

Sun StorEdge™ 3510 FC Array and 3511 SATA Array Controller Module Replacement Guide

IMPORTANT: READ THIS DOCUMENT BEFORE INSTALLING THIS FRU

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

To determine the firmware version of your I/O controller, check the model number. [TABLE 1](#) shows the model numbers for FC and SATA I/O controllers.

TABLE 1 I/O Controller Model Numbers

I/O Controller	FRU Model Number	X-Option
3.27 FC controller	370-5537-06	595-6578-05
4.11G FC controller *	370-5537-07	595-6578-06
4.11I or later FC controller	370-5537-08 (or higher)	595-6578-07 (or higher)
4.1x FC controller (RoHS)	371-0532-01	594-3339-01
3.27 SATA controller	370-6773-01	595-7419-01
4.11G SATA controller *	370-6773-02	595-7419-02
4.11I or later SATA controller	370-6773-03 (or higher)	595-7419-03 (or higher)

* In a single-controller configuration, the 4.11G firmware must be upgraded to 4.11I or later, or downgraded to 3.27.

Note – The 4.1x released firmware version is available on SunSolve™:

FC patch ID 113723 for the Sun StorEdge™ 3510 FC array

SATA patch ID 113724 for the Sun StorEdge 3511 SATA array

The 4.1x firmware upgrade requires Sun StorEdge CLI 2.4 which is available on the Sun Download Center.

Note – Go to SunSolve Online at <http://sunsolve.sun.com> to see the latest available firmware upgrades.

For information on version 4.1x controller firmware and 2.4 software, refer to the latest release notes. For upgrade instructions, refer to the patch README file for your product.

If you keep controller firmware version 3.27, be sure to upgrade the SES firmware to the latest version in the latest 3.27 patch:

- FC 3.27R patch ID 113723-09 for the Sun StorEdge 3510 FC array
- SATA 3.27R patch ID 113724-03 for the Sun StorEdge 3511 SATA array



Caution – Firmware version 4.1x supports a maximum of 32 partitions per logical drive. Firmware version 3.27 supports as many as 128 partitions per logical drive on Sun StorEdge 3510 FC arrays and Sun StorEdge 3511 SATA arrays. **You must use controller version 3.27 if you have more than 32 partitions on one logical drive.**

Topics in this document include:

- [“Saving the NVRAM Configuration Settings” on page 4](#)
- [“Downloading the Firmware Patch” on page 4](#)
- [“I/O Controller Replacement for a Dual-Controller Array” on page 4](#)
 - [“Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU” on page 6](#)
 - [“SES Firmware Update Sometimes Required with I/O Controller Module Replacements” on page 7](#)
 - [“Restoring the Configuration Settings of a Powered-Off Array” on page 8](#)
- [“Converting a Dual-Controller Array to a Single-Controller Array” on page 8](#)
- [“Converting a Single-Controller Array to a Dual-Controller Array” on page 9](#)
- [“I/O Controller Replacement for a Single-Controller Array” on page 10](#)
- [“Downgrading from Controller Firmware Version 4.1x to 3.27” on page 11](#)

Note – On Sun StorEdge 3510 FC arrays and Sun StorEdge 3511 SATA arrays, the RAID controller is an integral part of the I/O controller module. To replace an FC or SATA RAID controller, you must replace the entire I/O controller module. For simplicity, the I/O controller module is sometimes referred to as *the controller*.

I/O 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”.

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- 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*.

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.

In a dual-controller configuration, if the controller replacement FRU has a higher SES firmware version than the surviving controller, there will be an SES mismatch with alarms and an amber LED. You need to correct the SES mismatch and download the newer SES firmware. See [“SES Firmware Update Sometimes Required with I/O Controller Module Replacements”](#) on page 7.



Caution – For any firmware upgrade, be sure to follow the upgrade instructions carefully in the patch README file for your array, with great care to download and install firmware correctly. If the wrong firmware is installed, or the firmware is installed on the wrong device, your controller might be rendered inoperable. Always be sure to upgrade your SES firmware first before trying to determine if you need a PLD upgrade.

