage

RAID group selected for deletion on Delete RAID Groups page

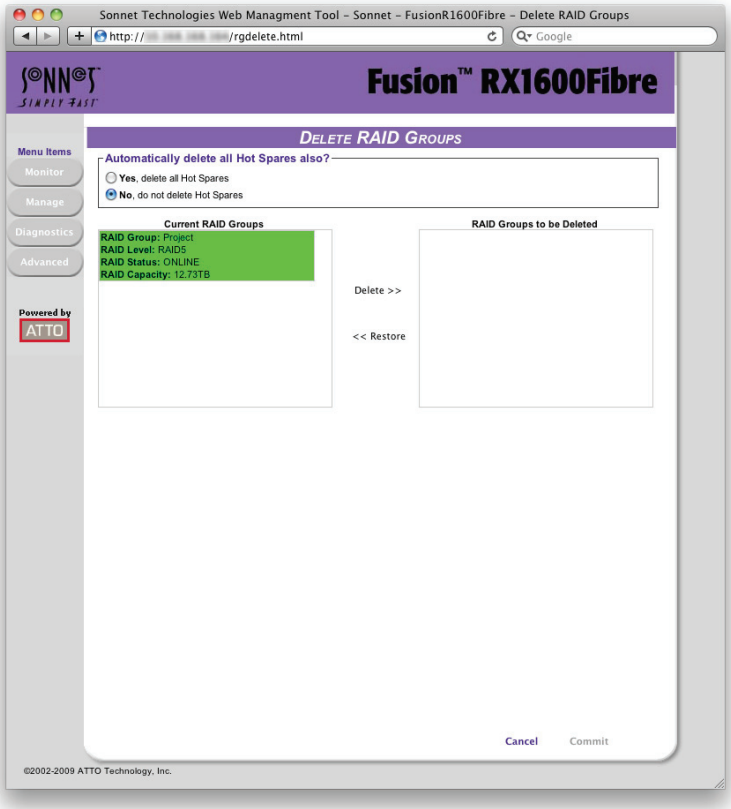

Figure 27

Add Drives to RAID Group page

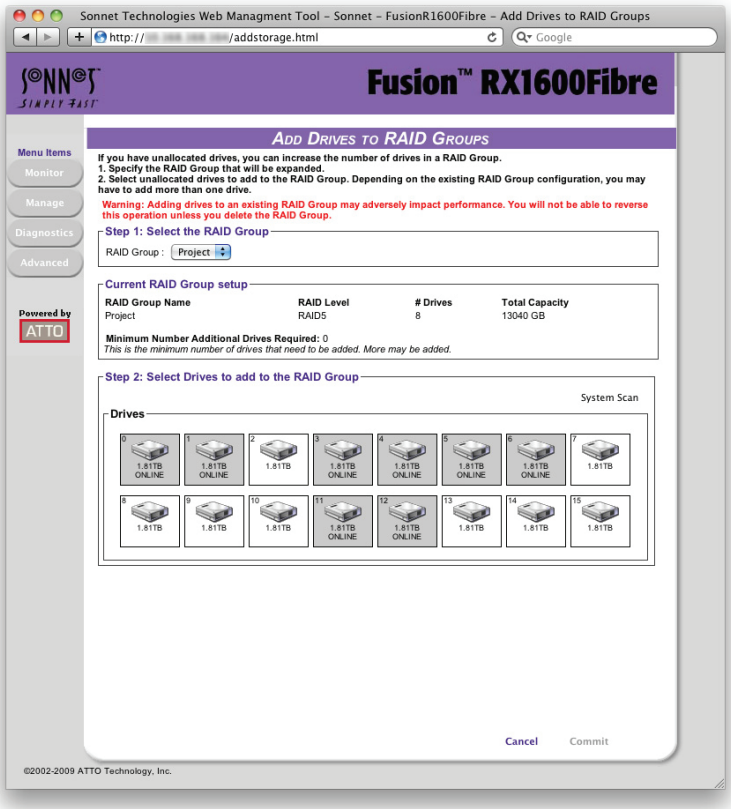

Figure 28

1.8 Modify Storage

Add Mirrors page

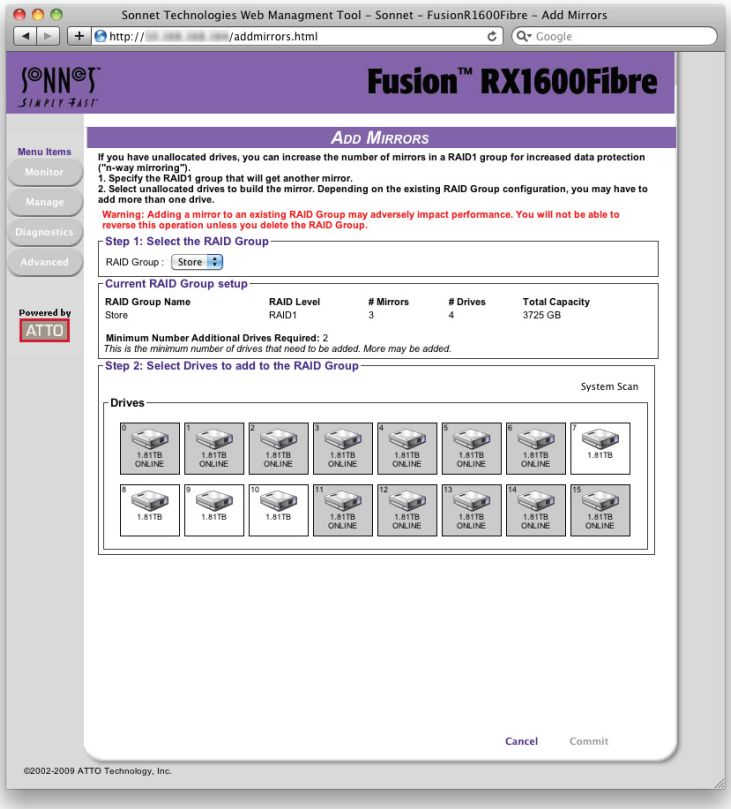

Figure 29

RAID Migration page

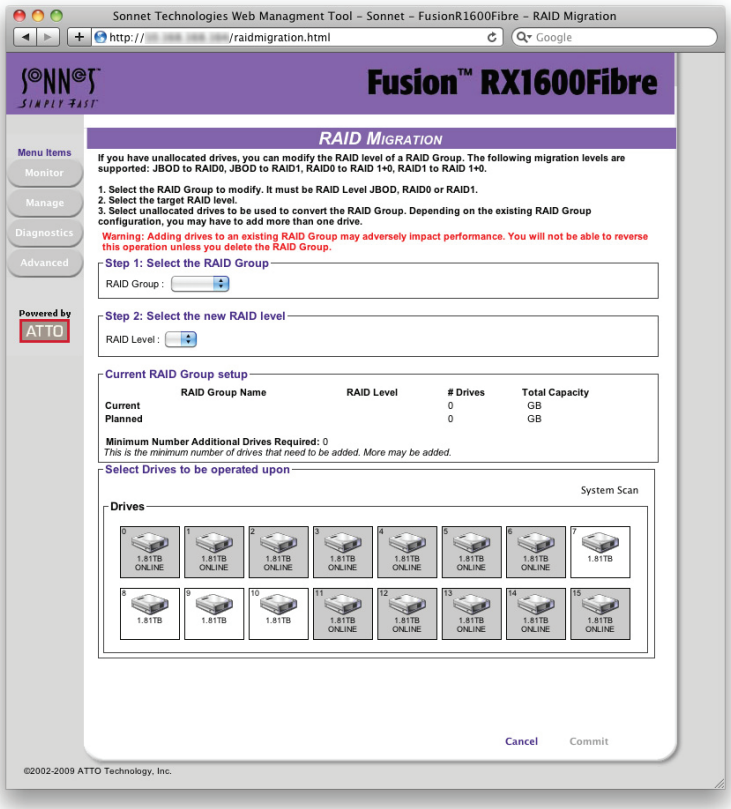

Figure 30

1.8 Modify Storage

Selecting auto-mapping for SCSI-FCP LUNs on the Mapping page

Figure 31

Split or merge RAID group partitions on the Partition page

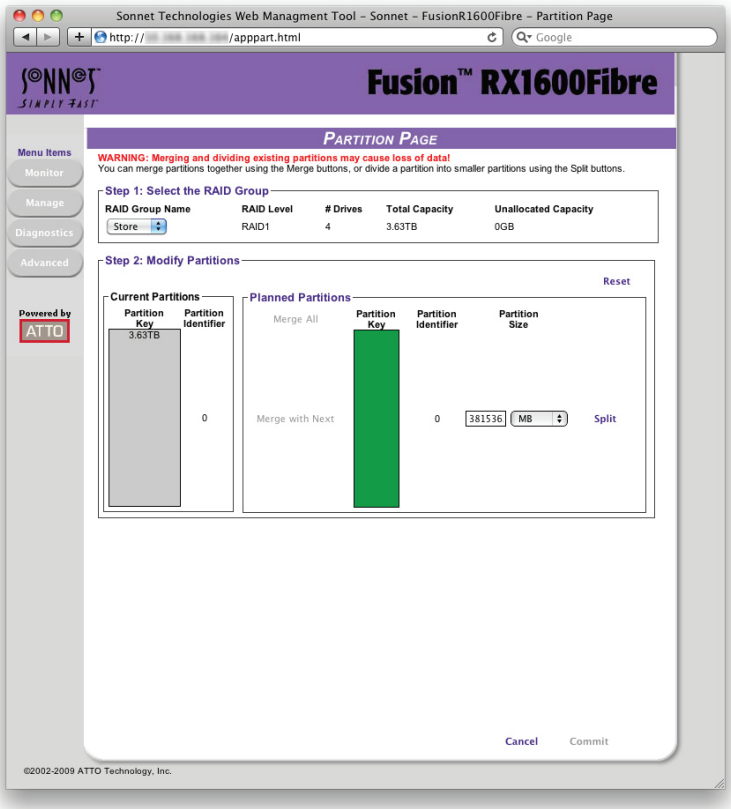

Figure 32

1.8 Modify Storage

Rebuilding a degraded RAID group manually on the RAID Rebuild page

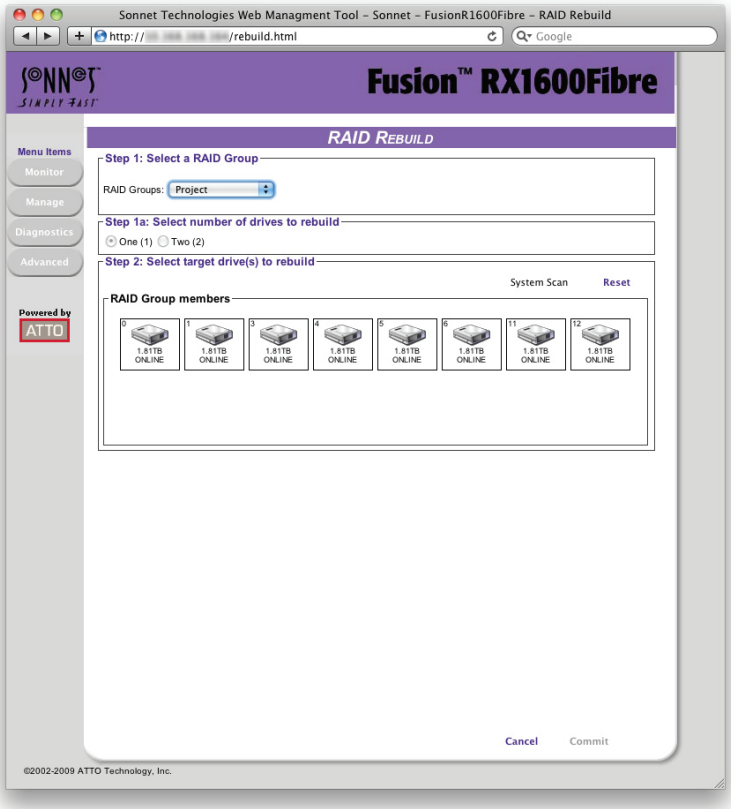

Figure 33

Modify settings on an existing RAID Group on the Modify RAID Options page

Figure 34

1.8 Modify Storage

Add or remove global or dedicated hot spares on the Add/Remove Hot Spares page

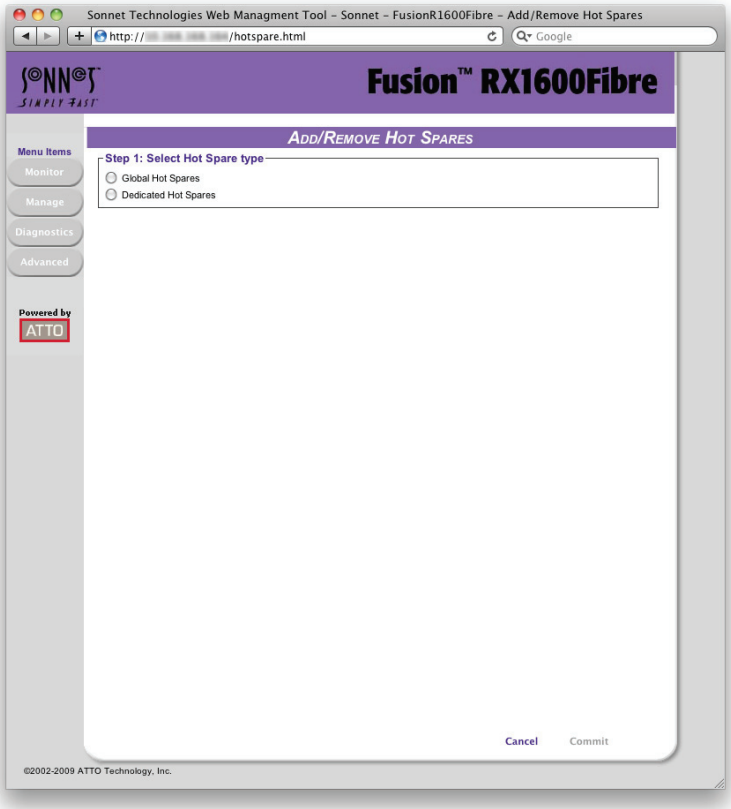

Figure 35

Clean stale RAID configuration data from drives on the Clean RAID Configuration Data page

