

Sun StorEdge™ 3320 SCSI Array Controller Module Replacement Guide

IMPORTANT: Read This Doc Before Installing This Field Replaceable Unit (FRU)

For successful replacement of your controller module, carefully follow the procedures contained in this document. If you do not follow the steps precisely, you risk controller failure. The following CAUTION is one of several cautions which are critical to successful replacement.



Caution – Wait a minimum of 10 minutes for the firmware cross-load to be completed. If the newly installed controller is removed for *any* reason during the period when the status LED is amber (for 10 minutes or more), the controller can be rendered inoperable and must be returned for repair.

Topics in this document include:

- [“Saving the NVRAM Configuration Settings” on page 3](#)
- [“Downloading the Firmware Patch” on page 3](#)
- [“SCSI Controller Replacement for a Dual-Controller Array” on page 3](#)
 - [“Monitoring the Firmware Update for a Recently Installed Controller FRU” on page 4](#)
 - [“Restoring the Configuration Settings of a Powered-Off Array” on page 5](#)
- [“Converting a Dual-Controller Array to a Single-Controller Array” on page 6](#)
- [“Converting a Single-Controller Array to a Dual-Controller Array” on page 6](#)
- [“SCSI Controller Replacement for a Single-Controller Array” on page 7](#)

Note – These FRU components can be replaced by customers or by Sun-trained personnel.

All user documentation is available on the following websites:

- www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/

Documentation includes the following manuals and release notes.

- For the latest product news, refer to *Sun StorEdge 3320 SCSI Array Release Notes*.
- To access the RAID firmware Main Menu through the serial port, refer to the *Sun StorEdge 3000 Family RAID Firmware User’s Guide*.
- To install the software, use the *Sun StorEdge 3000 Family Software Installation Manual*.
- For additional FRU information, refer to the *Sun StorEdge 3000 Family FRU Installation Guide*.

As a minimum, be sure to review the latest product release notes on the website above.

SCSI controller modules are hot-swappable. In the event that it is impossible or impractical to halt I/O from hosts to the array, a controller can be replaced while the surviving controller is active and servicing I/O.

However, if your configuration enables you to halt I/O during the controller replacement procedure without disruption, it is a good idea to do so. With write-back cache enabled under heavy I/O, cache synchronization can take three hours or more to complete. During this time, your controller will display “preparing failback” status and the LED remains amber.

Note – Under firmware version 4.1x, a failed controller forces write-through cache mode by default and is only subject to the 10 minute cross-load time. However, if the default event trigger for a failed controller has been set to DISABLED, cache synchronization could take over three hours. For details regarding write policy and event triggers, refer to the *Sun StorEdge 3000 Family RAID Firmware User’s Guide*.

It is also possible that hardware errors or configuration errors may be present but undetected, resulting in an unserviceable condition that will only be revealed when the hot-swap is underway. For instance, it is possible that a hardware module might be improperly seated.

It is good practice before replacing a controller FRU to try to verify your system's health. Do not replace a working controller on a channel that is offline.

When a controller fails in a **dual-controller configuration**, the remaining controller automatically becomes the primary controller, if it is not already. If you replace a controller that has not failed, force-fail the controller to be replaced via one of the following methods.

- From the RAID firmware Main Menu:
 - To fail the primary controller, choose “view and edit Peripheral devices → Set Peripheral Device Entry → Redundant Controller – Primary → force Primary controller failure”.
 - To fail the secondary controller, choose “view and edit Peripheral devices → Set Peripheral Device Entry → Redundant Controller – Primary → force Secondary controller failure”.
- From the CLI:
 - To fail the primary controller, type:

```
sccli> fail primary
```

- To fail the secondary controller, type:

```
sccli> fail secondary
```

Note – If you are running version 2.0 or greater of the Sun StorEdge CLI, before issuing the `fail` command, perform a `show redundancy` command to check the status of the redundant pair. This command will also display the position of the primary controller. Also perform a `show events` command for each controller to view any error messages. The dual-controller array is healthy if the Redundancy mode is Active-Active and the status is Enabled. The single-controller array is healthy if the Redundancy mode is Active-Active and the status is Scanning.

For details on the `fail`, `show redundancy`, and `show events` commands, refer to the *Sun StorEdge 3000 Family CLI User’s Guide*.

Note – When a controller is installed and when configuration settings are changed, you are strongly advised to make a record of the new configuration settings and firmware version. This is particularly important in a **single-controller configuration** for re-establishing your configuration settings when a controller is replaced. You can record this information in the “Record of Settings” appendix in the *Sun StorEdge 3000 Family RAID Firmware User’s Guide*.