In a single-controller configuration, you cannot restore the NVRAM configuration settings from disk if you replace a version 3.27 controller with a version 4.1x controller. See [“I/O Controller Replacement for a Single-Controller Array”](#) on page 10 for single-controller replacement instructions.

Note – When a controller is installed and initialized or 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.

Related documentation includes the following manuals on the product web site:

- *Sun StorEdge 3510 FC Array and 3511 SATA Array Release Notes* for the latest information
- *Sun StorEdge 3000 Family FRU Installation Guide*, for FRU procedures and required static electricity precautions

Saving the NVRAM Configuration Settings

Before replacing a controller, save the NVRAM configuration settings to disk. The saved NVRAM file can be used to restore configuration settings **only if the replacement controller has the same firmware version** as the defective controller.

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



Caution – Do not restore a saved 3.27 NVRAM file onto a 4.1x controller FRU, or vice versa.

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. To downgrade to 3.27R on a single controller array, refer to “[Downgrading from Controller Firmware Version 4.1x to 3.27](#)” on page 11.

I/O Controller Replacement for a Dual-Controller Array

To replace an I/O controller module in a dual-controller configuration, perform the following steps.

▼ Removing an I/O Controller Module

1. Keep the array powered on and make sure that the connected hosts are inactive.
2. Write down the cabling configuration for the controller-to-host connections and expansion unit connections so that you can reconnect the cables correctly with the new I/O controller module.
3. Remove all cables and SFPs from the I/O controller module.
4. Turn the thumbscrews on the left and right sides of the I/O controller module counterclockwise until the thumbscrews are disengaged from the chassis.
5. Grasp the handle and carefully pull out the I/O controller module.

▼ Installing an I/O 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.

2. Gently slide the I/O controller module into the unit.



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 8.

- 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 I/O 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.

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. 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 FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 4.13C and the new controller has 4.15, the new controller will be cross-loaded with the 4.13C firmware of the running controller. To monitor this process, see [“Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU”](#) on page 6.



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.

If you hear an audible alarm after the firmware cross-load, and you see a blinking amber Event light on the front of your array, the SCSI Enclosure Services (SES) firmware or its associated Programmable Logic Device (PLD) code in the new controller has a version that is different from the code in the other I/O controller in your array. To solve this mismatch, see [“SES Firmware Update Sometimes Required with I/O Controller Module Replacements”](#) on page 7.

The beep code that identifies an SES or PLD firmware mismatch is the repeating Morse code letter “R” (dot dash dot).

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4. If you want the most current version of firmware on your controllers, download the latest firmware patch as described in the release notes for the array. See page 1 for current patch IDs and [“Downloading the Firmware Patch” on page 4](#).



Caution – Follow the upgrade instructions in the patch README file or the downgrade instructions in this document with great care. If the wrong firmware is installed, or the firmware is installed on the wrong device, your controller might be rendered inoperable.