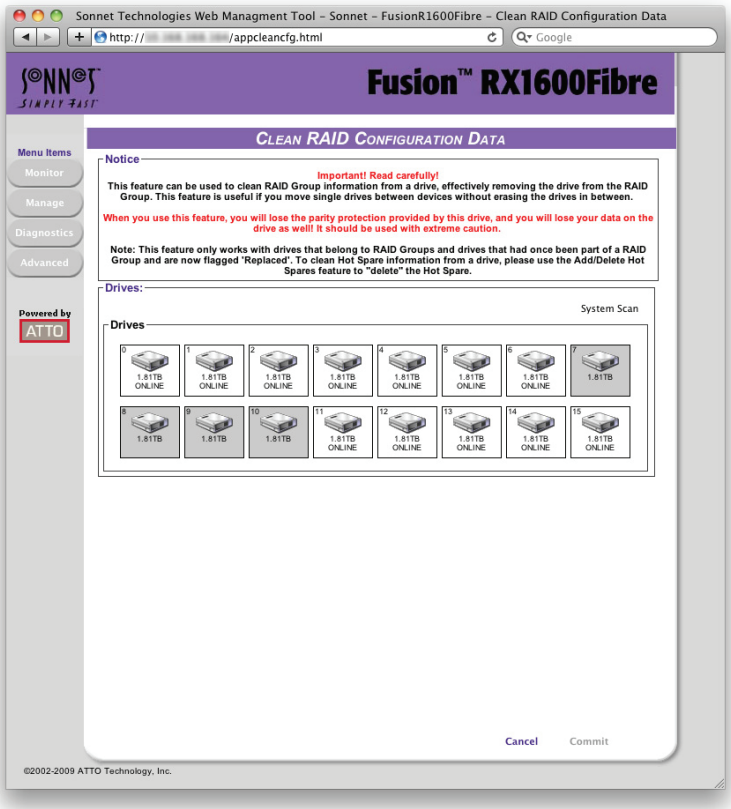

Figure 36

1.8 Modify Storage

Advanced CLI Page

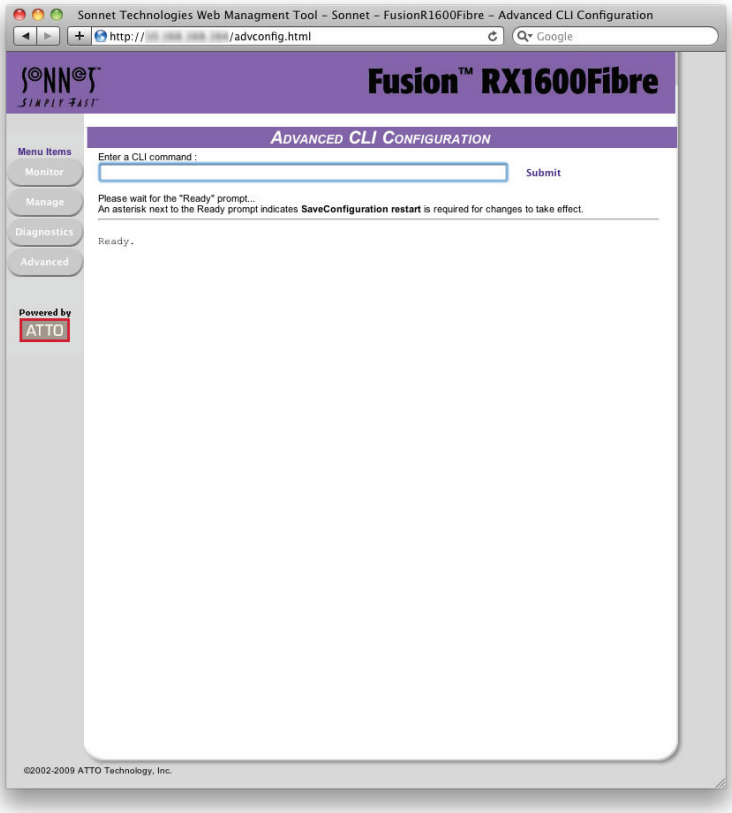

Figure 37

2.0 Manage Sonnet Devices, Configurations

You may save the current configuration of your Fusion RX1600Fibre, use a configuration from another RX1600Fibre, or change the configurations of other RX1600Fibre storage systems using the Sonnet Web Management Tool.

If you have other RX1600Fibre storage systems in the same broadcast domain with no routers between them, and any switches between this RX1600Fibre and the other devices are configured to forward UDP broadcast messages, you may physically identify these devices and manage them from within the browser you are currently using.

You may also save the configuration of the RX1600Fibre you are currently using, or restore it from a previously-saved configuration, or import a configuration from another RX1600Fibre. It is best practice to give your current RX1600Fibre a recognizable name so that you can distinguish it more easily from among other RX1600Fibre storage systems.

Creating a Unique Name for Your RX1600Fibre

You may wish to name your RX1600Fibre if you are going to manage several of them from one browser.

1. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**
2. The **Monitor** page appears. Click the **Manage** button on the left side of the window.
3. Click **Other Devices** in the Select User Process box.
4. Under **Other Devices**, click **Set Appliance Name**.
5. Click **Next**. The **System Configuration** page appears. See **Figure 38** on page 44.
6. Type in a name for your RX1600Fibre in the text box provided.
7. Click **Commit**. The name you typed appears in the upper right corner of the screen under the Fusion RX1600Fibre banner.

Discovering, Managing Other Sonnet Devices

1. Follow steps 1-3 in Creating a Unique Name for Your RX1600Fibre above.
2. Under **Other Devices**, click **Find Sonnet Devices**.
3. Click **Next**. The **Find Devices** page appears. See **Figure 39** on page 44.
4. Click **Rescan**.
5. Select a device from the list. An arrow points to the controller you are currently using.
6. Press the **Identify** button to activate a blinking LED on the selected product. Click the listed device again to stop the blinking LED.
7. Click the device from the list and click the **Launch in Browser** button to view the device's management console.

Saving or Restoring a Configuration

You may save the configuration of the RX1600Fibre you are currently using, restore the configuration from a previously-saved configuration for that RX1600Fibre, or clone a configuration from another RX1600Fibre using the Save/Restore feature.

Note: *It is best practice to save a copy of your configuration settings to a file to easily replace a unit or to set up additional controllers.*

1. Follow steps 1-2 in Creating a Unique Name for Your RX1600Fibre.
2. Click **Fusion RX1600Fibre** in the Select User Process box.
3. Under Fusion RX1600Fibre, click **System Configuration Save/Restore**.
4. Click **Next**. The System Configuration Save/Restore page appears. See **Figure 40** on page 45.
5. Choose the option you wish to use.

WARNING: If you perform a full restore on multiple Fusion RX1600Fibre storage systems on the same SAN, you will have World Wide Name conflicts. Use a partial restore to keep unique WWNs on your SAN.

6. Click **Commit**.
7. A warning box appears. If you wish to continue with the changes you have chosen and restart your RX1600Fibre, select **Yes**. If you do not wish to make the changes, select **No**.

2.0 Manage Sonnet Devices, Configurations

Name the RX1600Fibre enclosure in the Appliance Name box on the System Configuration page

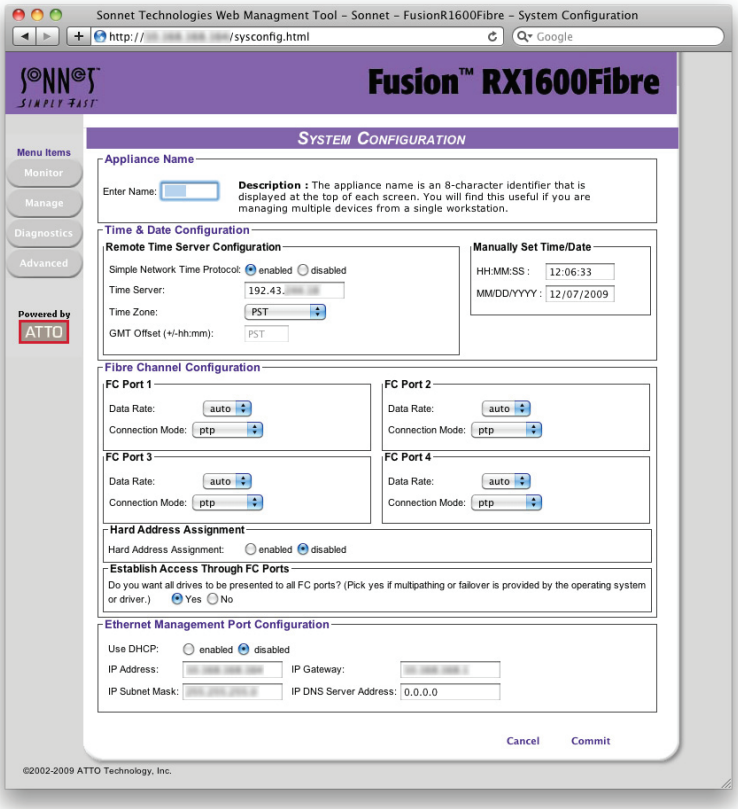

Figure 38

Use the Find Devices page to manage multiple Fusion enclosures from the RX1600Fibre

Figure 39

2.0 Manage Sonnet Devices, Configurations

System Configuration Save/Restore page

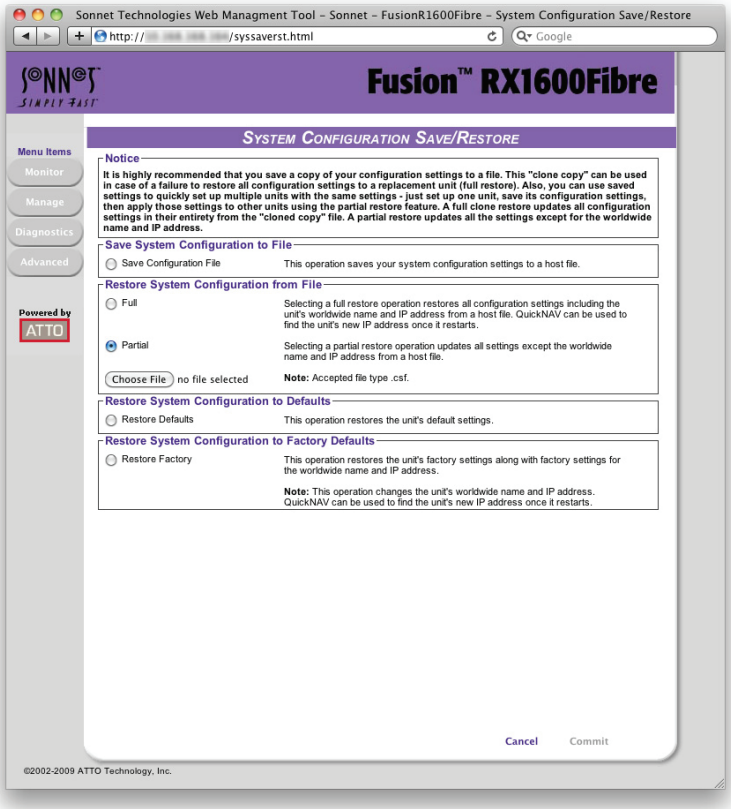

Figure 40

2.1 Interface Options

The best way to manage, monitor and configure the Fusion RX1600Fibre is to use the ExpressNAV Storage Manager, a browser-based application installed in your system, but you may use a terminal emulation program or Telnet.

Using the Sonnet Web Management Tool

Use the Sonnet Web Management Tool to manage, monitor and configure the RX1600Fibre and any attached RX1600 Expansion systems. The choices you make lead you from screen to screen. Choices which are not available are greyed out.

Note: *The RX1600Fibre is initially configured with DHCP enabled. It is best if you have access to a DHCP server.*

1. Work from the computer attached to the RX1600Fibre's Ethernet port. From the CD supplied with your system, run the **QuickNav Utility QuickNAV-Mac** for Mac OS X or **QuickNAV-windows.exe** for Windows.

2. Locate the RX1600Fibre with the serial number recorded earlier.

3. Highlight the serial number.

4. Click **Next**. If a DHCP server is available on your network, an address is assigned automatically by the server. Note the assigned address. If you do not have a DHCP server, get an IP address and subnet mask from your network administrator, type it into the area provided, and click **Next**.

5. Click **Launch Browser**. Your browser points to the Sonnet Web Management Tool splash screen. Press **Return (Enter)**.

6. Type in the user name and password values.

Note: *The default values are user name: root and password: Password. The user name is case insensitive and the password is case sensitive.* **It is best practice to change the user name and password.** *Refer to Changing the Current User Name, Password on page 17.*

The pages which next appear depend on whether or not you have begun configuring the RX1600Fibre.

Using the Serial Port

To connect to a terminal emulation program to manage the RX1600Fibre, use the serial port.

1. Connect the supplied cable between the RX1600Fibre's serial port and a personal computer or server's serial (COM) port.

