Sun StorEdge™ A3x00 Controller FRU Replacement Guide

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Preface

The *Sun StorEdge A3x00 Controller FRU Replacemnt Guide* contains procedures for replacing a failed controller on your Sun StorEdge™ A3000, A3500, or A3500FC system (referred to collectively hereafter as the A3*x*00 system). This document is written for experienced system administrators who are familiar with the Sun StorEdge RAID Manager software.

How This Book Is Organized

Chapter 1 provides procedures for replacing failed controllers in Solaris™ systems running RAID Manager 6.1.1 or earlier compatible versions.

Chapter 2 provides procedures for replacing failed controllers in Solaris systems running RAID Manager 6.22 or later compatible versions.

Chapter 3 provides procedures for replacing failed controllers in Windows NT systems running RAID Manager 6.2 or later compatible versions.

Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
AaBbCc123	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename.*

Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

Title	Part Number
Sun StorEdge RAID Manager 6.2 Installation and Support Guide for Windows NT	805-6888
Release Notes: Sun StorEdge RAID Manager 6.2 for Windows NT	805-6890
Sun StorEdge RAID Manager 6.2 User's Guide	805-6887
Sun StorEdge RAID Manager 6.22 Installation and Support Guide for Solaris	805-7756
Sun StorEdge RAID Manager 6.22 Release Notes for Solaris	805-7758
Sun StorEdge RAID Manager 6.22 User's Guide	806-0478
Sun StorEdge RAID Manager 6.1.1 Installation and Support Guide for Solaris	805-4058
Sun StorEdge RAID Manager 6.1.1 Release Notes	805-3656
Sun StorEdge RAID Manager 6.1.1 User's Guide	805-4057
Sun StorEdge A1000 and D1000 Installation, Operations, and Service Manual	805-2624
RSM Array 2000 System Manual	805-2782
Sun StorEdge A3500/A3500FC Controller Module Guide	805-4980
Sun StorEdge A3500FC Controller Upgrade Guide	806-0479

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CHAPTER 1

RAID Manager 6.1.*x* for the Solaris Operating Environment

The controller shipped with this document is preloaded with firmware version 2.05.06; once you have installed the new controller in your system, you *must* download firmware to match the version on the other controller in your Sun StorEdge A3*x*00 system.

Note – Firmware version 2.05.06 is *not* operational code, and you should *not* run with it; its sole purpose is to be a *universal* firmware version that you can use to download compatible firmware for your A3*x*00 system.

This chapter explains how to replace a controller in a Solaris system running RAID Manager 6.1.1 or earlier compatible versions. The chapter is organized as follows:

- "Required Patches for RAID Manager 6.1.x" on page 1-2
- "Installing a New Replacement Controller and Verifying Its Compatibility With the Existing System Software" on page 1-3

Caution – Failure to follow these procedures can impair the operation of your equipment or cause data to be lost. If you encounter any problems while performing these procedures, consult your Sun service provider. Customers in the U.S. or Canada can contact Sun Enterprise Services at 1-800-USA-4SUN (1-800-872-4786); please have your Service ID and PIN numbers available. Customers outside the U.S. and Canada can locate the nearest Sun Solution Center by visiting `http://www.sun.com/service/contacting/solution.html`.

Required Patches for RAID Manager 6.1.*x*

Before you start the procedures for replacing a controller, be sure to install the following patch (if applicable):

- Patch ID: 107995-01 (or later revision level)
- Patch description: Firmware upgrade for TX chip

You can download the patch from the SunSolve Online℠ Public Patch Page Access Web site:

```
http://sunsolve.sun.com/
```

Be sure to download the latest revision level for each patch. If you have any questions, contact your nearest Sun Solution Center for assistance.

For an overview of the patches necessary to run the Sun StorEdge RAID Manager software on Solaris platforms, see the *Sun StorEdge RAID Manager 6.1.1 Release Notes*.

Installing a New Replacement Controller and Verifying Its Compatibility With the Existing System Software

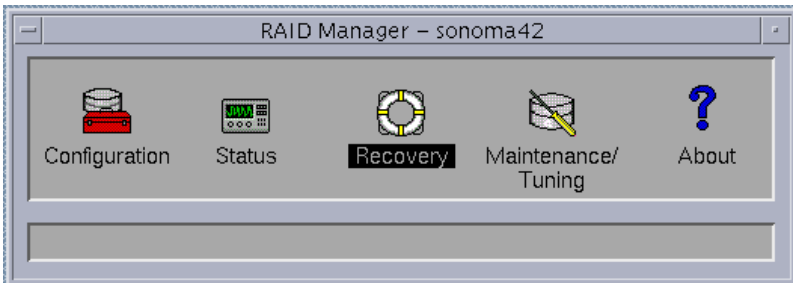
A new replacement controller is referred to as a universal controller and always has application firmware version 2.5.6.32 and boot firmware version 2.5.6.32. You will either upgrade or downgrade the new universal controller firmware to be compatible with both the existing controller firmware version and the host RAID Manager software version.

Note – Do not confuse “downgrade” with software “download.”

The application firmware is hereafter referred to as *appware* and the boot firmware is hereafter referred to as *bootware*.

▼ To Determine if a Controller has Failed

1. **Click the Recovery icon in the RAID Manager window.**



The Recovery dialog box appears and reports a data path failure.

2. **Click Fix.**

   A Summary Report appears and gives a number of possible failure causes.