Note – The batteries in controller FRUs experience discharge during shipment and might require an extended charging cycle upon initial power-up. Nominal battery operation is achieved when the battery status LED changes from amber to flashing green within 25 minutes after the initial power cycle. If the battery status LED remains amber for more than 25 minutes after the initial power-up, then the unit must be power cycled to initiate the extended charging cycle. If the battery status LED remains amber for more than 30 minutes after initiating the extended charging cycle, contact Sun service personnel for additional instructions.

Saving the NVRAM Configuration Settings

Before replacing a controller module, save the NVRAM configuration settings to disk. The saved NVRAM file can be used to restore configuration settings.

1. From the RAID firmware Main Menu, choose “system Functions → controller maintenance → save NVRAM to disks.”
2. Select Yes to confirm. A message informs you that NVRAM information has been successfully saved.

Downloading the Firmware Patch

1. Go to <http://sunsolve.sun.com>.
2. Click on Patch Portal.
3. Use Patch Finder to locate the patch ID by entering the patch ID into the search field and clicking the Find Patch button.
4. Select the link for the format that you want, either HTTP or FTP next to Download Patch, or HTTP or FTP next to Download Signed Patch.
5. In the dialog box that is displayed, indicate the destination directory for the patch and proceed to download the file to that location.
6. To install the latest firmware, follow the instructions in the patch README file.

SCSI Controller Replacement for a Dual-Controller Array

When a controller is replaced in a dual-controller configuration, the controller firmware of the remaining functional controller automatically overwrites the firmware of the new replacement controller to maintain compatibility. This is referred to as *cross-loading*. Cross-loading uses the NVRAM configuration settings to synchronize the firmware version of the newly installed controller to match the firmware version of the running controller.

To replace a SCSI controller module in a dual-controller configuration, perform the following steps.

▼ Removing a SCSI Controller Module

1. Keep the array powered on.
2. Turn the thumbscrews on the left and right sides of the controller module counterclockwise until the thumbscrews are disengaged from the chassis.
3. Hold the thumbscrews, and carefully pull out the controller module.

▼ Installing a SCSI Controller Module

1. Keep the array powered on.



Caution – DO NOT POWER OFF the chassis when you replace a controller module. Multiple problems can occur. If you power off the array and replace a controller module in a dual-controller configuration, the replacement controller could become the primary controller and overwrite any configuration settings

previously set. Additionally, if the array is powered off incorrectly, data that is written to cache and that has not been completely written to the disks will be lost. If you powered off the array during replacement, see [“Restoring the Configuration Settings of a Powered-Off Array”](#) on page 5.

2. Gently slide the controller module into the array.



Caution – Be sure that the module is properly inserted in the guide rails of the array and that you keep the power on. If you power off and then replace the module, you will have to continue with additional steps. See [“Restoring the Configuration Settings of a Powered-Off Array”](#) on page 5.

- a. Insert the controller FRU into the slot, and push forward until you begin to feel resistance as the connecting pins engage.
- b. Push the controller FRU until the connecting pins are fully seated and the RAID controller fits flush against the back plate of the RAID array.

Failure to insert the controller carefully as described above can cause one of the following problems:

- The surviving controller might reset, causing both controllers to go offline, or the replacement controller might become primary and the surviving controller might become secondary which can cause the controllers to go offline. Recovery: Wait until both RAID controllers initialize and come up in redundant mode with no intervention required.
- If the controller status LED is blinking green on both controllers, then both controllers are primary controllers. Recovery: Take out the replacement controller and reinsert it, carefully following the instructions above. If this does not remedy the problem, power-cycle the array.

3. Turn the thumbscrews on the left and right sides of the controller module clockwise until they are finger-tight, to secure the module and to make the module’s front panel flush with the chassis.

To ensure that a thumbscrew is finger-tight, tighten it with a screwdriver and then loosen the thumbscrew counterclockwise a quarter turn.



Caution – Wait a minimum of 10 minutes for the firmware cross-load to be completed. If the newly installed controller is removed for *any* reason during the period when the status LED is amber (for 10 minutes or more), the controller can be rendered inoperable and must be returned for repair.

The new controller automatically becomes the secondary controller.

In a redundant controller configuration where a new controller FRU is installed, the controller status LED will remain amber until the controllers complete the redundant controller process, which can take more than 10 minutes. Identical firmware versions on both controllers are required for proper redundant controller operation.

The redundant controller process automatically cross-loads the firmware version of the newly installed controller FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 4.12B and the new controller has 4.12E, the new controller will be cross-loaded with the 4.12B firmware of the running controller.

To monitor this process, see [“Monitoring the Firmware Update for a Recently Installed Controller FRU”](#) on page 4.



Caution – You must connect the hosts to the correct host channels on the controller module or your configuration will not work correctly.