2. Start a terminal emulation program on the computer, and use it to connect to the RX1600Fibre. For example, if you are using Hyper Terminal on a computer running a Windows operating system:

   a. Type Fusion RX1600Fibre in the **New Connection** dialog box.

   b. Click **OK**.

   c. In the **Connect To** dialog box in the **Connect using** field, select the COM port number to which your serial cable is connected.

   d. Click **OK**.

   e. In the **COM Properties** dialog box select the following values:

   - Bits per second: 115200
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
   - Flow Control: None
   - Terminal type: ASCII
   - Echo: off

   f. Click **OK**.

3. Turn on the RX1600Fibre.

4. After you connect to the RX1600Fibre, startup messages are displayed. The last line in the startup message sequence is Ready. Make adjustments to the RX1600Fibre using the Command Line Interface as described in CLI Provides an ASCII-Based Interface on page i of the Appendix.

Note: *In serial port sessions, there is no prompt on the line below the word Ready. Begin typing commands in the blank line where the cursor is resting. No user name or password is required for serial port access.*

5. To verify that you have connected successfully, type **help** after the **Ready** prompt and press **Return (Enter)**. If a list of all available commands does not appear on the screen, review the steps in this section, check the cable, or contact service personnel until the problem is solved. If you have difficulty using the serial port, verify that you have the correct settings and that your serial cable is less then two meters in length.

2.1 Interface Options

Using Telnet

Up to three Telnet sessions using the Fusion RX1600Fibre's Ethernet management port can be conducted simultaneously. A serial port session can use the CLI while Telnet sessions are open. Whichever session issues the first set CLI command that requires a SaveConfiguration can continue to issue set commands, while the other sessions can only issue get commands or display information. Once a connection is established, refer to CLI Provides an ASCII-based Interface on page i of the Appendix.

1. Connect to the RX1600Fibre from a computer on the same Ethernet network.

2. Start a Telnet session.

Note: *There is more than one way to connect to the FastStream using a Telnet program. Your Telnet program may operate differently than in the following instructions.*

3. At the Telnet prompt, issue the open command
   `telnet > open x.x.x.x`
   where x.x.x.x is the IP address of the RX1600Fibre.

4. If you have to specify a port type, type in the port type "telnet" and the terminal type "SC100".
   ```
   port type: telnet
   terminal type: SC100
   ```

5. Type in the default values for the user name **root** and the password **Password** if you did not set new values in Changing the Current User Name, Password on page 17.

2.2 Update Firmware

Firmware updates are available on the Sonnet Web site.

The ATTO FastStream controller in the Fusion RX1600Fibre has several processors which control the flow of data. The firmware to control these processors can be upgraded in the field using the Sonnet Web Management Tool. Be sure all data is backed up before updating firmware to prevent data loss.

WARNING: Ensure that all I/O to the RX1600Fibre has stopped. During this procedure, do not interrupt the update process.

1. The Fusion RX1600Fibre firmware is distributed as an image file (.ima). Download the appropriate firmware file from the Sonnet Web site (http://www.sonnettech.com/support/) or insert the Installation CD containing the file into your computer.

2. If you're not already in the Sonnet Web Management Tool, type the IP address of your RX1600Fibre in a standard browser. On the splash screen, click E**nter Here.** In the box provided, type in your user name and password, and then c**lick OK.**

3. The **Health and Status Monitor** page appears.

4. Click the **Diagnostics** button on the left side of the window.

5. The **Diagnostics** menu page appears. From the **Select User Process** box, select **Update the Firmware**.

6. Click **Next**. The **Firmware Update** page appears. See **Figure 41** on page 50.

7. If you know the name and location of the .ima file, enter it into the text box provided. If you do not know the file name and location, click **Browse** to navigate to the new firmware and click it until the file name appears in the text box.

8. Click **Upload**.

WARNING: Do not power down the host or the RX1600Fibre. Interrupting the update process makes your Fusion storage system inoperable and you must return it to Sonnet for repair.

9. Wait for a success message to be displayed.

10. Click **Restart**.

11. When the **Diagnostics** menu page appears your new firmware has been uploaded and installed.

2.2 Update Firmware

Update RX1600Fibre firmware to add features and improve usability

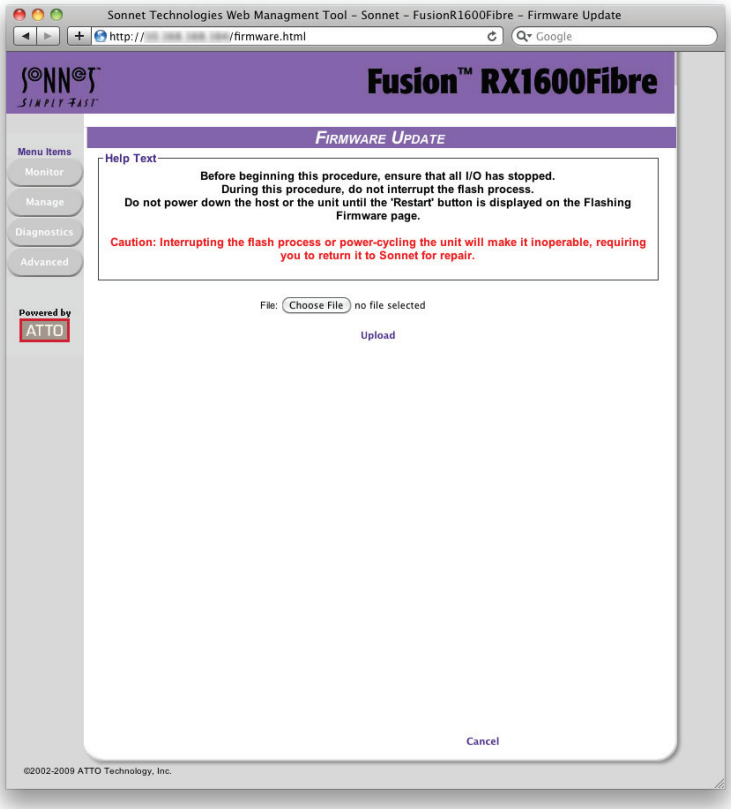

Figure 41

Appendix A - CLI ASCII-Based Interface

The command line interface (CLI) uses ASCII commands typed in the CLI window.

WARNING: Do not use CLI unless you are directed to by a Sonnet technician, as changing parameters may cause loss of data and/or disruption to performance and reliability of the Sonnet RAID controller. The Sonnet Web Management Tool is the preferred tool to operate and manage the Fusion RX1600Fibre and attached Fusion RX1600 Expansion systems.

The command line interface (CLI) is a set of ASCII-based commands which perform configuration and diagnostic tasks. You may use them through the Sonnet Web Management Tool Advanced CLI page (refer to Advanced CLI page on page 35) or by using the serial port interface or the Ethernet management port (refer to Interface Options on page 47).

- CLI commands are context sensitive and generally follow a standard format
  `[Get|Set] Command [Parameter1|Parameter2]`
  followed by the **return** or **enter** key

- CLI commands are case insensitive: you may type all upper or all lower case, or a mixture. Upper and lower case in this manual and the **help** screen are for clarification only.

- Commands generally have three types of operation: get, set and immediate.

- The get form returns the value of a parameter or setting and is an informational command.

- Responses to get commands are followed by **Ready**.

- The set form is an action that changes the value of a parameter or configuration setting. It may require a **SaveConfiguration** command and a restart of the system before it is implemented. The restart can be accomplished as part of the **SaveConfiguration** command or by using a separate **FirmwareRestart** command. A number of set commands may be issued before the **SaveConfiguration** command.

- Responses to **set** commands are either an error message or **Ready. ***. The asterisk indicates you must use a **SaveConfiguration** command to finalize the **set** command.

- Set commands which do not require a **SaveConfiguration** command, defined as immediate commands, are immediately executed.

Support Note: Using certain CLI commands during normal operation can cause a performance drop. Once command actions are complete, performance should return to normal levels.

Figure A-1 *Symbols, typefaces, and abbreviations used to indicate functions and elements of the command line interface used in this manual.*

Symbol	Indicates
–	A range (6 – 9 = 6, 7, 8, 9)
…	Indicates optional repetition of the preceding item
[ ]	Required entry
|	Pick one of
< >	Optional entry
EnclosureIndex	Index designation of an enclosure found by using the SESIdentify command
fl	Fibre Channel LUN ID (0 <= fl <= 31)
fp	Fibre Channel port number (1 <= fp <= 2)
GroupName	The name of the RAID group, designated by the user, to which a block device is assigned. Use RGDisplay to discover RAID group names
MemberIndex	Index designation of a RAID group member as found in the RMStatus command
mp1	Ethernet port used to manage the FastStream
PartitionIndex	Index designation of a partition as found by using the PartitionDisplay command

Appendix A - CLI ASCII-Based Interface

CLI Error Messages

The following error messages may be returned by the Command line Interface

```
ERROR Invalid Command. Type "Help" for command list.

ERROR Wrong/Missing Parameters

Usage: <usage string>

ERROR Invalid RAID Group State

ERROR Invalid Block Device index

ERROR Invalid RAID Member index

ERROR Maximum number of RAID Groups exceeded

ERROR Insufficient number of RAID Group members

ERROR Block Device at specified index no longer
      available

ERROR Insufficient RAID Group members for RAID type
```

CLI Summary

The following chart summarizes the Command Line Interface commands, their defaults, and an example of how to enter the commands. **Please note that** commands which have no default values have a blank entry in that column of the table.

WARNING: Do not use the CLI unless you are directed to by a Sonnet technician, as changing parameters may cause loss of data and/or disruption to performance and reliability of the Fusion storage system.

Command	Default	Example
AutoMap		automap
AutoResume	initialize = enabled rebuild = enabled erase = disabled	set autoresume all disabled
BlockDevClean		blockdevclean 30
BlockDevIdentify		blockdevidentify alpha 3
BlockDevIDStop		blockdevidstop
BlockDevScan		blockdevscan
BootDelay	5	set bootdelay 25
BridgeModel		get bridgemodel
BridgeName		set bridgename Omega6
ClearEventLog		clearеventlog
Date		set date 03/03/2009
DeleteAllMaps		deleteallmaps
DisplayEventLog		displayeventlog
DisplayEventLogFilter	all all all	set displayeventlogfilter gen info all
DriveTest		drivetest begin
DriveTestConfig	not initiated	set drivetestconfig read
DriveTestList		get drivetestlist all
DriveTestStatus		get driveteststatus
DumpConfiguration		dumpconfiguration

Appendix A - CLI ASCII-Based Interface

Command	Default	Example
DumpEventLog		dumpeventlog
EmailFromAddress		set emailfromaddress
EmailNotify	disabled	set emailnotify enabled
EmailNotifyAddress		get emailnotifyaddress
EmailPassword		set emailpassword
EmailServerAddress	0.0.0.0	get emailserveraddress
EmailUsername		get emailusername
EthernetSpeed	auto	set ethernetspeed mp1 100
EventLog	enabled	set eventlog disabled
EventLogFilter	all all all	set eventlogfilter gen info all
Exit		exit
FCConnMode	loop	set fcconnmode all ptp
FCDataRate	auto	get fcdatarate all
FCHard	disabled	set fchard enabled
FCHardAddress	fp1=3; fp2=4, fp3=5, fp4=6	set fchardaddress 1 122
FCMultiNode	disabled	set fcmultinode enabled
FCPortErrors		get fcporterrors all
FCPortList		fcportlist
FCWWName		get fcwwname 1
FirmwareRestart		firmwarerestart
Help		help eventlog
HSAdd		hsadd 3
HSDisplay		hsdisplay
HSRemove		hsremove 3
IdentifyBridge	disabled	set identifybridge enabled
Info		info
IPAddress	10.0.0.1	get ipaddress mp1
IPDHCP	enabled	set ipdhcp mp1 disabled
IPDNSServer		set ipdnsserver mp1 172.15.12.123
IPGateway	0.0.0.0	get ipgateway mp1
IPSubnetMask	255.255.0.0	get ipsubnetmask mp1
IsReserved		isreserved
MaxOpTemp	70	get maxoptemp
Metrics		metrics display all
MinOpTemp	0	set minoptemp 10
OpTempWarn	5	set optempwarn 15
Partition		partition alpha1 6 4 GB

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Command	Default	Example
PartitionDisplay		partitiondisplay alpha1
PartitionMerge		partitionmerge all
PartitionWriteCache		set partitionwritecache enabled
PartitionSplit		partitionsplit alpha1 22 2
PassThroughMode	disabled	set passthroughmode all
PassThroughPersistent		passthroughpersistent
PassThroughRediscover		passthroughredicsover
Password	Password	set password
Performance		get performance 2
Ping		ping mp1 192.42.155.155
RAIDRebuildPriority	same	set raidrebuildpriority low
RAIDSpeedWriteLimit	8	set raidspeedwritelimit 16
ReadOnlyPassword	Password	set readonlypassword
ReadOnlyUsername	user	set readonlyusername
Reserve		reserve
ResetFCPortErrors		resetfcporterrors 1
RestoreConfiguration		restoreconfiguration default
RGAddStorage		rgaddstorage groupname1 span commit
RGAutoRebuild	disabled	set rgautorebuild all enabled
RGCancelAddStorage		rgcanceladdstorage groupname1
RGCommit		rgcommit all
RGCreate		rgcreate groupname1 raid0
RGDelete		rgdelete groupname1
RGDiskWriteCache		set rgdiskwritecache g1 enabled
RGDisplay		rgdisplay all
RGErase		rgerase groupname1
RGHaltConversion		rghaltconversion groupname1
RGHaltErase		rghalterase groupname1
RGHaltInitialization		rghaltinitialization groupname1
RGHaltRebuild		rghaltrebuild groupname1
RGMemberAdd		rgmemberadd groupname1 30
RGMemberRemove		rgmemberremove groupname1 30
RGPrefetch	0	rgprefetch groupname1 2
RGRebuild		rgrebuild groupname1
RGResumeConversion		rgresumeconversion groupname1
RGResumeErase		rgresumeerase groupname1
RGResumeInitialization		rgresumeinitialization groupname1