5. Reconnect the original cables to the new I/O controller module.



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

Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU

To monitor the status of the automatic firmware update, use the Sun StorEdge CLI `show redundancy-mode` 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 packaged 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-mode
sccli: selected se3000://210.7.180.17:58632 [SUN StorEdge 3510 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 version. 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
```

SES Firmware Update Sometimes Required with I/O Controller Module Replacements

Located on <http://sunsolve.sun.com>, Sun StorEdge 3510 FC and Sun StorEdge 3511 SATA array patches contain the most current version of the controller, SES, and PLD firmware.

SunSolve has extensive search capabilities that can help you find the appropriate patch, as well as regular patch reports and alerts to let you know when firmware upgrades and related patches become available. In addition, SunSolve provides reports about bugs that have been fixed in patch updates.

Each patch includes an associated README text file that provides detailed instructions about how to download and install that patch. But, generally speaking, all firmware downloads follow the same steps:

- Locating the patch on SunSolve that contains the firmware upgrade you want, and downloading the patch to a location on your network.
- Using your array software (Sun StorEdge CLI) to download the firmware to the device it updates.

Refer to the release notes for your array for the latest patch available for your array at the time of release.

If after replacing a controller module, you hear an audible alarm and see a blinking amber Event light on the front of the array/unit, the new I/O expansion module or controller module has a different version of SES firmware or PLD firmware than that of the other I/O module in the array/unit. To resolve this mismatch you must download new SES firmware. This can be done using the Sun StorEdge Command-Line Interface (CLI) for your array. (See “[SES Firmware Mismatches between RAID Controllers and Expansion Units](#)” for non-reported mismatches.)

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

Use the Sun StorEdge CLI commands `show ses-devices` and `show events` to see what error condition is causing the alarms. If the error message indicates a PLD firmware mismatch, it might be because your SES firmware has not yet been upgraded. Upgrading your SES firmware usually resolves any apparent PLD mismatch. Refer to the *Sun StorEdge 3000 Family CLI User's Guide* or the `sccli(1M)` man pages for instructions on downloading SES firmware to the appropriate device.

SES Firmware Mismatches between RAID Controllers and Expansion Units

SES firmware mismatches between RAID Controllers and expansion units are not reported by audible alarms or LEDs. You need to use the `show ses devices` CLI command as described below:

SES Firmware Upgrade:

1. **Verify the SES firmware version of all SES devices on the loop, including expansion units. Type the following command at the `sccli` prompt:**

`show ses-devices`

```
sccli> show ses-devices
```

```
Ch Id Chassis Vendor / Product ID  Rev  PLD  WWNN
```

```
-----
```

```
2 12 000187 SUN StorEdge 3510F A 1102 A000 204000C0FF000187
```

```
2 60 0066AE SUN StorEdge 3511F D 0420 1100 204000C0FF000187
```

```
3 12 000187 SUN StorEdge 3510F A 1102 A000 204000C0FF000187
```

3 60 0066AE SUN StorEdge 3511F D 0420 1100 204000C0FF000187

2. Examine the SES firmware revision codes displayed in the "Rev" column. More than two lines will be displayed if a RAID enclosure has expansion chassis connected to it. The Product ID field will be "StorEdge 3510F A" for SES devices internal to the RAID array chassis, and "StorEdge 3510F D" for SES devices internal to the expansion chassis.

If all the lines contain the same revision code in the "Rev" field, then no SES firmware update is necessary. If they differ, upgrade them all to the same SES firmware version, following the instructions in the README.

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 completion of the crossload. When you power on the array, the automatic firmware cross-load will perform the correct operation but must be checked.

1. Power on the array and allow a few minutes to complete initialization.
2. Check that the correct firmware version is active on the array, by entering one of the following commands:
 - From the RAID firmware Main Menu, choose "view system Information" and check the Firmware Version number.
 - Enter the following CLI command where the firmware version is the Revision number.