Monitoring the Firmware Update for a Recently Installed Controller FRU

To monitor the status of the firmware update, use the Sun StorEdge CLI `show redundancy` command. The Sun StorEdge CLI will display the progression of “Failed,” “Scanning,” “Detected” and “Enabled” states.

Note – If you have not installed the Sun StorEdge CLI software, you must install it from the CD that was ordered with your array, or from the Sun Download Center web site. For details, see the release notes for your array.

- **Initial Failed Status Response:** This is the response to the command upon a controller failure and is shown for completeness.

```
sccli> show redundancy
sccli: selected se3000://210.7.180.17:58632 [SUN StorEdge 3320 SN#0043E6]
Primary controller serial number: 8008583
Redundancy mode: Active-Active
Redundancy status: Failed
Secondary controller serial number: 8002663
```

- **Scanning Status: Install Controller FRU.** The installed controller is performing self-test and scanning disk channels. This is also the state where the controller will update the firmware on the newly installed controller if not identical to the running firmware revision. The controllers can remain in this state for up to 10 minutes depending upon system activity.

```
...
Redundancy status: Scanning
Secondary controller serial number: 0
```

- **Detected Status: Redundant Controller Process Starts.** The installed controller has completed the scanning of the disk channels, updated installed controller firmware as required, and communicated to the primary controller. This status is transitional and normally cannot be detected unless repetitive operations are executed.

```
...
Redundancy status: Detected
Secondary controller serial number: 0
```

- **Enabled State: Redundant Controller Procedure Completed.** The installed controller has completed the redundant controller procedure enabling the active-active operation.

```
...
Redundancy status: Enabled
Secondary controller serial number: 8006511
```

Restoring the Configuration Settings of a Powered-Off Array

If the array was inadvertently powered off during the controller replacement in a dual-controller configuration, you must perform the following steps to ensure successful operation of your array.

1. **In a dual-controller configuration where both controllers have the same version number (such as 4.12B), power on the array and wait a minimum of 10 minutes for firmware cross-load to occur.**

The controller with the higher serial number becomes the primary controller.



Caution – If the newly installed controller is removed for *any* reason during the period when the status LED is amber (for 10 minutes or more), the controller can be rendered inoperable and must be returned for repair.

2. **Check that the secondary controller is active on the array by entering one of the following commands.**

-
- From the RAID firmware Main Menu, choose “view and edit Peripheral devices → View Peripheral Device Status.”
The Redundant Controller: Enabled status indicates an initialized secondary redundant controller.
 - Enter the following CLI command.

```
sccli> show redundancy-mode
```

The Redundancy Status: Enabled indicates an initialized secondary redundant controller.

Converting a Dual-Controller Array to a Single-Controller Array

If one controller fails in a dual-controller configuration, you might want to run a single controller for an extended period of time so that the array does not display as degraded.

For instructions on converting a dual-controller configuration to a single-controller configuration, refer to the section titled “To Convert a Dual Controller Array to a Single Controller Array” in the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

Converting a Single-Controller Array to a Dual-Controller Array

Note – SCSI single-controller arrays ship with a blanking panel covering the secondary controller slot. This must be removed in order to install a secondary controller.

1. Keep the array powered on and make sure that the connected hosts are inactive.
2. Turn the thumbscrews on the left and right sides of the blanking panel and remove it.
3. Gently slide the new controller module into the array.



Caution – Be sure that the module is properly inserted in the guide rails of the array and that you keep the power on.

- a. Insert the controller FRU into the slot, and push forward until you begin to feel resistance as the connecting pins engage.
- b. Push the controller FRU until the connecting pins are fully seated and the RAID controller fits flush against the back plate of the RAID array.
Failure to insert the controller carefully as described above can cause one of the following problems:
 - The original controller might reset, causing both controllers to go offline, or the new controller might become primary and the original controller might become secondary which can cause the controllers to go offline.
Recovery: Wait until both RAID controllers initialize and come up in redundant mode with no intervention required.
 - If the controller status LED is blinking green on both controllers, then both controllers are primary controllers.
Recovery: Take out the new controller and reinsert it, carefully following the instructions above. If this does not remedy the problem, power-cycle the array.

-
4. **Turn the thumbscrews on the left and right sides of the controller module clockwise until they are finger-tight to secure the module and to make the module's front panel flush with the chassis.**

To ensure that a thumbscrew is finger-tight, tighten it with a screwdriver and then loosen the thumbscrew counterclockwise a quarter turn.

The new controller automatically becomes the secondary controller.

When the new controller FRU is installed, the controller status LED will remain amber until the controllers complete the redundant controller process, which can take more than 10 minutes. The same firmware versions must be installed on both controllers for proper redundant-controller operation.