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Command	Default	Example
RGResumeRebuild		rgresumerebuild groupname1
RGSectorSize	512	setrgsectorsize groupname1 8192
RGSpanDepth	1	set rgspandepth groupname1 22
RGSpeedRead	auto	set rgspeedread groupname1 enabled
RGUnmap		rgunmap groupname1
RMStatus		rmstatus groupname1
Route		route fc 1 0 raid alpha1 6
RouteDisplay		routedisplay fc
SASPortList		
SASTargets		sastargets
SaveConfiguration		saveconfiguration
SerialNumber		get serialnumber
SerialPortBaudRate	115200	set serialportbaudrate 19200
SerialPortEcho	enabled	get serialportecho
SES	enabled	set ses disabled
SESAlarmTest		sessalarmtest 22 set
SESDiskFailureAlarm	disabled	set sesdiskfailurealarm enabled
SESEnclosures		sesenclosures
SESIdentify	off	set sesidentify all
SESIdentifyStop		sesidentifystop all
SESMute		
SESPoll	30	set sespoll 0
SESStartingSlot	1	set sesstartingslot 2
SESStatus		sesstatus
SNTP	enabled	get sntp
SNTPServer	192.43.244.18	set sntpserver 129.6.15.28
TailEventLog		taileventlog
Temperature		get temperature
Time		set time 03:32:30
TimeZone	EST	set timezone pst
UserName	root	set username Binky
VerboseMode	enabled	set verbosemode disabled
VirtualDriveInfo		virtualdriveinfo
WrapEventLog	enabled	set wrapeventlog disabled
zModem		zmodem receive

Appendix A - CLI ASCII-Based Interface

CLI Command Explanations

Command line interface commands are listed alphabetically with explanations of what they are used for, their defaults and syntax.

WARNING: Using CLI without contacting a Sonnet technician is not recommended because changing parameters may cause loss of data and/or disruption to performance and reliability of the Fusion storage system.

- **AutoMap (Immediate, Disabled on Error)**
  Automatically assigns a subset of source protocol LUNs to a subset of target destination devices visible to the unit. The unit reports a five-second delay while it scans for devices. All previous maps are deleted.

  If FCMultiNode is enabled (multiple node):

  ```
  AutoMap <fp>
  ```

  SaveConfiguration command required

  If FCMultiNode is disabled (single node):

  ```
  AutoMap
  ```

  SaveConfiguration command required

- AutoResume
  Regulates the AutoResume features for interrupted rebuild and erase operations at startup. If no group name is specified, all existing RAID groups are affected.

  Default: enabled for AutoResume Rebuild, Initialize disabled for AutoResumeErase

  ```
  set AutoResume [Rebuild | Erase |Initialize | All ] [enabled | disabled] <group name>
  ```

- **BlockDevClean (Immediate, Disabled on Error)**
  Removes any RAID configuration data from the block device with the specified block ID.

  BlockDevClean [BlockDevID]

WARNING: All RAID group setup information is lost when the BlockDevClean command is performed, therefore all data is lost. Back up your files before performing this command.

- **BlockDevIdentify (Immediate, Disabled on Error)**
  Turns on a drive activity LED on the Fusion drive enclosure for a specified drive until a BlockDevIDStop command is given. Use either RAID group name and member index, or block ID.

WARNING: The BlockDevIdentify command is intended for diagnostic purposes only. Executing this command may adversely impact the performance and throughput of the Fusion storage system for the time that the LED is illuminated.

```
BlockDevIdentify <Groupname> [BlockDevID | member index]
```

- **BlockDevIDStop (Immediate, Disabled on Error)**
  Turns off the previously identified disk drive's activity LED.

  ```
  BlockDevIDStop
  ```

- **BlockDevScan (Immediate, Disabled on Error)**
  Lists all currently-connected drives and any potential RAID group association. Each drive listed is assigned a unique index at the time of the scan which is used to identify drives for other CLI operations.

  ```
  BlockDevScan
  ```

- **Boot Delay**
  Regulates the delay (in seconds) which the unit waits after startup before allowing hosts to detect target devices. The value 0 produces no delay.

  Default: 5

  ```
  set BootDelay [0-255]
  get BootDelay
  ```

- **BridgeModel**
  Reports specific model and firmware information.

  ```
  get BridgeModel
  ```

- **BridgeName**
  Specifies an ASCII name assigned to the unit to identify individual units. It is not the World Wide Name. Changes take effect immediately. The name may be contain up to 8 characters.

  ```
  set BridgeName [name]
  ```

  SaveConfiguration Restart command required

  ```
  get BridgeName
  ```

- **ClearEventLog (Immediate)**
  Clears the contents of the EventLog. No new entries are recorded until the operation is completed.

  ```
  ClearEventLog
  ```

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- **Date**
  Sets/displays the current date. The date range is 01/01/2000 to 12/31/2099.

```
set Date [MM]/[DD]/[YYYY]
get Date
```

- **DeleteAllMaps (Immediate, Disabled on Error)**
  Removes all mapped devices from the map table. Upon the subsequent POST, the default maps are loaded if no maps are present.

```
DeleteAllMaps
```

  SaveConfiguration command required

- **DisplayEventLog (Immediate, Disabled on Error)**
  Displays the EventLog. The event log may be filtered using the DisplayEventLogFilter command. The optional parameter n is the number of lines to be displayed as a single page with no user interaction. After the command has executed, use +, - or = to scroll through the log. Type quit and press Return (Enter) to exit the command.

```
DisplayEventLog <n>
```

- **DisplayEventLogFilter (Immediate, Disabled on Error)**
  Filters the display of data for specified subsystems and levels during DisplayEventLog mode. Valid event log subsystem entries are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level are displayed.

  Default: all all all

```
set DisplayEventLogFilter [subsystem | all]
[level | all] [all | none]
get DisplayEventLogFilter [subsystem |all]
[level | all]
```

- **DriveTest (Immediate, Disabled on Error)**
  Starts or stops a drive test with the previously specified configuration. Drives being tested are not available for RAID configuration or RAID operations. Only one test can be run at a time.

```
DriveTest [Begin | Cancel]
```

- **DriveTestClearList**
  Configures the next drive test to perform one of the following operations: initialize (destructive write-only), read (nondestructive read-only), verify (destructive verify), or init-verify (destructive write-read-verify). The test is not started until the DriveTest **Begin** command is given.

```
set DriveTestConfig [init | read | verify |
init-verify]
get DriveTestConfig
```

- **DriveTestConfig (Disabled on Error)**
  Configures the next drive test to perform one of the following operations: initialize (destructive write-only), read (nondestructive read-only), verify (destructive verify), or init-verify (destructive write-read-verify). The test is not started until the DriveTest **Begin** command is given.

```
set DriveTestConfig [init | read | verify |
init-verify]
get DriveTestConfig
```

- **DriveTestList (Disabled on Error)**
  Specifies drives to be run in the next drive test. This command can be called with different eligible block IDs and each one is added to the list. Drives which are not part of a RAID group or are not hot spares are eligible. The all parameter automatically chooses eligible drives. The test is not started until the DriveTest **Begin** command is given..

```
set DriveTestList [drive [BlockDevID] | all]
get DriveTestList
```

- **DriveTestStatus**
  Displays the status of the currently running drive test but does not display performance metrics. If a block device ID is not running or cannot be found, its state is **idle** and percent complete is **0**.

```
get DriveTestStatus <drive [BlockDevID]>
```

- **DumpConfiguration (Immediate)**
  Displays the unit's configuration to the **Advanced** page of the Sonnet Web Management Tool or a terminal emulation or Telnet session. The record may not be displayed completely in the Sonnet Web Management Tool page.

```
DumpConfiguration
```

- **DumpEventLog (Immediate)**
  Displays the contents of the EventLog to the Advanced page of the Sonnet Web Management Tool or a terminal emulation or Telnet session. The record may not be displayed completely in the Sonnet Web Management Tool page.

```
DumpEventLog
```

- **EmailFromAddress**
  Configures the Email address that the unit uses to communicate with the Email server. Full Email address is a fully qualified Internet Email address, not more than 128 characters long.

```
set EmailFromAddress [full email address]
get EmailFromAddress
```

- **EmailNotify**
  Regulates Email notification.

  Default: disabled.
  ```
  set EmailNotify [enabled | disabled]
  get EmailNotify
  ```

- **EmailNotifyAddress**
  Configures notification addresses. Index is a number between 1 and 5. Full Email address is a fully qualified Internet Email address, not more than 128 characters long. Emails are sent based on the warning level you set to trigger an Email alert.

  Warning levels
  None: no Emails
  Critical: only critical severity events
  Warning: warnings and critical events
  Informational: information
  All: all warnings, critical events and informational messages

  ```
  set EmailNotifyAddress [index] [full email address] [warning level]
  get EmailNotifyAddress <index | all>
  ```

- **EmailPassword**
  Configures the password which authenticates the login to the SMTP Email server. The password must not be more than 64 characters. A password is not required if the Email server does not require authentication.

  ```
  set EmailPassword
  ```

  SaveConfiguration command required

- **EmailServerAddress**
  Configures the address of the server the unit must contact in order to send out Email notifications using either an Email address (xxx.xxx.x.x) or a fully qualified domain name (mail.myserver.com).

  Default: 0.0.0.0
  ```
  set EmailServerAddress [IP address |domain name]
  ```

  SaveConfiguration command required

  ```
  get EmailServerAddress
  ```

- **EmailUsername**
  Configures the user name which authenticates the login to the SMTP Email server. The user name must not be more than 128 characters. A user name is not required if the Email server does not require authentication.

  ```
  set EmailUsername [username]
  ```

  SaveConfiguration command required

  ```
  get EmailUsername
  ```

- **EthernetSpeed**
  Regulates the speed of the RX1600Fibre's Ethernet port. If **Auto** is enabled, the Ethernet speed is negotiated. When hard set, 10 and 100 speeds are half duplex.

  Default: auto
  ```
  set EthernetSpeed [mp1] [10 | 100 | auto]
  ```

  SaveConfiguration Restart command required

  ```
  get EthernetSpeed [mp1]
  ```

- **EventLog (Enabled, Disabled on Error)**
  Regulates event logging. When enabled, records various system errors to the event log.

  ```
  set EventLog [enabled | disabled]
  get EventLog
  ```

- **EventLogFilter (Enabled, Disabled on Error)**
  Filters data from specific unit subsystems and levels when event logging is enabled. The specific entries supported are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level are displayed.

  ```
  set EventLogFilter [subsys | all] [eventlevel | all] [all | none]
  get EventLogFilter [subsys | all] [eventlevel | all]
  ```

- Exit (Immediate)
  Terminates the current CLI session over Telnet. This command has no effect if used during a serial CLI session.

  ```
  Exit
  ```

• **FCConnMode**
Specifies the connection mode the unit uses when communicating across a Fibre Channel network.

Connection modes:
FC_AL arbitrated loop: loop
Point-to-point: ptp
auto-negotiation, loop preferred: loop-ptp
auto-negotiation, ptp preferred: ptp-loop:

Default: loop
```
set FCConnMode [fp| all] [loop | ptp | loop-ptp
| ptp-loop]
```

SaveConfiguration Restart command required

```
get FCConnMode [fp | all]
```

• **FCDataRate**
Specifies the Fibre Channel data rate at which operation will occur. If no connection has been made, the data rate in the Info command output toggles among 1Gb, 2Gb or 4Gb on hardware capable of 4Gb per sec., and 8Gb on hardware capable of 8Gb per sec.

```
set FCDataRate [fp | all] [1Gb | 2Gb | 4Gb |
8Gb | auto]
get FCDataRate [fp | all]
```

• **FCHard**
Regulates Fibre Channel hard address assignment. When enabled, the unit tries to use its internal hard address as its address on the Fibre Channel loop. Under soft addressing, the unit loop address is assigned during loop initialization.

Default: disabled
```
set FCHard [enabled | disabled]
```

SaveConfiguration Restart command required

```
get FCHard
```

• **FCHardAddress**
Specifies the value used as the FC-AL hard address. This value represents the address that will be used if the FCHard command is enabled. Valid Fibre Channel hard address values are from 0 through 125.

```
set FCHardAddress [fp | all] [address]
get FCHardAddress [fp | all]
```

• **FCMultiNode**
Determines the reported identity of Fibre Channel ports. When enabled (multiple node mode), each port reports a separate unique Node Name; logical units may be mapped to any port. When disabled (single node), each port reports the same Node Name and each logical unit map is applied to all ports.

Support Note: Changing the FC port reporting causes all maps to be deleted: you must perform a SaveConfiguration command before creating new maps using the AutoMap or Route commands.