   - Disconnected or faulty cables
   - Disconnected or faulty terminators
   - Controller failure
   - Host or network adapter failure

3. **Click OK.**

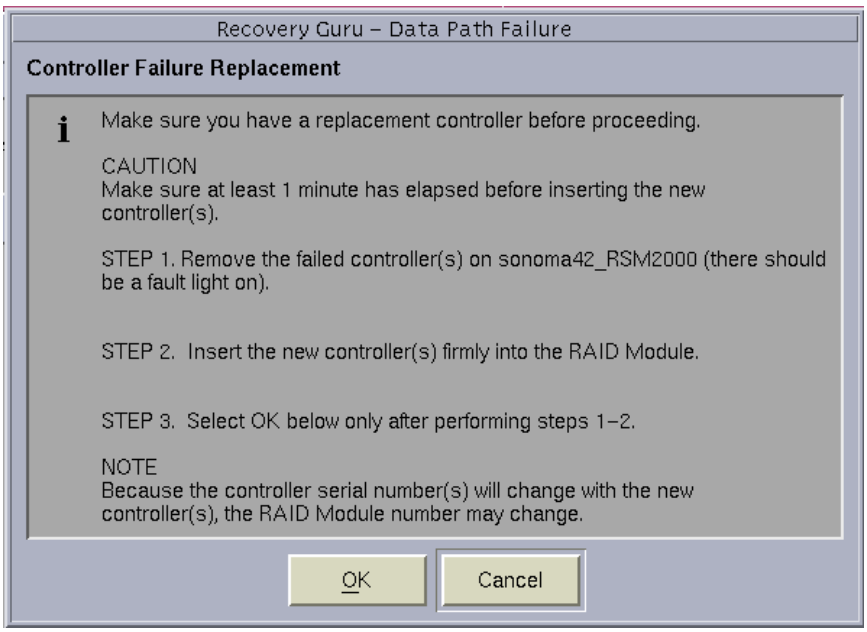
   A Check Connections message appears.

4. **Follow the instructions to check for network problems, cables, terminators, and so on, and then click OK.**

   A Controller Failure Detected message appears.

5. **Click OK.**

The Recovery Guru Controller Failure Replacement window appears.



6. **You can now proceed to one of the following sections:**
   - "To Collect Information to Prepare for an Upgrade or Downgrade of the New Controller Firmware" on page 1-6
   - "To Replace the Controller" on page 1-10

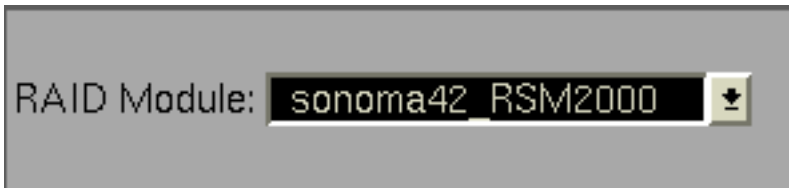
▼ To Collect Information to Prepare for an Upgrade or Downgrade of the New Controller Firmware

---

Note – You can skip this section if you have already recorded this information.

---

1. **select the RAID Module in the Maintenance and Tuning dialog box.**



The *RAID module name* is given in the list box. In the example it is:

```
sonoma42_RSM2000
```

2. **Record the RAID module name here.**

RAID module name: _____

3. **Click on the Module Profile button at the top of the dialog box.**

The Module Profile dialog box appears as shown in FIGURE 1-1.

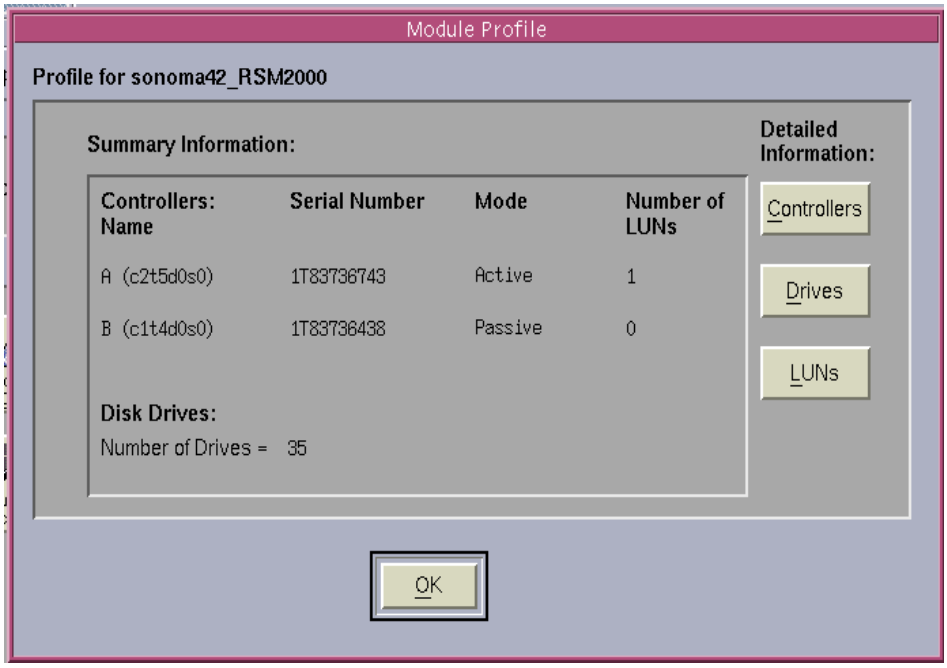


FIGURE 1-1 Module Profile Dialog Box Example

Note – FIGURE 1-1 does not represent a true failure situation. In the actual case of a failure, one Mode status will indicate a failed controller.

---

4. **Click controllers.**

The Module Profile dialog box is displayed. An example appears in FIGURE 1-2.