The redundant-controller process automatically cross-loads the firmware version of the newly installed controller FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 4.12B and the new controller has 4.15, the new controller will be cross-loaded with the 4.12B firmware of the running controller. To monitor this process, see [“Monitoring the Firmware Update for a Recently Installed Controller FRU” on page 4.](#)



Caution – Wait a minimum of 10 minutes for the firmware cross-load to be completed. If the newly installed controller is removed for any reason during the period when the status LED is amber (for 10 minutes or more), the controller can be rendered inoperable and must be returned for repair.

5. **If you want the most current version of firmware on your controllers, download the latest firmware patch as described in the release notes for your array.**
6. **Set up the host channels for the new controller module.**

For host channel set up information, refer to the “Connecting Your Array” chapter in the Sun StorEdge 3000 Family Installation, Operation, and Service Manual for your array.



Caution – You must set the hosts to the correct host channels on the controller module or your configuration will not work correctly.

SCSI Controller Replacement for a Single-Controller Array

To replace a SCSI controller module in a single-controller configuration, perform the following steps.

1. **If possible, make a record of the firmware version and configuration settings before replacing the controller.**
 - a. **Use the `show configuration` CLI command to output the configuration settings to a file. Refer to the *Sun StorEdge 3000 Family CLI User's Guide* for more information.**
 - b. **Save NVRAM configuration settings to disk.**

From the RAID firmware Main Menu select “system Functions → Controller maintenance → Save nvram to disks,” and choose Yes to save the contents of NVRAM to disk.
 - c. **Record the Unique Controller Identifier which combines the serial number and MAC address for each chassis and is used for network connections.**

From the RAID firmware Main Menu, select “view and edit Configuration parameters → Controller Parameters → Controller Unique Identifier <hex>.”
2. **Remove the old controller.**
 - a. **Keep the array powered on and make sure that the connected hosts are inactive.**
 - b. **Turn the thumbscrews on the left and right sides of the controller module counterclockwise until the thumbscrews are disengaged from the chassis.**
 - c. **Grasp the handle and carefully pull out the controller module.**
3. **Insert the replacement controller.**

- a. Keep the array powered on.
- b. Gently slide the controller module FRU into the slot, and push forward until you begin to feel resistance as the connecting pins engage.
- c. Slowly push the controller FRU the rest of the way until the connecting pins are fully seated and the RAID controller fits flush against the back plate of the RAID array.



Caution – Be sure that the module is properly inserted into the guide rails of the array.

- d. Turn the thumbscrews on the left and right sides of the controller module clockwise until they are finger-tight, to secure the module and to make the module's front panel flush with the chassis.

To ensure that a thumbscrew is finger-tight, tighten it with a screwdriver and then loosen the thumbscrew counterclockwise a quarter turn.

4. Restore the NVRAM settings.

If the old controller and the new controller have the same firmware version number, from the RAID firmware Main Menu, select "system Functions → Controller maintenance → Restore NVRAM from disks," and choose Yes to confirm.

5. Confirm that the "Controller Unique Identifier" parameter is set to the value recorded in step 1c.

- a. From the RAID firmware Main Menu, select "view and edit Configuration parameters → Controller Parameters → Controller Unique Identifier <hex>."

- b. Type the value 0 (to automatically read the chassis serial number from the midplane) or type the hex value for the original serial number of the chassis (used when the midplane has been replaced).

The Controller Unique Identifier is used to create Ethernet MAC addresses and worldwide names. The value 0 is immediately replaced with the hex value of the chassis serial number. A nonzero value should be specified only if the chassis has been replaced, but the original chassis serial number must be retained; this feature is especially important in a Sun Cluster environment, to maintain the same disk device names in a cluster.

- c. To implement the revised configuration settings, choose "system Functions → Reset controller" from the RAID firmware Main Menu, then select Yes to confirm.

Copyright © 2006 Dot Hill Systems Corporation. All rights reserved. Use is subject to license terms. Third-party software is copyrighted and licensed from Sun suppliers. Portions may be derived from Berkeley BSD systems, licensed from U. of CA. Sun, Sun Microsystems, the Sun logo, Solaris, Sun StorEdge, AnswerBook2, and docs.sun.com are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries. Federal Acquisitions: Commercial Software - Government Users Subject to Standard License Terms and Conditions.

Copyright © 2006 Dot Hill Systems Corporation. Tous droits réservés. Distribué par des licences qui en restreignent l'utilisation. Le logiciel détenu par des tiers, et qui comprend la technologie relative aux polices de caractères, est protégé par un copyright et licencié par des fournisseurs de Sun. Des parties de ce produit pourront être dérivées des systèmes Berkeley BSD licenciés par l'Université de Californie. Sun, Sun Microsystems, le logo Sun, Solaris, Sun StorEdge, AnswerBook2, et docs.sun.com sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. aux Etats-Unis et dans d'autres pays.



Sun Microsystems, Inc.
www.sun.com