Default: disabled
```
set FCMultiNode [enabled | disabled]
get FCMultiNode
```

• **FCPortErrors**
Displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or use of the ResetFCPortErrors command.

```
get FCPortErrors [fp | all]
```

• **FCPortList**
Displays a list of available FC ports and their current status. Valid reported status values are **Up**, **Down**, **Failed**, **Reserved** and **Disabled**.

```
FCPortList
```

• **FCWWName**
Reports the World Wide Port Name of the Fibre Channel interface referenced. Each Fibre Channel port has an individual and unique 8-byte Port Name.

```
get FCWWName [fp | all]]
```

• **FirmwareRestart**
Resets and reinitializes the unit firmware. Use the forced option to override any CLI reservations held by other sessions.

```
FirmwareRestart <forced>
```

• **Help (Immediate)**
Displays a list of available commands. If command name is specified, displays detailed command-specific information

```
Help <command>
```

• **HSAdd (Immediate)**
Assigns a drive to the Hot Spare pool. If RAID and RAID group name are specified, the Hot Spare is assigned only to the specified RAID group. If no group name is specified, the Hot Spare is a global Hot Spare and available for use by any RAID group.

```
HSAdd <RAID Group Name> [BlockDevID]
```

- **HSDisplay (Immediate)**
  Lists all drives in the Hot Spare pool.

```
HSDisplay
```

- **HSRemove (Immediate)**
  Removes a drive from the Hot Spare pool

```
HSRemove [BlockDevID | all]
```

- **IdentifyBridge (Immediate)**
  When enabled, the fault LED on this unit blinks so that hardware may be identified. Disabling this option cancels the blinking..

  Default: disabled
```
set IdentifyBridge [enabled | disabled]
get IdentifyBridge
```

- **Info (Immediate)**
  Displays version numbers and other production information for key components. Use the optional "brief" parameter to display a more concise subset of system information.

```
Info <brief>
```

- **IPAddress**
  Controls the current IP address of the RX1600Fibre's Ethernet port. If IPDHCP is enabled, the get command reports the current IP address assigned by the network DHCP server, followed by the DHCP identifier.

  Default: 10.0.0.1
```
set IPAddress [mp1] [xxx.xxx.xxx.xxx]
```

  SaveConfiguration Restart command required

```
get IPAddress [mp1]
```

- **IPDHCP**
  Regulates how the unit acquires its IP address. When disabled, the unit uses the IP address specified by the IPAddress CLI command; when enabled, the unit gets its IP address from a DHCP server.

  Default: enabled
```
set IPDHCP mp1 [enabled | disabled]
```

  SaveConfiguration Restart command required

```
get IPDHCP
```

- **IPDNSServer**
  Controls the current DNS Server address. If IPDHCP is enabled, the DNS Server address is automatically detected. If IPDHCP is disabled, you must set the address manually using this command.

```
set IPDNSServer mp1 [xxx.xxx.xxx.xxx]
get IPDNSServer
```

- **IPGateway**
  Controls the current default gateways used by the RX1600Fibre's Ethernet port. If IPDHCP is enabled, the **get** command reports the current IP gateway assigned by the network DHCP server.

  Default: 0.0.0.0
```
set IPGateway [mp1] [xxx.xxx.xxx.xxx]
```

  SaveConfiguration Restart command required

```
get IPGateway [mp1]
```

- **IPSubnetMask**
  Controls the current subnet masks used by the RX1600Fibre's Ethernet port. If IPDHCP is enabled, the **get** command reports the current IP subnet mask assigned by the network DHCP server.

  Default: 255.255.0.0
```
set IPSubnetMask [mp1] [xxx.xxx.xxx.xxx]
```

  SaveConfiguration Restart command required

```
get IPSubnetMask [mp1]
```

- **IsReserved (Immediate)**
  Displays the reservation status of the current services session or interface.

```
IsReserved
```

- **MaxOpTemp**
  Regulates or lists the maximum operating temperature. Valid entries are from 55 through 70°Celsius.

  Default: 70
```
set MaxOpTemp [55 – 70]
```

  SaveConfiguration Restart command required

```
get MaxOpTemp
```

- **Metrics (Immediate)**
  Controls the collection of standard data metrics within a product based on the command parameters.

```
Metrics [Start | Stop | Display] [drive
[BlockDevID] | all | running]
```

- **MinOpTemp**
  Regulates or lists the minimum operating temperature. Valid entries are from 0 through 15° Celsius.

  Default: 0
```
set MinOpTemp [0 – 15]
```

  SaveConfiguration Restart command required

```
get MinOpTemp
```

- **OpTempWarn**
  Regulates or lists the offset when a warning is issued before a thermal control event. Valid entries are from 0 to 15° Celsius.

  Default: 5

```
set OpTempWarn [0 – 15]
```

  SaveConfiguration Restart command required

```
get OpTempWarn
```

- **Partition (Immediate)**
  Creates a specified partition to the specified capacity in Gigabytes (GB), Megabytes (MB), or blocks. The specified capacity must be smaller than the specified partition's current capacity. A new partition is created to acquire the remainder of the original partition's space.

```
Partition [GroupName] [PartIndex] [capacity] [GB
| MB | blocks]
```

- **PartitionDisplay (Immediate)**
  Lists all the partitions available in the specified RAID group. The partitions are listed contiguously (as opposed to index order). GroupName is the ASCII name of the RAID Group for which partitions will be displayed.

```
PartitionDisplay [GroupName]
```

- **PartitionMerge (Immediate)**
  Merges the specified contiguous partitions into one partition. GroupName is the ASCII name of the RAID Group containing the partitions to merge. PartIdx is the index of a partition to merge, along with a number of contiguous partitions to merge to that index. **All** indicates that all partitions in the RAID Group will be merged into a single Virtual Disk. The RAID Group must not be in a NEW state. None of the partitions to merge may be mapped.

```
PartitionMerge [GroupName] [[[PartIdx] [2-128]] |
All]
```

- **PartitionSplit (Immediate)**
  Divides the specified partition into one or more partitions whose capacities are evenly distributed among the capacity of the original partition. GroupName is the ASCII name of the RAID Group containing the partition to split. PartIdx is the index of the partition to split. The partition to split cannot be mapped and the RAID group must not be in a NEW state.

```
PartitionSplit [GroupName] [PartIdx] [2-128]
```

- **PartitionWriteCache**
  If enabled, RAID internal Write Cache performs with a higher write rate providing a small risk of data loss after a system failure. If disabled, RAID internal Write Cache performs at a higher level of data integrity with lower write performance..

```
set PartitionWriteCache [GroupName] [PartIdx]
[enabled | disabled]
get PartitionWriteCache [GroupName] [PartIdx]
```

- **PassThroughMode**
  Specifies the non-disk device types which are automatically mapped at startup. Use **all** to map all non-disk devices. Use **SES** to map dedicated SES processor LUNs. Use **non-SES** to map all non-SES devices. Use **disabled** to disable the passthrough mode.

  Default: disabled
```
set PassThroughMode [all | SES | non-SES |
disabled]
get PassThroughMode
```

- **PassThroughPersistent**
  Stores maps for currently-attached passthrough devices to persistent memory.

```
PassThroughPersistent
```

- **PassThroughRediscover**
  Makes any previously-deleted pass through target devices visible to the host.

```
PassThroughRediscover
```

- **Password**
  Specifies the password used for all sessions: Telnet, FTP and Sonnet Web Management Tool. Password is case sensitive, from 0 through 32 characters, and cannot contain spaces. Configure an empty password by pressing **Return (Enter)** when asked to designate a new password and confirmation.

  Default: Password
  ```
  set Password
  ```

- **Performance**
  Lists performance data for the specified Fibre Channel port including the average rate (MB/sec.) and number of I/Os measured over the previous sampling period. Samples are taken about every second. Successful SCSI Read (08h, 28h) and Write (0Ah, 2Ah) commands are considered I/Os.

  ```
  get Performance <fp>
  ```

- **Ping**
  Sends an ICMP echo request to the specified host.

  ```
  ping [mp1] [xxx.xxx.xxx.xxx] <count <size>>
  ```

- **RAIDRebuildPriority**
  Sets or displays the RAID rebuild priority. A RAID rebuild priority set to high gives higher priority to RAID rebuilds and lower priority to the processing of simultaneous read/write transactions. A RAID rebuild priority set to low gives lower priority to the rebuild and a higher priority to read/write transactions. Set to same, the RAID rebuild and processing of read/write transactions is the same.

  Default: same
  ```
  set RAIDRebuildPriority <GroupName | all> [high
  | low | same]

  SaveConfiguration command required

  get RAIDRebuildPriority <GroupName | all>
  ```

- **RAIDSpeedWriteLimit**
  Specifies or displays the limit on the RAID Speed Write function. **Warning**: *Changing the default setting (8) may result in poor performance or timeouts*. A lower setting is recommended when using multiple initiators. A higher setting may improve performance with multiple streams of sequential write I/O, but too high a setting will cause timeouts.

  Default: 8
  ```
  set RAIDSpeedWriteLimit [0-256]
  get RAIDSpeedWriteLimit
  ```

- **ReadOnlyPassword**
  Specifies a password which allows only read and no writes. It is case sensitive, 0 to 32 characters, and cannot contain spaces. An empty password can be configured by not specifying one.

  Default: Password
  ```
  set ReadOnlyPassword
  ```

- **ReadOnlyUsername**
  Specifies the user name which allows only read and no writes. It is case insensitive, 1 to 32 characters, and cannot contain spaces.

  Default: user
  ```
  set ReadOnlyUsername [username]
  get ReadOnlyUsername
  ```

- **Reserve (Immediate)**
  Reports the state of CLI reservation for the current CLI session. If the command reports that Reservations are enabled, then another CLI session has control of parameter modification on the unit.

  ```
  Reserve
  ```

- **ResetFCPortErrors**
  Resets all Fibre Channel error counts for the specified port to zero.

  ```
  ResetFCPortErrors [fp | all]
  ```

- **RestoreConfiguration (Immediate, Disabled on Error)**
  Use **default** to force the NVRAM setting to its original defaults. Use **factory** to force the NVRAM setting to its original defaults, including the unit's World Wide Name (WWN). Use **saved** to undo any changes made since the last save.

  ```
  RestoreConfiguration [default | factory | saved]
  ```

- **RGAddStorage (Immediate)**
  Adds additional storage to an existing RAID group. **Warning**: *This feature is not supported under Mac OS X*. Up to 10 indices of available block devices, provided by the BlockDevScan command, may be added to the RAID group. If this list is omitted, use **RGMemberAdd** instead of **RGAddStorage**. If you use **Commit** to automatically save the configuration, all user data is removed from each new member drive. If you do not use Commit, you must use the command **RGCommit** to save the configuration. If you do not use the Commit parameter and you have not used RGCommit, you may use the command RGCancelAddStorage. **Note**: *Mirrors cannot be added to a RAID 4, RAID 5, RAID 6, or DVRAID RAID group.*

  ```
  RGAddStorage [GroupName] [Mirror | Stripe |
  Span] <BlockDevID... <commit>
  ```

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- **RGAutoRebuild**
  RGAutoRebuild enables and disables Auto-Rebuild functionality for one or more RAID Groups. Auto-Rebuild uses drives assigned as Hot Spares, followed by all other available drives, as automatic replacements for any member that fails. Auto-

  Default: disabled
  ```
  set RGAutoRebuild [GroupName | all] [enabled | disabled]
  get set RGAutoRebuild [GroupName | all]
  ```

- **RGCancelAddStorage (Immediate, Disabled on Error)**
  Cancels the **RGAddStorage** command.

  ```
  RGCancelAddStorage [GroupName]
  ```

- **RGCommit (Immediate, Disabled on Error)**
  Saves a RAID group's configuration to its member drives. If you add storage to an existing RAID group, the additional storage is stamped with the existing group's configuration. Use **Advanced** to initialize new drives, erasing and verifying the drive media; the RAID group is unavailable until the operation completes. Use **Express** to perform a background initialization; the RAID group is immediately available for use.

  ```
  RGCommit < GroupName <Advanced | Express> | all <Advanced | Express> >
  ```

- **RGCreate (Immediate)**
  Creates a new RAID group with the name, RAID level and interleave level, if specified. KB denotes interleave in kilobytes. Without the KB suffix, interleave is set in 512 byte blocks. If interleave is not provided, the system's default interleave is used.

  ```
  RGCreate [Group Name] [RAID [0|1|10|4|5|6] |JBOD] <8KB|16KB|32KB|64KB|128KB|256KB|512KB|1024 KB |16|32 |64|128|256|512|1024|2048>
  ```

- **RGDelete**
  Deletes all RAID group configurations or the specified RAID group configuration.

  ```
  RGDelete [group name | all]
  RGDisplay <GroupName | all>
  ```

- **RGDiskWriteCache (Immediate)**
  If enabled, produces higher write performance with a small risk of data loss after a system failure. If disabled, drives are updated at the expense of some write performance.

  ```
  set RGDiskWriteCache [GroupName | all] [enabled | disabled]
  get RGDiskWriteCache [GroupName | all]
  ```

- **RGDisplay (Immediate)**
  Displays status information for a single RAID group, or if **All** is used, all available RAID groups.

  ```
  RGDisplay <GroupName | all>
  ```

- **RGErase (Immediate)**
  Erases the data from the specified existing RAID group.
  Warning: *All data is lost when you use the RGErase command!*

  ```
  RGErase [GroupName]
  ```

- **RGHaltConversion (Immediate)**
  Stops the conversion on the specified existing RAID group.

  ```
  RGHaltConversion [GroupName]
  ```

- **RGHaltErase (Immediate)**
  Stops the erase on the specified RAID group.

  ```
  RGHaltErase [GroupName]
  ```

- **RGHaltInitialization (Immediate)**
  Stops the initialization process on the specified existing RAID group.

  ```
  RGHaltRebuild [GroupName]
  ```