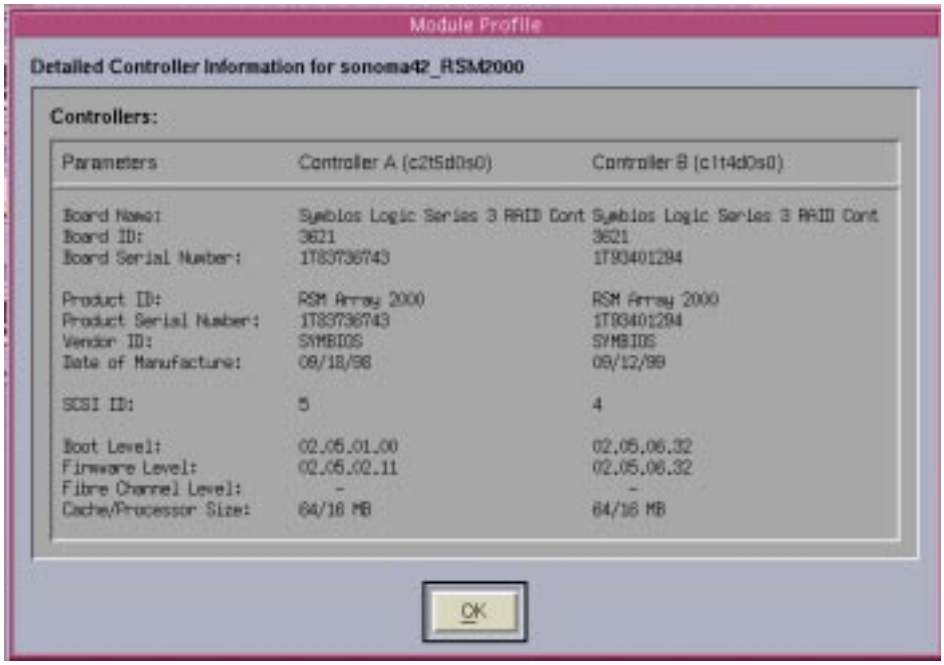


FIGURE 1-2 Module Profile Menu Example

Note – FIGURE 1-2 does not represent a true failure situation. In the actual case of a failure, the failed controller's data will not be displayed.

---

5. **Record the** *boot level* **and** *firmware level* **for the existing controller.**

Boot Level software version: _____

Firmware (appware) Level software version: _____

6. **In a terminal window, type the following to determine the values for *x* in the expression c*x*t*x*d*x*s0.**

```
# lad
```

The command returns something like the following:

```
c1t4d0s0 1T93401294 LUNS:
c2t5d0s0 1T83736743 LUNS: 0
```

A separate line appears for each controller in your system. You must know which line represents the new controller. You can identify the new controller by the its serial number. For example, the serial number of the controller on the first line is: 1T93401294. The controllers can be identified with their serial numbers in the Module Profile menu (FIGURE 1-2).

7. **Record the values for the new controller.**

c*x*t*x*d*x*s0 values for the new controller: _____

▼ To Replace the Controller

1. **Place the controller in the controller module by following the Recovery Guru instructions (**FIGURE 1-3**) and the** *Sun StorEdgeA3500FC Controller Upgrade Guide***.**

   Wait for the system to check the data path to the new controller.

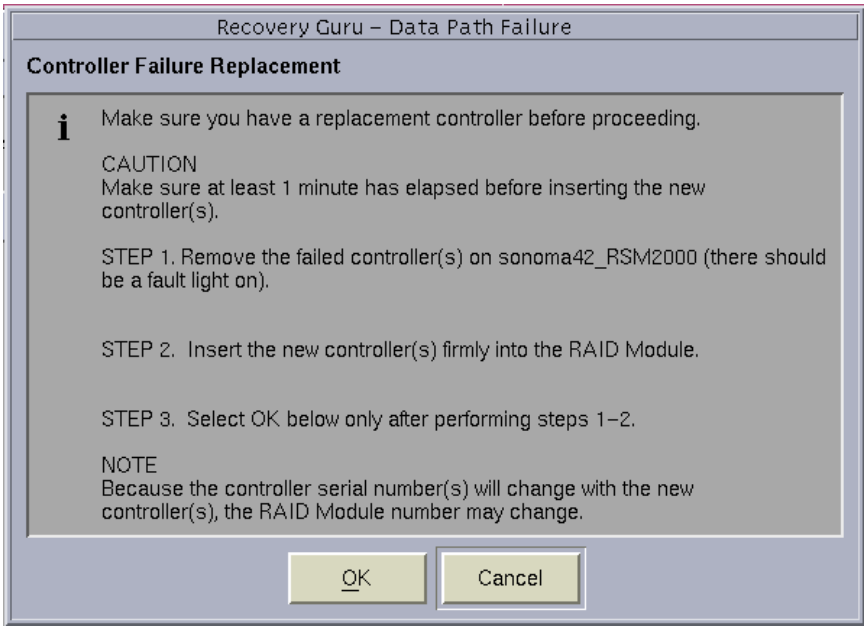
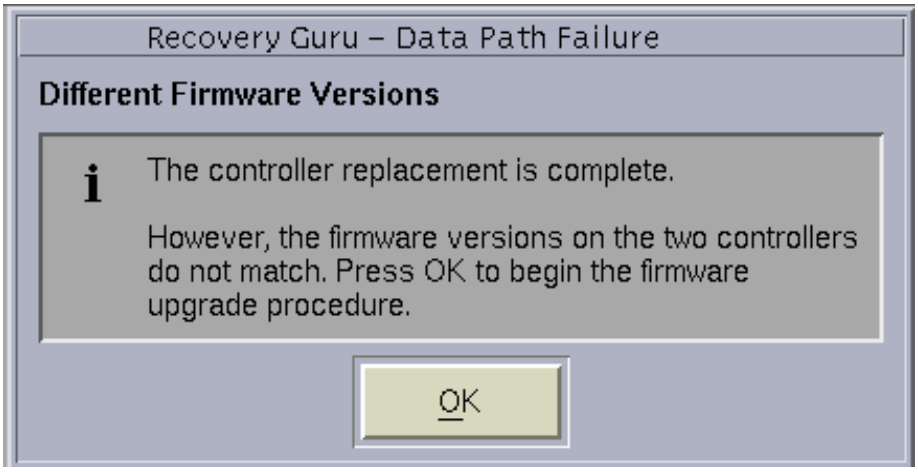


FIGURE 1-3 Recovery Guru Controller Replacement Message Box

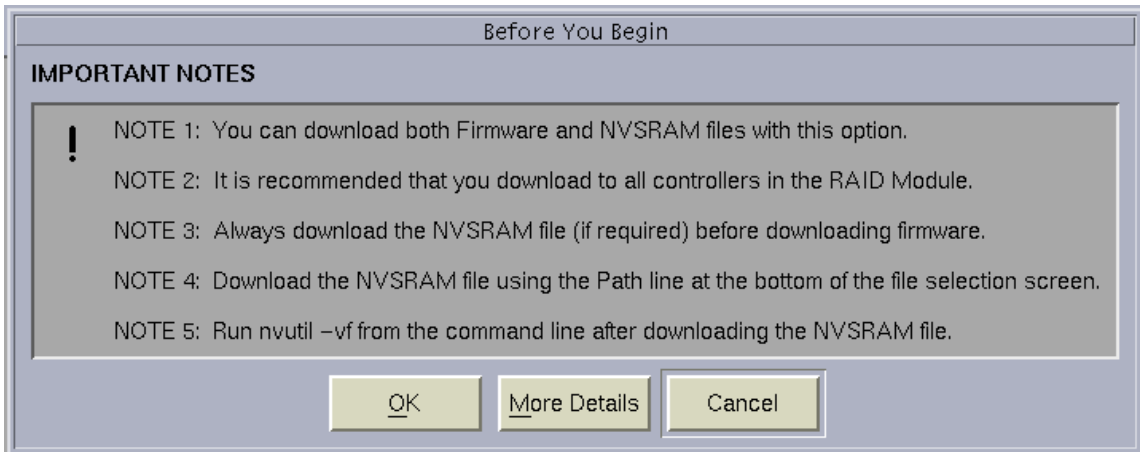
2. **Click OK.**

The Different Firmware Versions message box appears.



3. **Click OK to begin the download process.**

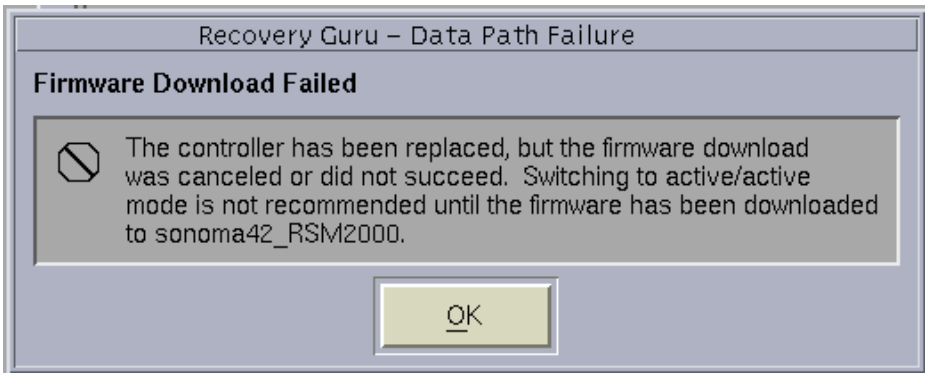
   The Before You Begin message box appears.



4. **Click Cancel, because the graphical user interface (GUI) cannot be used for firmware downgrade.**

Note – Do not click OK!

The Firmware Download Failed message box appears.

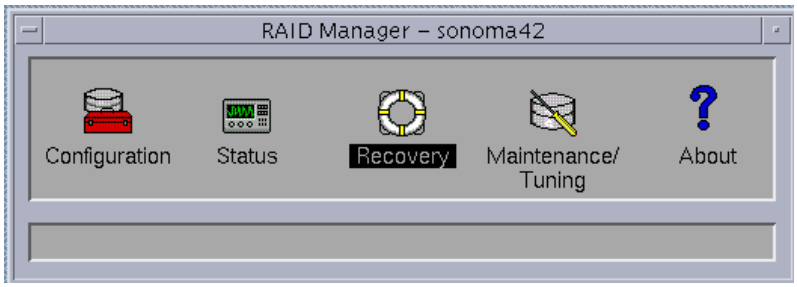


5. **Click OK.**

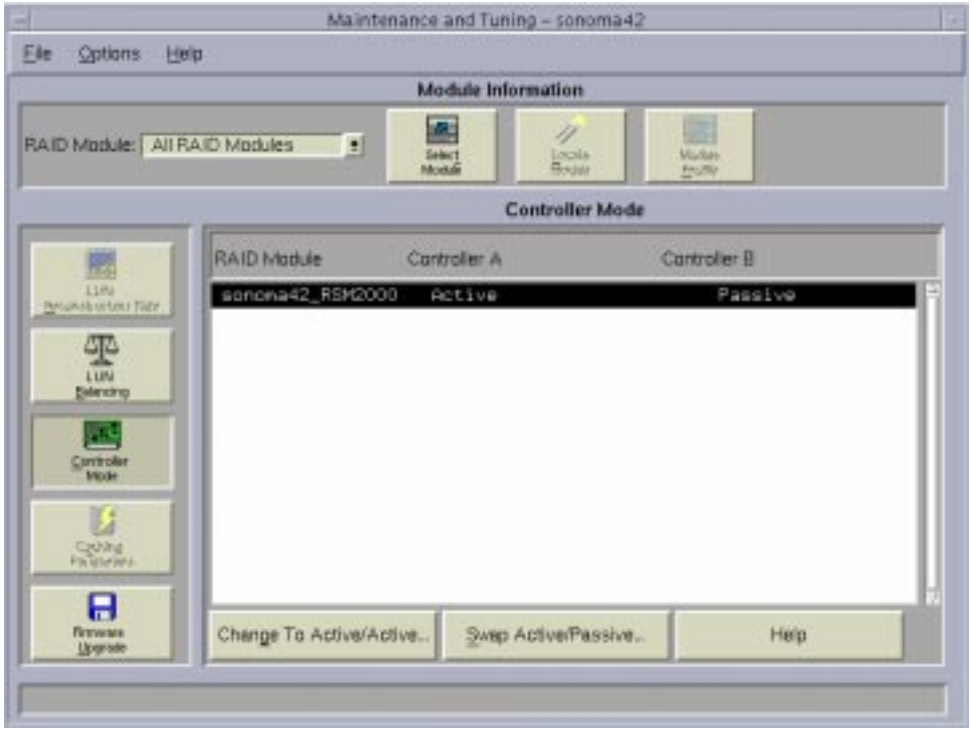
The Recovery dialog box appears. Ignore this dialog box and proceed to “Verify That the New Controller Is in Passive Mode” on page 1-13.