- **RGHaltRebuild (Immediate)**
  RGHaltRebuild halts the rebuild(s) on the specified existing RAID Group. Optional parameter MemberIndex specifies the RAID Member whose rebuild will be halted. For RAID 6 Groups, if a MemberIndex is specified, all rebuilding RAID Members on the span with that MemberIndex will halt as well. If no MemberIndex is specified, all rebuilds on that RAID Group will be halted.

  ```
  RGHaltRebuild [GroupName] <MemberIndex>
  ```

- **RGMemberAdd (Immediate)**
  Adds available block devices to a new RAID group or as part of an RGAddStorage operation and resets the number of RAID partitions to 1. Up to 10 block IDs may be specified. If all is specified, then all available unused blocks are added to the RAID group until the maximum number of RAID group members has been met.

  ```
  RGMemberAdd [GroupName | all] [BlockDevID]
  ```

- **RGMemberRemove (Immediate)**
  Removes a RAID member from a new RAID group and resets the number of partitions to 1.

  ```
  RGMemberRemove [GroupName] [MemberIndex]
  ```

- **RGPrefetch**
  Specifies or lists the prefetch value..

```
set RGPrefetch [GroupName | all] [Value 0 to 6]
get RGPrefetch [GroupName | all]
```

- **RGRebuild (Immediate)**
  Starts rebuilding the specified existing RAID Group. Optional parameters MemberN specify the members to rebuild. If no member is specified, all degraded members will be rebuilt. Optional parameters BlockDevID1 allows an available block device to be substituted for the RAID Member currently assigned to the Member Index. RAID 6 groups can rebuild two members using the optional **and**.

```
RGRebuild [GroupName] <Member1> <BlockDevID1>
<and> <Member2> <BlockDevID2>
```

- **RGResumeConversion (Immediate)**
  Continues the stopped conversion on the specified existing RAID group.

```
RGResumeConversion [GroupName]
```

- **RGResumeErase (Immediate)**
  Continues the erase on the specified existing RAID group.

```
RGResumeErase [GroupName]
```

- **RGResumeInitialization (Immediate)**
  Continues the initialization on the specified existing RAID group.

```
RGResumeInitialization [GroupName]
```

- **RGResumeRebuild**
  Continues the rebuild on a RAID group. For RAID 6 groups, if a Member Index is specified, all rebuilds stopped on the span with that Member Index resume. If no Member Index is specified, all stopped rebuilds on that RAID Group are resumed.

```
RGResumeRebuild [Group Name] <Member Index>
```

- **RGSectorSize**
  Set or get the sector size of the specified RAID Group. The desired RAID Group sector size must be evenly divisible by the sector size of any member disk. 512 bytes is the default size for most operating systems. Use 4K sectors to enable large volume support (greater than 2TB, up to 16TB) in Windows XP (32-bit).

  Default: 512

```
set RGSectorSize [GroupName] [512-8192]
get RGSectorSize [GroupName]
```

- **RGSpanDepth**
  Regulates the span depth on the specified existing new RAID group for all RAID configurations except JBOD, which implicitly supports spanning as members are added.

```
set RGSpanDepth [GroupName] [SpanDepth [1-16]]
get RGSpanDepth [GroupName]
```

- **RGSpeedRead**
  Performs look-ahead during reads from RAID group member disks for all or the specified RAID group. Choose **Auto** to base the read algorithm on each I/O command.

```
set RGSpeedRead [GroupName | all] [enabled |
disabled | auto]
get RGSpeedRead [GroupName | all]
```

- **RGUnmap (Immediate)**
  Removes all mapped partitions of the specified RAID group from the routing table. The partitions themselves will be unaffected, though they will now be inaccessible to any initiators.

```
RGUnmap [GroupName | all]
```

- **RGWaitTimeout (Disabled on Error)**
  Specifies the maximum time in seconds that the system waits to discover previously-configured RAID groups. The time out is used during system boot time and when the BlockDevScan command is issued.

  Default: 5

```
set RGWaitTimeout [1-3600]
```

  SaveConfiguration Restart command required

```
get RGWaitTimeout
```

- **RMStatus (Immediate)**
  Lists the status of all RAID members within a RAID group or a specific RAID member.

```
RMStatus [GroupName] <MemberIndex>
```

- **Route**
  Maps a RAID partition or SAS/SATA PassThrough device onto the Fibre Channel network as an FC LUN (SCSI-FCP LUN). Mapping a RAID partition to a current FC LUN overwrites the previous map. If the unit is configured for verbose mode, overwriting a map requires secondary confirmation.

  If FCMultiNode is enabled:

```
Route FC [fl] [ [RAID [Group Name] [Part Index]]
| [SAS [SAS Index]]| Delete ]
```

  If FCMultiNode is disabled:

```
Route FC [fl] [ [RAID [Group Name] [Part Index]]
| [SAS [SAS Index]]| Delete ]
```

- **RouteDisplay (Immediate)**
  Lists all maps with RAID group partition identifier, group name and FC LUN (SCSI-FCP LUN). Use **Passthrough** to list only passthrough device maps. Use Persistent to list only Pass Through maps stored in persistent memory.

  If FCMultiNode is enabled:
  ```
  RouteDisplay FC <LUN> | <passthrough> |
  <persistent>
  ```

  If FCMultiNode is disabled:
  ```
  RouteDisplay FC <LUN> |<passthrough> |
  <persistent>
  ```

- **SASPortList (Immediate)**
  Lists the status of all available SAS ports.

  ```
  SasPortList
  ```

- **SASTargets (Immediate, Disabled on Error)**
  Lists the physical devices that are connected to all SAS ports.

  ```
  SASTargets
  ```

- **SaveConfiguration (Immediate, Disabled on Error)**
  Issued with the restart option, cycles unit power after saving configuration changes. The **norestart** option saves changes without restarting. **Note**: *Certain modifications require a system restart.*

  ```
  SaveConfiguration
  ```

- **SerialNumber**
  Displays the serial number. The serial number is a 13 character field. The first seven alphanumeric characters are an abbreviation representing the product name. The remaining six digits are the individual unit's number.

  ```
  get SerialNumber
  ```

- **SerialPortBaudRate**
  Configures the baud rate for the unit's RS-232 serial port. The number of data bits per character is fixed at 8 with no parity.

  Default: 115200
  ```
  set SerialPortBaudRate [9600 | 19200 | 38400 |
  57600 | 115200]
  ```

  SaveConfiguration Restart command required

  ```
  get SerialPortBaudRate
  ```

- **SerialPortEcho**
  Controls if the unit echoes characters on its RS-232 port. When enabled, all non-control character keyboard input is output to the display.

  Default: enabled
  ```
  set SerialPortEcho [enabled | disabled]
  get SerialPortEcho
  ```

- **SES (Enabled, Disabled on Error)**
  Enables support for SES enclosures that have been discovered by the controller.

  ```
  set SES [enabled | disabled]
  get SES
  ```

- **SESAlarmTest (Immediate, Disabled on Error)**
  Turns on an enclosure's audible alarm if certain conditions exist. **Reset** turns off the alarm. Use SESEnclosures before setting the alarm.

  ```
  SESAlarmTest [EnclIdx] [SET | RESET] [INFO |
  NON-CRIT | CRIT | UNRECOV]
  ```

- **SESDiskFailureAlarm (Disabled, Disabled on Error)**
  When enabled, activates an audible alarm when the RAID controller determines that a RAID member disk drive has failed. The alarm in the enclosure which contains the failed disk drive will sound, other enclosures will be unaffected.

  ```
  set SESDiskFailureAlarm [enabled | disabled]
  get SESDiskFailureAlarm
  ```

- **SESEnclosures (Immediate, Disabled on Error)**
  Displays a list of SES-enabled enclosures which have been discovered by the controller.

  ```
  SESEnclosures
  ```

- **SESIdentify (Disabled on Error)**
  Commands the SES enclosure to identify the specified element. ALL identifies all disks. RAID and RAID group name identify all disks in a RAID group. If the **Member Index** is also specified, only that disk is identified. **ENC** and enclosure index identify all slots in the specified enclosure. **DRIVE** and **BlockDevID** identify the specified disk. Use SESEnclosures first before identifying elements using **ALL** or **ENC**. If using ENC, use BlockDevScan first.

  ```
  set SESIdentify [ALL | RAID Group Name
  <Member Index> | ENC Enclosure Index | DRIVE
  BlockDevID]
  get SESIdentify [ALL | RAID Group Name
  <Member Index> | ENC Enclosure Index | DRIVE
  BlockDevID]
  ```

- **SESIdentifyStop (Immediate, Disabled on Error)**
  Commands an SES enclosure to stop identifying the specified element. **ALL** stops identifying all enclosure drive slots. **RAID** and RAID group name stop identifying disks in a RAID group. **ENC** and enclosure index stop identifying all slots in the enclosure. **DRIVE** and **BlockDevID** stop identifying the specified drive. Use SESEnclosures first before identifying elements using **ALL** or **ENC**.

  ```
  SESIdentifyStop [ALL | RAID Group Name
  <Member Index> | ENC Enclosure Index | DRIVE
  BlockDevID]
  ```

- **SESMute (Immediate, Disabled on Error)**
  Causes the audible alarms of all known enclosures or the specific enclosure to be muted or set to the remind state if supported. The remind state causes an occasional audible reminder of the alarm condition. Use SESEnclosures first before using this command.

  Default: Mute
  ```
  SESMute <EnclIdx> <REMIND>
  ```

- **SESPoll (Enabled, Disabled on Error)**
  Specifies the SES enclosure polling interval in seconds. At the specified interval, all known SES enclosures are polled for their current status. A setting of **0** disables SES enclosure polling.

  ```
  Default: 60
  set SESPoll [0 | 30-3600
  get SESPoll
  ```

- **SESStartingSlot (Disabled on Error)**
  SESStartingSlot establishes the starting slot/ID number for all attached SES enclosures.

  ```
  set SESStartingSlot [0 | 1]
  get SESStartingSlot
  ```

- **SESStatus (Immediate, Disabled on Error)**
  SESStatus displays the last polled status of the specified element type in the specified enclosure. SupportLevel indicates the SES features supported by the specified enclosure: Fan, Power, Temp, Alarm, DriveLEDs. If no element type is specified, all status is displayed. Note that SESEnclosures must be executed prior to executing SESStatus.

  ```
  SESStatus [EnclIdx] <ENC | DRIVE | FAN | POWER
  | TEMP | ALARM | SUPPORTLEVEL>
  ```

- **SNTP**
  Controls whether an SNTP time server is used to set the date and time.

  Default: enabled
  ```
  set SNTP [enabled | disabled]
  ```

  SaveConfiguration Restart command required

  ```
  get SNTP
  ```

- **SNTPServer**
  Regulates or lists the main IP address the client uses to retrieve the SNTP time and date.

  Default: 192.43.244.18
  ```
  set SNTPServer [xxx.xxx.xxx.xxx]
  ```

  SaveConfiguration Restart command required

  ```
  get SNTPServer
  ```

- **TailEventLog**
  Displays new events to the terminal. Type **quit** then press **return (Enter)** to exit tail mode.

  ```
  TailEventLog
  ```

- **Temperature**
  Lists the current internal operating temperature in degrees Celsius. The value is read-only.

  ```
  get Temperature
  ```

- **Time (Disabled on Error)**
  Sets or displays the current time as in 24 hour format.

  ```
  set Time [HH: MM: SS]
  get Time
  ```

- **TimeZone**
  Sets or displays the time zone or an offset from GMT. GMT offset must be in the format +/-HH:MM

  Default: EST
  ```
  set TimeZone [[EST | CST | MST | PST] | [[+|-]
  [HH]:[MM]]]
  ```

  SaveConfiguration Restart command required

  ```
  get TimeZone
  ```

- **Username**
  Specifies the user name for all sessions: Telnet, FTP and Sonnet Web Management Tool. It is case insensitive, from 1 through 32 characters, and cannot contain spaces.

  Default: root
  `set Username [username]`

  SaveConfiguration command required

  `get Username`

- **VerboseMode (Enabled)**
  Controls the level of detail in CLI **Help** output and command response output for the current CLI session.

  Default: enabled
  `set VerboseMode [enabled | disabled]`
  `get VerboseMode`

- **VirtualDriveInfo (Immediate)**
  Displays characteristics and statistics for all the available virtual drives or any available virtual drive identified by its virtual drive ID.

  `VirtualDriveInfo <Virtual Drive ID>`

- **WrapEventLog (Enabled, Disabled on Error)**
  When enabled, the unit logs up to 2,048 event entries before wrapping (overwriting the first entries). If disabled, the unit stops logging event entries when the buffer is full.

  Default: enabled
  `set WrapEventLog [enabled | disabled]`
  `get WrapEventLog`

- zModem
  Transfers a file using the RS-232 port and the zModem protocol. You must type in the file name to send a file.

  `zModem [[send [file name]] | receive]`

Appendix B - RAID Group Designs

The ATTO FastStream controller in the Fusion RX1600Fibre provides instant hardware data protection and intelligence to existing storage independent of the storage type.

WARNING: RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.

To set up RAID groups refer to Configure Storage into RAID Groups on page 7. The Fusion RX1600Fibre allows RAID functionality. In general, the process begins with individual drives called block devices.

Note: *If a drive has corrupt or outdated configuration data, that drive cannot be assigned to any RAID group. Ensure all drives are configured properly. Refer to Ensure Drive Integrity on page 3 or Removing RAID configuration data on page 34.*

A RAID group is a virtual, independent single drive whose data is written to physical drives according to a RAID algorithm. The ATTO FastStream supports JBOD, DVRAID, RAID Level 0, 1, 1+ 0, 4, 5 and 6.

RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.