▼ Verify That the New Controller Is in Passive Mode

1. **Click the Maintenance/Tuning icon in the RAID Manager window.**



The Maintenance and Tuning dialog box is displayed.



2. **Click the Controller Mode button.**

   The new controller (A or B, depending on which one was replaced) should be in the passive mode. If the controller is *not* in the passive mode, open a terminal window and type the following command:

```
# rdacutil -m 1 RAID module-name
```

Note – The first time this command is issued, it places controller B in the passive mode. If the new controller is in slot A, repeat the command, to swap the active/passive modes between slots A and B.

▼ To Determine Whether to Upgrade or Downgrade the New Controller Firmware

You must verify that the application firmware and boot firmware of the existing controller is compatible with the RAID Manager software version of the host system.

Note – TABLE 1-1 is current as of March 2000.

---

1. **Determine whether to upgrade or downgrade the new universal controller Firmware.**

   Reference the RAID Manager firmware version with respect to the universal controller firmware as shown in TABLE 1-1 as a guide. If your RAID Manager version is:

   - Earlier than the universal controller FRU, *upgrade* the controller firmware. See "To Upgrade the New Controller Firmware" on page 1-15.
   - Later than the universal controller FRU, *downgrade* the controller firmware. See "To Downgrade the New Controller Firmware" on page 1-17.

TABLE 1-1 Sun StorEdge A3*x*00 Software Releases

RAID Manager Version	Associated Appware	Associated Bootware
6.0	02.04.1d	02.04.01
6.1	02.04.04.01	02.04.04.00
6.1.1	02.05.02.09	02.05.01.00
6.1.1 Update 1	02.05.02.11	02.05.01.00

TABLE 1-1 Sun StorEdge A3*x*00 Software Releases *(Continued)*

RAID Manager Version	Associated Appware	Associated Bootware
6.1.1 Update 2	02.05.02.32	02.05.06.32
6.1.1 with 106513-01 patch	02.05.02.14	02.05.01.00
6.1.1 with 106513-02 patch	02.05.02.14	02.05.01.00
6.1.1 with 106707-01 patch	02.05.02.15	02.05.01.00
6.1.1 with 106513-03 patch	02.05.02.32	02.05.06.32
6.1.1 with 106707-02 patch	02.05.02.32	02.05.06.32
Universal Controller FRU	**02.05.06.32**	**02.05.06.32**
6.1.1 with 106513-04 patch	02.05.06.33	02.05.06.32
6.1.1 with 108555-02 patch[1]	02.05.06.60	
6.22	03.01.02.35	03.015.02.33

1. This patch is not available to the public.

Note – If you have any questions regarding the compatibility of software patches and upgrade versions for your RAID Manager, consult your Sun service provider. Customers in the U.S. or Canada can contact Sun Enterprise Services at 1-800-USA-4SUN (1-800-872-4786); please have your Service ID and PIN umbers available. Customers outside the U.S. and Canada can locate the nearest Sun Solution Center by visiting `http://www.sun.com/service/contacting/solution.html`.

▼ To Upgrade the New Controller Firmware

Note – Use the Solaris command line, as described in this procedure, to upgrade the new controller firmware. Do not use the GUI.

---

1. **Add the** `/usr/lib/osa` **search path to the** `.profile` **file, using a text editor.**

2. **Upload the bootware by typing:**

```
# fwutil /usr/lib/osa/fw/bbbbbbbb.bwd cxtxdxs0
```

   - Where *bbbbbbbb* is the values (without the periods) determined for the Boot Level software version in Step 5 on page 1-8
   - Where the values for *x* in cxtxdxs0 are those values determined in Step 7 on page 1-9

   Wait for the `fwutil succeeded` message to appear.

3. **Upload the appware by typing:**

```
# fwutil /usr/lib/osa/fw/aaaaaaaa.apd cxtxdxs0
```

   - Where *aaaaaaaa* is the values (without the periods) determined for the Firmware Level software version in Step 5 on page 1-8
   - Where the values for *x* in cxtxdxs0 are those values determined in Step 7 on page 1-9

   Wait for the `fwutil succeeded` message to appear.

4. **Type the following to set the controller mode to active and balance the LUNs.**

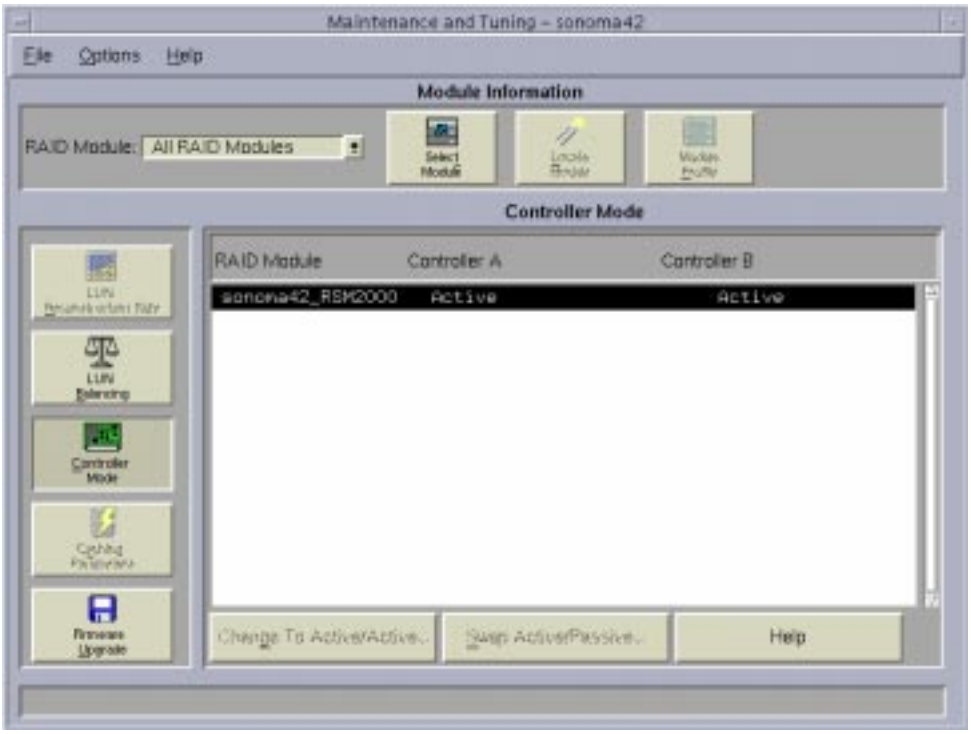
```
# rdacutil -m 2 -b RAID module name
```

   Where *RAID module name* is recorded in Step 2 on page 1-6.

   Wait for the `rdacutil succeeded` message to appear.

5. **Access the Maintenance and Tuning dialog box.**

Both controllers should now be active.



You need to verify the download. See “To Verify the Download” on page 1-20.

▼ To Downgrade the New Controller Firmware

Note – Use the Solaris command line, as described in this procedure, to downgrade the new controller firmware. Do not use the GUI.

---

1. **Download the appware by typing:**

```
# fwutil /usr/lib/osa/fw/aaaaaaaa.apd cxtxdxs0
```

   - Where *aaaaaaaa* is the values (without the periods) determined for the Firmware Level software version in, Step 5 on page 1-8

- Where the values for *x* in `cxtxdxs0` are those values determined in Step 7 on page 1-9

Wait for the `fwutil succeeded` message to appear.

2. **Download the bootware by typing:**

```
# fwutil /usr/lib/osa/fw/bbbbbbbb.bwd cxtxdxs0
```

- Where *bbbbbbbb* is the values (without the periods) determined for the Boot Level software version in Step 5 on page 1-8
- Where the values for *x* in `cxtxdxs0` are those values determined in Step 7 on page 1-9

Wait for the `fwutil succeeded` message to appear.

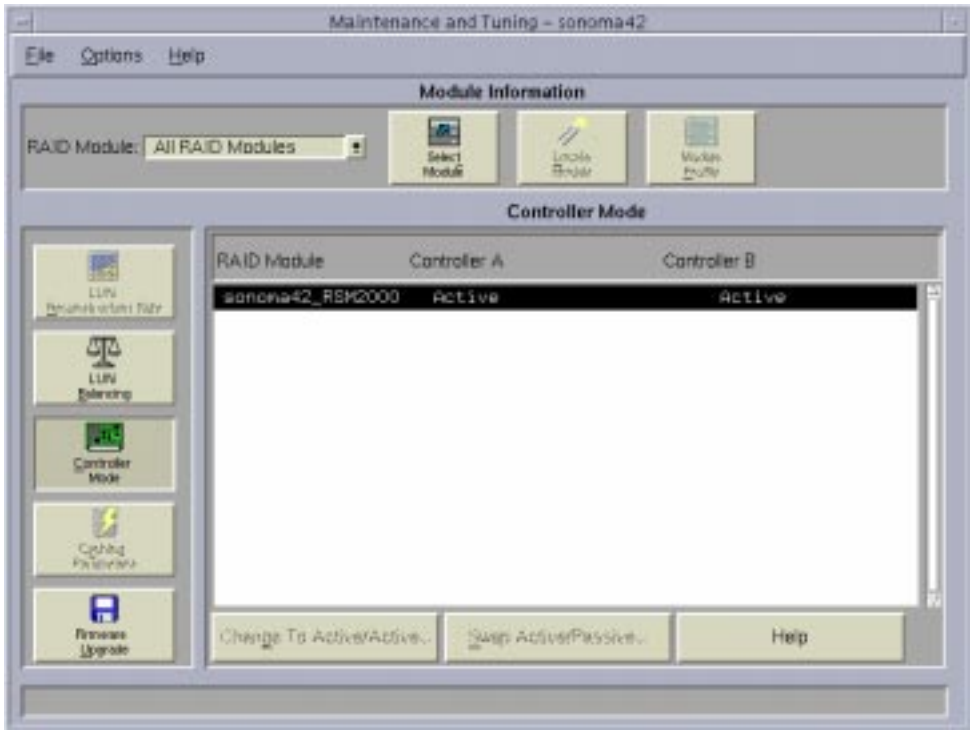
3. **Return to the command line to set the controller mode to active and balance the LUNs by typing:**

```
# rdacutil -m 2 -b RAID module name
```

Where *RAID module name* is the name recorded in Step 2 on page 1-6.