JBOD: Just a Bunch of Disks

JBOD configuration allows many individual drives to be available for normal storage operations with no special data protection by combining several drives into one large drive. See **Figure B-1**. A special case of a RAID group, multiple physical drives are assigned to a JBOD RAID group and their storage areas appear as a single spanned area of storage. The Fusion RX1600Fibre supports 1 to 32 drives per JBOD-configured RAID group.

RAID Level 0: Striping, No Redundancy

RAID Level 0 (striping) is based on the fact that increased performance can be achieved by simultaneously accessing data across multiple drives, increasing data transfer rates while reducing average access time by overlapping drive seeks. Drives are accessed alternately, as if stacked one on top of the other. **RAID Level 0 provides no data protection. If one drive fails, all data within that stripe set is lost**. See **Figure B-2**.

RAID Level 0 is used by applications requiring high performance for non-critical data. The Fusion RX1600Fibre supports 2 to 16 drives per RAID Level 0 group.

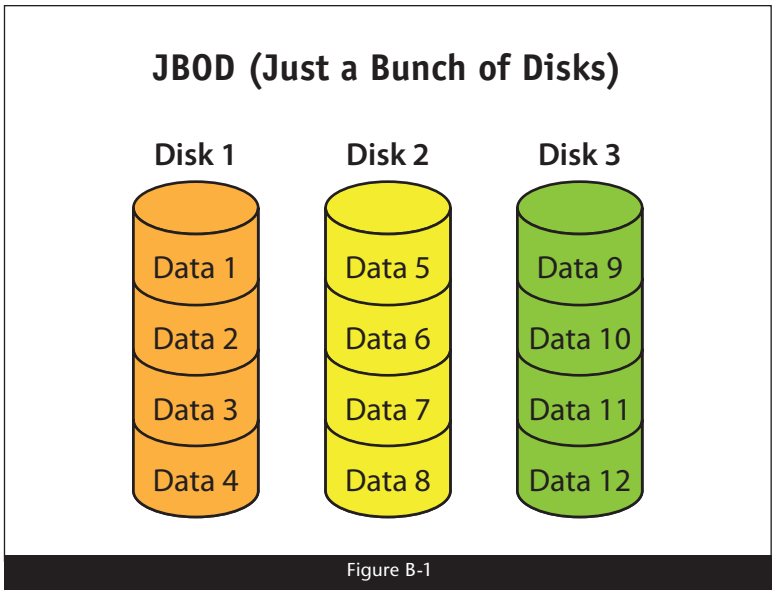

Figure B-1

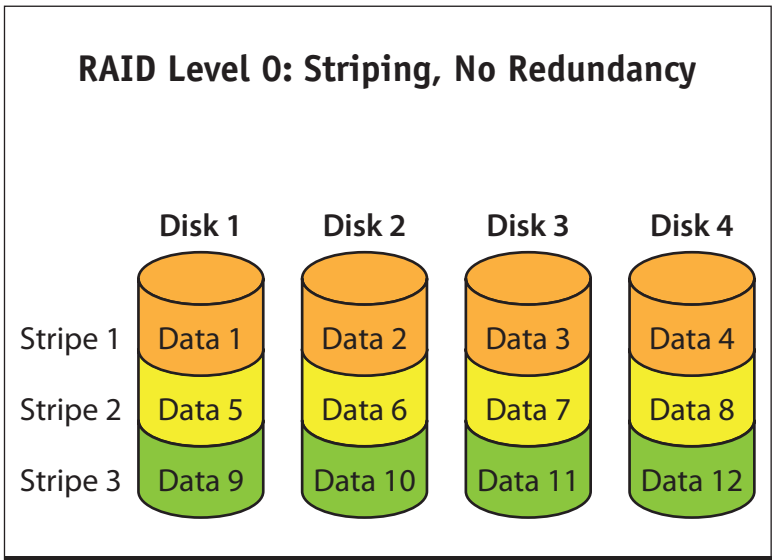

Figure B-2

Appendix B - RAID Group Designs

RAID Level 1: Mirroring (Duplicate Drives)

RAID Level 1 ensures the security of data by writing the exact same data simultaneously to two different drives. With RAID Level 1, the host sees what it believes to be a single physical drive of a specific size: it does not know about the mirrored pair. This application is used for critical data which cannot be at risk to be lost or corrupted due to the failure of a single drive. See **Figure B-3**.

The Fusion RX1600Fibre supports an even number of 2 to 16 drives per RAID Level 1 group.

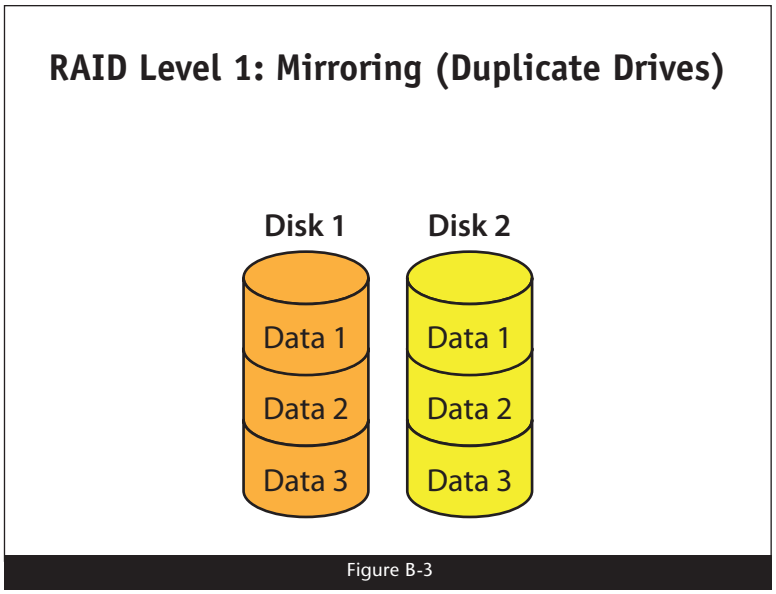

Figure B-3

RAID Level 1 Plus Additional Mirroring

RAID Level 1 with multiple mirrors uses at least 3 drives with the same data on each drive. This application offers the highest fault-tolerance with good performance, especially for small database applications. See **Figure B-4**.

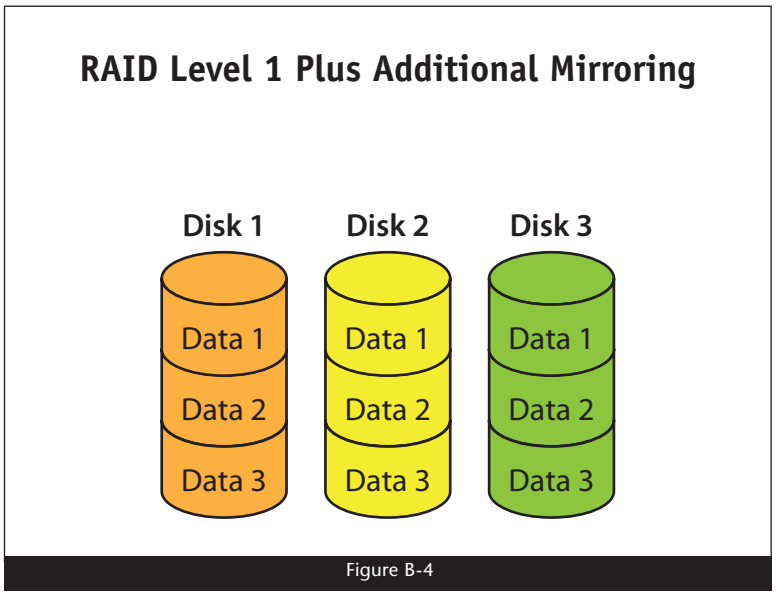

Figure B-4

RAID Level 1+0: Striping, Mirror Spans Two Drives

RAID Level 1+0 increases data transfer rates while ensuring security by writing the exact same data simultaneously to two or more different drives. RAID Level 1+0 is used in applications requiring high performance and redundancy, combining the attributes of RAID Levels 1 and 0. See **Figure B-5**.

The Fusion RX1600Fibre supports an even number of 4 to 16 drives per RAID Level 1+0 group.

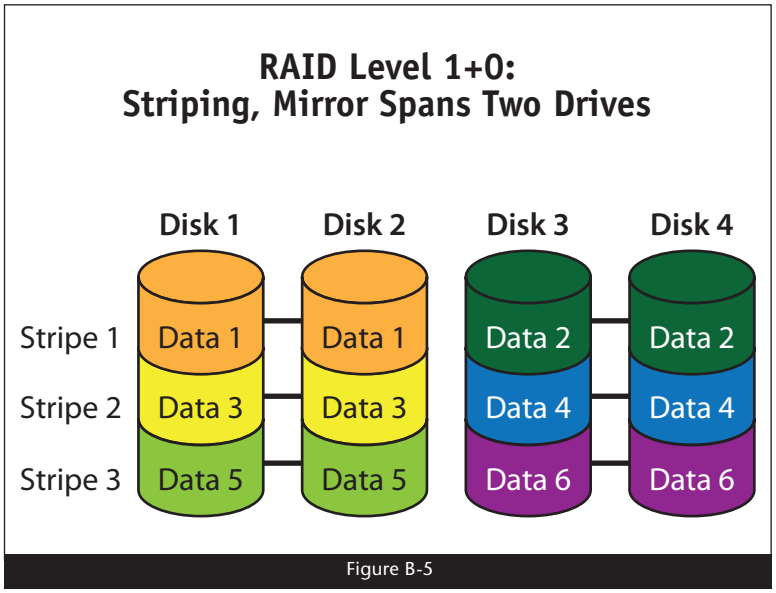

Figure B-5

Appendix B - RAID Group Designs

RAID Level 4: Striping, One Parity Drive

RAID 4 writes data across multiple drives or devices (striping) with parity blocks written to a single drive in the RAID group. This increases reliability while using fewer drives than mirroring. RAID Level 4 is best suited for applications that perform mostly sequential access such as video applications. See **Figure B-6**.

You must have at least three drives to set up RAID Level 4.

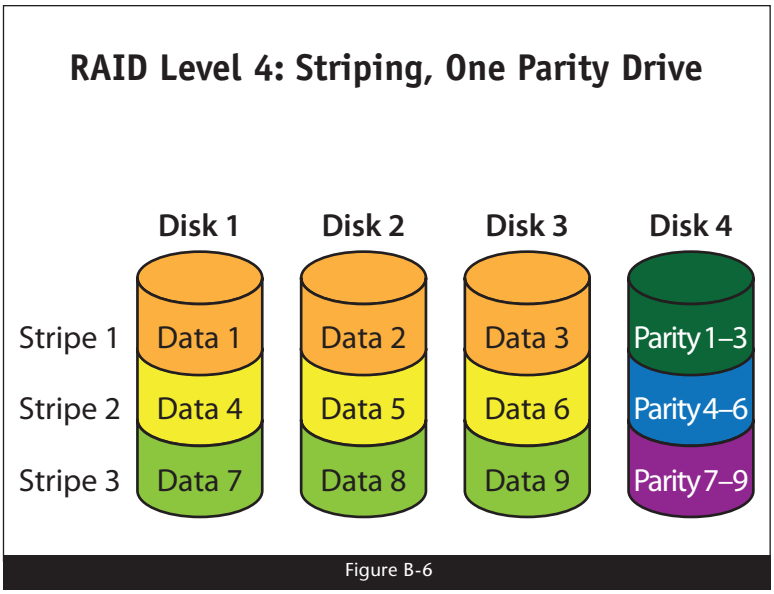

Figure B-6

DVRAID: Digital Video RAID

Digital Video RAID provides parity redundancy for your data. Optimized for performance for the high data transfer rates required in digital video environments, DVRAID is ATTO Technology proprietary technology which supports the editing of uncompressed 10-bit High Definition (HD) video and multiple streams of real-time, uncompressed Standard Definition (SD) video. See **Figure B-7**.

You must use the Quick Digital Video setup wizard in the Sonnet Web Management Tool.

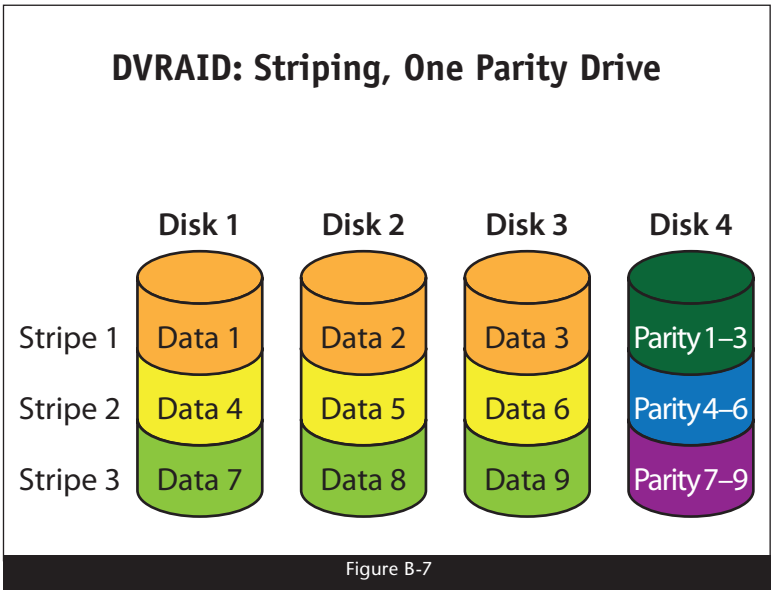

Figure B-7

RAID Level 5: Striping, Parity Distributed Among Drives

RAID Level 5 increases reliability while using fewer drives than mirroring by using parity redundancy: parity is distributed across multiple drives. See **Figure B-8**.