Wait for the `rdacutil succeeded` message to appear.

4. Open the Maintenance and Tuning dialog box.



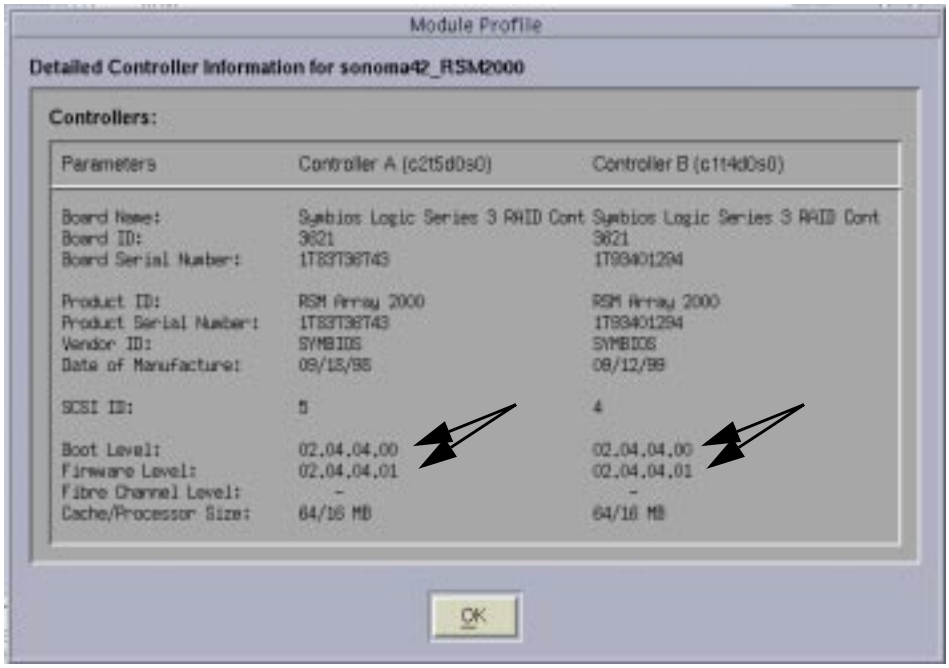
Both controllers should now be active. You are now ready to verify the download.

▼ To Verify the Download

1. **Click on the RAID Module drop-down list box in the Maintenance and Tuning dialog box.**
2. **Select the new controller.**
3. **Click on the Module Profile button.**

   The Module Profile dialog box appears.
4. **Click on the controllers button.**

   Detailed controller information appears.



5. **Verify that the** *boot level* **and** *firmware level* **match for both controllers.**

   Your system should now be fully operational.

CHAPTER 2

RAID Manager 6.22 for the Solaris Operating Environment

This chapter explains the procedures to replace a controller in a Solaris system running RAID Manager 6.22 or later compatible versions. The chapter is organized as follows:

- "To Detect Problems in Bringing the New Controller Online" on page 2-1
- "To Detect Incompatible Firmware" on page 2-2

Caution – Failure to follow these procedures can impair the operation of your equipment or cause data to be lost. If you encounter any problems while performing these procedures, consult your Sun service provider. Customers in the U.S. or Canada can contact Sun Enterprise Services at 1-800-USA-4SUN (1-800-872-4786); please have your Service ID and PIN numbers available. Customers outside the U.S. and Canada can locate the nearest Sun Solution Center by visiting `http://www.sun.com/service/contacting/solution.html`.

▼ To Detect Problems in Bringing the New Controller Online

Use the following procedure if you have a failed controller or if you are having problems in bringing your new controller online.

1. **Use Recovery Guru/Healthcheck from the Recovery application, to verify that the controller you want to remove is offline.**
2. **Exit all storage management applications.**
3. **Remove the failed controller, using the hardware controller replacement instructions that came with your system as a guide.**

4. **Wait at least one minute, and then insert the controller shipped with this document into the slot previously occupied by the controller that you removed in Step 3.**

5. **Run Recovery Guru/Healthcheck again.**

   This queries the system, updates RAID Manager on the state of the module, and loads vital configuration information.

   The new controller should be listed as offline.

6. **Confirm whether there is a new entry with the default name of** *hostname_xxx***.**

   - If yes, the firmware versions are mismatched: the replacement controller has 2.05.06 firmware, while your existing operational controller has 2.04.*x* or 3.*x* firmware. The new controller is being recognized as a single-controller RAID module, rather than being coupled with your existing controller. Go to Step 7 to solve this problem.
   - If no, something else is preventing the controller from being brought back online. Restart the background monitor and consult your Sun service provider.

7. **From the Recovery application, select Options → Manual Recovery → Controller Pairs.**

8. **Select the controller that is being replaced.**

9. **Click Place Online.**

   Once the controller has been placed online, you will see a message indicating that incompatible firmware has been detected. To solve this problem, continue with the next procedure, "To Detect Incompatible Firmware."

▼ To Detect Incompatible Firmware

Use the following procedure to download compatible firmware on the new replacement controller to match the version on the other controller in your A3*x*00 system.

For additional information on downloading firmware, refer to one of the following:

- "Upgrading the NVSRAM and Controller Firmware Version" in *Sun StorEdge RAID Manager 6.22 Installation and Support Guide for Solaris*
- "Upgrading Controller Firmware" in *Sun StorEdge RAID Manager 6.22 User's Guide*

1. **Use the normal procedure to download the firmware on the new replacement controller:**

   a. **Select the appropriate module from the Maintenance/Tuning application.**

   b. **Select Firmware Upgrade → OK → Offline method.**

   c. **Select the offline controller.**

   d. **From the list at the bottom of the panel, select the code that matches the firmware version on the other controller in your system.**

   e. **Click OK.**

      The bootware will be downloaded first, followed by the appware.