The Fusion RX1600Fibre supports 3 to 16 drives per RAID Level 5 group.

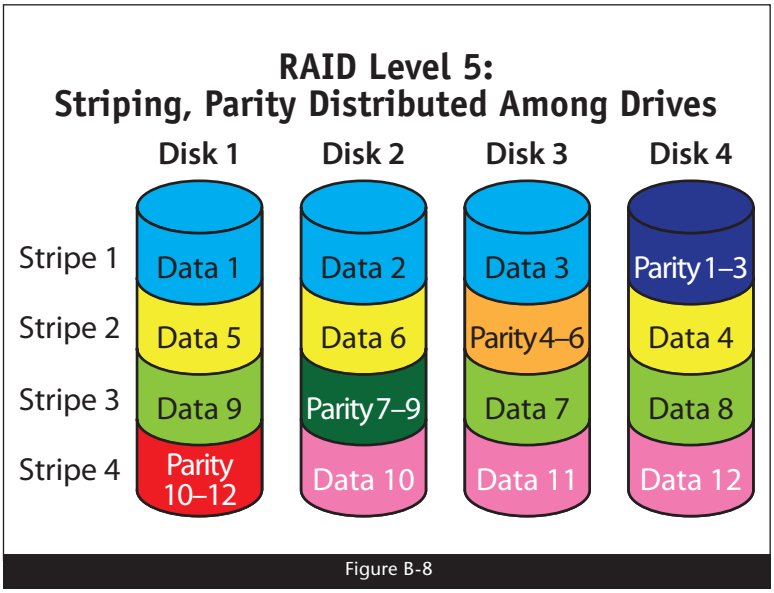

Figure B-8

RAID Level 6: Striping, Two Parity Blocks Distributed Among Drives

RAID Level 6 increases reliability for mission critical applications by striping both data and dual parity across multiple drives, writing data and parity blocks across all the drives in a RAID group. RAID 6 provides can tolerate failure of two drives and provides redundancy during rebuilds. See **Figure B-9**.

The Fusion RX1600Fibre requires at least four drives to build a RAID 6 group. Two drives per RAID group are used for parity protection and are unavailable for data.

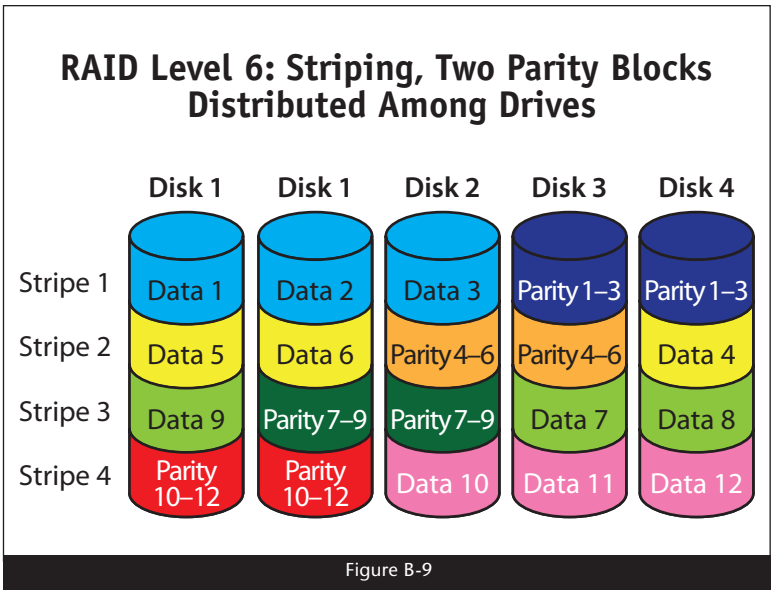

Figure B-9

Appendix C - Multipathing

The Fusion RX1600Fibre supports multipath I/O through its ATTO FastStream RAID storage controller, a technique that enhances performance and fault tolerance, combining data paths from two or more Fibre Channel ports to increase performance and provide redundancy in case of a port or cable malfunction, the leading causes of storage failure. Multipathing additionally provides load balancing to distribute I/O across multiple paths for improved system and application performance.

For environments where storage availability and increased performance are important, it is recommended that you take advantage of the ATTO FastStream controller's Failover and Load Balancing functionality.

The FastStream storage controller is compatible with generic Multipathing for Windows, OS X and Linux, however best results are achieved and supported with the ATTO Windows DSM MPIO driver and ATTO Celerity Multipathing for OS X.

Setup instructions for ATTO Celerity Multipathing for OS X and ATTO Windows DSM MPIO can be found on the software CD included with the Fusion RX1600Fibre, and may also be downloaded from the Sonnet Web site. Setup instructions for Red Hat and SuSE Linux Multipathing can be found on the same disc.

Setup of the RX1600Fibre with Multipathing

Multipathing functionality is set up and controlled from the Fibre Channel host adapter; minimal interaction is required on the RX1600Fibre. When the RX1600Fibre's FastStream storage controller is used with any multipathing technology, it must have MultiNode functionality disabled. This can be set via the Advanced CLI page with the command "FCMultiNode disabled" or from the Sonnet Web Management Tool from the Manage Menu > System Configuration > Establish Access through FC Ports (this must be set to Yes). No other setting changes are required in order for multipathing compatibility.

Improved Availability of Storage With Improved Performance

Multipathing Failover: Redundant physical path components - host adapters, SFPs, cables and switches are used to create logical paths between the server and the storage device. In the event that one or more of these components fails, causing the path to fail, ATTO Multipathing logic uses an alternate path for I/O so that applications can still access their data.

Multi-Load Balancing: Multipathing software also serves to redistribute the read/write load among multiple paths between the server and storage, thereby helping to remove bottlenecks and to balance workloads for better overall performance.

Load Balancing Algorithms for OS X and Windows DSM MPIO

Pressure: The path with the fewest number of bytes being transferred is selected for I/O. Pressure load balancing is domain-based. The first level of path selection is based on the domain (adapter channel) with the fewest number of bytes being transferred. If there are multiple paths to a target on a domain, a second level of selection is used. Pressure load balancing provides the best (or equal) performance of all load balancing policies regardless of storage topology.

Queue Depth: The path with the fewest outstanding I/O transactions is selected for I/O. This target-based policy is not generally recommended for use in an environment with mixed I/O transfers to many devices.

Round Robin: The least-used path is selected for I/O. This target-based policy uses the configuration's cumulative I/O count for path selection. For example, if an I/O operation starts and finishes on one path to a dual ported device, the second path is used when the next I/O operation starts.

Appendix D - Quick Drive Reformat Instructions

If your Sonnet Fusion RAID storage system shipped with pre-installed hard disk drives, the following information will assist you to reformat the drives per your needs.

In Fusion RX1600 systems shipped from Sonnet with hard disk drives installed, the drives are formatted Mac OS Extended (Journaled), and configured as a single RAID 6 RAID group. If you need to change the configuration, use the Sonnet Web Management Tool interface and the operating system software tools to reformat and reconfigure the drives.

Mac OS Users' Instructions

1. Follow all the steps in the included documentation to install the software and the Sonnet Fibre Channel host adapter, and to set up and connect the Fusion RX1600Fibre drive enclosure.

2. Start your computer, and then turn on the Fusion drive enclosure; the RAID volume should appear on the desktop.

3. Drag the volume to the trash (changes to an eject icon) to eject it.

4. Log into the Sonnet Web Management Tool.

5. Delete the RAID group as described in Deleting RAID Groups on page 31.

6. Set up new RAID groups following the instructions in Configure Storage into RAID Groups starting on page 7.

WARNING: After selecting the DVRAID, RAID Level 4, RAID Level 5, or RAID Level 6 option, **configuration of the drives will take several hours to complete, with the total time depending on the operating system and drive capacities.**

7. Depending on how you configure your setup, a *Disk Insertion* window will appear at some point stating that there is an unreadable volume; click Initialize, and then Disk Utility will open.

8. In the *Disk Utility* window, each RAID group you created using the ATTO Configuration Tool will appear as a single volume. Select the volume, and then click the Erase tab at the top of the window.

Support Note for Power Mac G5 Users: When creating RAID groups 16TB or larger, uncheck the Install Mac OS 9 Drivers checkbox; OS 9 drivers do not support volumes greater than 16TB.

9. Click Erase; a window will appear asking you to approve your choice.

10. Click Erase.

11. Repeat steps 8–10 for each remaining unformatted RAID group.

12. Close Disk Utility.

13. Depending on how you configured the RAID groups, the volumes may already be available to the system. If you created a DVRAID, RAID 4, RAID 5, or RAID 6 RAID group, configuration will take much longer. You may check on the progress by clicking the Monitor button to the left of the window.

14. Once all the RAID groups have been formatted and finish building, they are ready to use.

Windows Vista Users' Instructions

1. Follow all the steps in the included documentation to install the software and the Sonnet RAID controller, and to set up and connect the Fusion RAID enclosure.

2. Start your computer, and then turn on the Fusion drive enclosure.

3. Log into the Sonnet Web Management Tool.

4. Delete the RAID group as described in Deleting RAID Groups on page 31.

5. Set up new RAID groups following the instructions in Configure Storage into RAID Groups starting on page 7.

WARNING: After selecting the DVRAID, RAID Level 4, RAID Level 5, or RAID Level 6 option, **configuration of the drives will take several hours to complete, with the total time depending on the operating system and drive capacities.**

6. Select Computer Management From the Windows Start menu. If Computer Management is not available in the Start Menu, select Start > Control Panel > Administrative Tools. In the *Administrative Tools* window, double-click Computer Management.

7. In the *Computer Management* window, click Storage on the left, and then double-click Disk Management.

8. When the *Initialize Disk* window appears, select the RAID volume you created. Select the MBR partition style if you need to access your RAID storage from a computer running Windows XP Professional or 32-bit Windows Server 2003; otherwise, select GPT. Click OK.

9. In the *Disk Management* window, each RAID group you created will appear (listed as "unallocated") as a single volume. Right-click where the word "unallocated" appears, and then select New Simple Volume.

Appendix D - Quick Drive Reformat Instructions

Windows Vista Users' Instructions (continued)

10. When the Welcome to the *New Simple Volume Wizard* window appears, click next to start the process.

11. Follow the remaining steps to complete the process.

Note: *If you do not select the quick format option, this process will take much longer to complete.*

12. When the *Assign Drive Letter or Path* window appears, select Assign the following drive letter, choose a letter, and then click Next.

13. When the Format Partition window appears, enter a new name for the volume table if you'd like. For RAID volumes up to 16TB, accept the default allocation unit size; for RAID volumes greater than 16TB, select 8192 from the drop-down menu. Select Perform a quick format, and then click Next.

14. When the next window appears, click Finish.

15. Repeat steps 9–14 for each remaining "unallocated" disk.

16. Depending on how you configured the RAID groups, the volumes may already be available to the system. If you created a DVRAID, RAID 4, RAID 5, or RAID 6 RAID group, configuration will take much longer. You may check on the progress by clicking the Monitor button to the left of the window.

17. Once all the RAID groups have been formatted and finish building, they are ready to use.

Windows XP/Server 2003 Users' Instructions

1. Follow all the steps in the included documentation to install the software and the Sonnet RAID controller, and to set up and connect the Fusion RAID enclosure.

2. Start your computer, and then turn on the Fusion drive enclosure.

3. Log into the Sonnet Web Management Tool.

4. Delete the RAID group as described in Deleting RAID Groups on page 31.

5. Set up new RAID groups following the instructions in Configure Storage into RAID Groups starting on page 7.

WARNING: After selecting the DVRAID, RAID Level 4, RAID Level 5, or RAID Level 6 option, **configuration of the drives will take several hours to complete, with the total time depending on the operating system and drive capacities**.

6. Select Computer Management From the Windows Start menu. If Computer Management is not available in the Start Menu, select Start > Settings > Control Panel > Administrative Tools. In the *Administrative Tools* window, double-click Computer Management.

7. In the *Computer Management* window, click Storage on the left, and then double-click Disk Management.

8. When the *Initialize and Covert Disk Wizard* window appears, click OK.

9. When the *Select Disks to Initialize* window appears, select the RAID volume(s), and then click Next.

10. When the next window appears, click Finish.

11. In the *Disk Management* window, each RAID group you created will appear (listed as "unallocated") as a single volume. Right-click where the word "unallocated" appears, and then select New Partition.

12. When the Welcome to the *New Partition Wizard* window appears, click Next.

13. When the *Select Partition Type* window appears, select Primary Partition, and then click Next.

14. When the *Specify Partition Size* window appears, click next.

15. When the *Assign Drive Letter or Path* window appears, select Assign the following drive letter, choose a letter, and then click Next.

Appendix D - Quick Drive Reformat Instructions

Windows XP/Server 2003 Users' Instructions (continued)

16. When the Format Partition window appears, enter a new name for the volume table if you'd like. For RAID volumes up to 16TB, accept the default allocation unit size; for RAID volumes greater than 16TB, select 8192 from the drop-down menu. Select Perform a quick format, and then click Next.

17. When the next window appears, click Finish.

Note: *If you do not select the quick format option, this process will take much longer to complete.*

18. Repeat steps 11–17 for each remaining "unallocated" disk.

19. Depending on how you configured the RAID groups, the volumes may already be available to use. If you created a DVRAID, RAID Level 4, or RAID Level 5 group, configuration will take much longer. You may check on the progress by clicking the Monitor button to the left of the window.

20. Once all the RAID groups have been formatted and finish building, they are ready to use.

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