Note – While you can download older firmware versions (for example, 2.04.*x*), if you have unusual needs, you usually *must* upgrade your system to the latest RAID Manager software and your array controllers to the latest matching firmware.

The firmware download procedure may take up to five minutes if there is heavy I/O on the system.

After the controller code download is complete, you will see a message indicating that the procedure was successful. The controller will be in a passive state.

2. **Click on the Controller Mode button in the Maintenance/Tuning application.**

3. **Click on Change to Active/Active to place the new controller in active mode in the Change Controller Mode window.**

   The default setting will balance the LUNs across controllers.

   Your system should now be fully operational.

CHAPTER 3

RAID Manager 6.2 for Windows NT

This chapter explains the following procedures for replacing a controller in a Windows NT system running RAID Manager 6.2 or later compatible versions. The chapter is organized as follows:

- "To Detect Problems in Bringing the New Controller Online" on page 3-1
- "To Detect Incompatible Firmware" on page 3-3

Caution – Failure to follow these procedures can impair the operation of your equipment or cause data to be lost. If you encounter any problems while performing these procedures, consult your Sun service provider. Customers in the U.S. or Canada can contact Sun Enterprise Services at 1-800-USA-4SUN (1-800-872-4786); please have your Service ID and PIN numbers available. Customers outside the U.S. and Canada can locate the nearest Sun Solution Center by visiting `http://www.sun.com/service/contacting/solution.html`.

▼ To Detect Problems in Bringing the New Controller Online

Use the following procedure if you have a failed controller or if you are having problems in bringing your new controller online.

1. **Remove the failed controller and replace it with the one shipped with this document, if you have not already done so.**

   Refer to the hardware controller replacement instructions that came with your system for details.

2. **Exit all storage management applications, including the program group.**

3. **Stop the storage management software's background monitor (the Disk Array Monitor):**

Note – When the Disk Array Monitor is stopped, *none* of the RAID modules connected to the host will be checked. Be sure to restart the Disk Array Monitor once the controller is replaced and is placed online.

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   a. **Choose Start → Settings → Control Panel → Services.**

   b. **Select the Disk Array Monitor service.**

   c. **Click Stop.**

      When the status changes to Stopped, close the Services application.

4. **Disable the** `System_LunReDistribution` **parameter in the** `\program files\Raidmgr\rmparams` **file.**

Caution – Because of the critical nature of the `rmparams` file, create a backup copy of the file in a directory other than the installation directory before you modify the current file. If this file becomes corrupted or missing, copy the backup `rmparams` file to the installation directory to resume normal operation. Furthermore, if you make any changes to this file directly or use the options in the GUI that write to this file (such as log settings), always copy the new version of the file to the backup directory once you are sure that the changes work.

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   a. **Make a backup copy of your existing** `rmparams` **file in a directory other than the installation directory.**

   b. **Edit the** `rmparams` **file, changing the entry** `System_LunReDistribution=TRUE` **to** `System_LunReDistribution=FALSE`**.**

   c. **Save the revised** `rmparams` **file.**

5. **Use the Recovery application to choose Select Module.**
6. **Scan the list of RAID Modules that are displayed.**

   You should see your original RAID Module. Confirm whether there is a new entry with the default name of *hostname_xxx*.

   - If yes, the firmware versions are mismatched: the replacement controller has 2.05.06 firmware, while your existing operational controller has 2.04.*x* or 3.*x* firmware. The new controller is being recognized as a single-controller RAID module, rather than being coupled with your existing controller. Continue with Step 7 to solve this problem.
   - If no, something else is preventing the controller from being brought back online. Restart the background monitor and consult your Sun service provider.
7. **Select the new RAID Module entry named** *hostname_xxx*.
8. **Click Remove.**
9. **Exit all storage management applications, including the program group.**
10. **Restart the Recovery application.**
11. **Select the original affected RAID Module.**
12. **Choose Manual Recovery → Controller Pairs.**
13. **Select the controller that is offline.**
14. **Click Place Online.**

    Once the controller is placed online, you will see a message indicating that incompatible firmware has been detected. To solve this problem, go on to the next procedure, “To Detect Incompatible Firmware.”

▼ To Detect Incompatible Firmware

Use the following procedure to download compatible firmware on the new replacement controller to match the firmware version on the other controller in your A3*x*00 system.

For additional information on downloading firmware, refer to one of the following:

- “Upgrading the Controller Firmware Version” in *Sun StorEdge RAID Manager 6.2 Installation and Support Guide for Windows NT*
- “Upgrading Controller Firmware” in *Sun StorEdge RAID Manager 6.2 User’s Guide*

1. **Restart the storage management software's background monitor (Disk Array Monitor), if it is not already running.**

   a. **Choose Start → Settings → Control Panel → Services.**

   b. **Highlight the Disk Array Monitor service.**

   c. **Click Start.**

      When the status changes to Started, close the Services application.

2. **Use the normal procedure (Maintenance/Tuning → Firmware Upgrade → Offline method) to download the firmware, making sure to select only the new replacement controller.**

3. **Set the** `System_LunReDistribution` **parameter in the** `\program files\Raidmgr\rmparams` **file.**

Caution – Because of the critical nature of the `rmparams` file, create a backup copy of the file in a directory other than the installation directory before you modify the current file. If this file becomes corrupted or missing, copy the backup `rmparams` file to the installation directory to resume normal operation. Furthermore, if you make any changes to this file directly or use the options in the GUI that write to this file (such as log settings), always copy the new version of the file to the backup directory once you are sure that the changes work.

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   a. **Edit the** `rmparams` **file, changing the entry** `System_LunReDistribution=FALSE` **to** `System_LunReDistribution=TRUE`**.**

   b. **Save the revised** `rmparams` **file.**

Your system should now be fully operational.