```
sccli> show inquiry
```

3. In a dual-controller configuration where both controllers have the same version number and two different letter identifiers (such as 4.14A and 4.14B), wait a minimum of 10 minutes for firmware cross-load to be completed.
4. In a dual-controller configuration where the controller modules have different firmware versions (such as 4.13 and 4.15), the 4.13 firmware will cross-load to the 4.15 controller.



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. Check that the secondary controller is active on the array by entering one of the following commands.
 - Using the serial port connection to the firmware application, 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 you convert a dual-controller array into a single-controller array, the Sun StorEdge Configuration Service software does not automatically recognize the change and reports that the SES and battery board from the removed controller are failed or not present.

If you are running Sun StorEdge Configuration Service software and want to avoid this message, follow the steps in the chapter titled "Maintaining the Array," in the *Sun StorEdge 3000 Family Configuration Service User's Guide*. The section containing the instructions is titled, "To Convert a Dual Controller Array to a Single Controller Array."

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

Note – FC and SATA single-controller arrays ship with a JBOD I/O module in 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 JBOD I/O module counterclockwise until the thumbscrews are disengaged from the chassis.
3. Grasp the handle and carefully pull out the JBOD I/O module.
4. Gently slide the I/O 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.
5. Turn the thumbscrews on the left and right sides of the I/O 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 FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 4.13C and the new controller has 4.15, the new controller will be cross-loaded with the 4.13C firmware of the running controller. To monitor this process, see [“Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU” on page 6](#).



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.

If you hear an audible alarm after the firmware cross-load and see a blinking amber Event light on the front of your array, the SCSI Enclosure Services (SES) firmware or its associated Programmable Logic Device (PLD) code in the new controller has a version that is different from the code in the other I/O controller in your array. To solve this mismatch, see to [“SES Firmware Update Sometimes Required with I/O Controller Module Replacements” on page 7](#).

Note – The beep code that identifies an SES or PLD firmware mismatch is the repeating Morse code letter “R” (dot dash dot).

6. 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.
7. Connect the cables to the new I/O controller module.
8. Set up the host channels for the new I/O controller module.
For cabling and 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 connect the hosts to the correct host channels on the I/O controller module or your configuration will not work correctly.

I/O Controller Replacement for a Single-Controller Array

To replace an I/O 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 choose “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>.”
 - d. Write down the cabling configuration for the controller-to-host connections and expansion unit connections so that you can reconnect the cables correctly with the new I/O controller module.
2. Remove the old controller.
 - a. Keep the array powered on and make sure that the connected hosts are inactive.
 - b. Remove all cables and SFPs from the I/O controller module.
 - c. Turn the thumbscrews on the left and right sides of the I/O controller module counterclockwise until the thumbscrews are disengaged from the chassis.
 - d. Grasp the handle and carefully pull out the I/O controller module.
3. Insert the replacement controller.
 - a. Keep the array powered on.
 - b. Gently slide the I/O controller module FRU into the slot, and push forward until you begin to feel resistance as the connecting pins engage.
 - c. 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.



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

- d. Turn the thumbscrews on the left and right sides of the I/O 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. Reconnect the original cables to the new I/O controller module.



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

5. From the RAID firmware Main Menu, select “system Functions → Controller maintenance → Restore NVRAM from disks,” and choose Yes to confirm. Confirm that all configuration parameters are correctly set.
6. Confirm that the “Controller Unique Identifier” parameter is set to the value recorded in step 1c.



Caution – If the “Controller Unique Identifier” parameter has the wrong value, network connections will not work correctly and the WorldWide Name will be incorrect which will cause problems accessing the array.

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

- b. If the “Controller Unique Identifier” is not set to the value recorded in step 1c, 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 choose Yes to confirm.

Downgrading from Controller Firmware Version 4.1x to 3.27



Caution – Do not downgrade from controller version 4.1x to 3.27 unless you are performing a FRU replacement or in an emergency with Technical Support assistance. If you upgrade an array to 4.1x controller firmware, change one or more parameters, and then downgrade back to 3.27, you can lose all data. You can lose or corrupt all data from all logical drives due to conflicting parameters between firmware versions, such as optimization and stripe size settings which have different NVRAM structures and different defaults.

Earlier versions of the controller firmware work with the latest SES, PLD, and software versions. There is no need to downgrade any of these components if you downgrade the controller version. For instance, CLI version 2.4 is compatible with controller version 3.27. CLI 1.6.2 can be used to downgrade to 3.27 controller firmware but cannot be used to upgrade to 4.1x controller firmware.

Note – While an upgrade script exists for upgrading from controller firmware version 3.27 to version 4.1x, the script is not backward compatible. You cannot use the script to downgrade from controller version 4.1x to version 3.27.

The CLI download controller-firmware command restores factory defaults with downgrades and does not restore:

- Controller IP address - You must have a serial connection to restore the IP address, and the serial connection must be set to 38400.
- Net mask and gateway settings and baud rate for the serial port
- Host LUN filter settings - type, access mode, and name
- Channel data rate - FC and SATA arrays: If the channel data rate was set to 1 GHz or 2 GHz, after the download command is run, the channel speed is set to auto (auto-negotiation). Since a FC channel communicates at a rate of either 1 GHz or 2 GHz, the "Auto" setting uses the best rate for communications at the time.
- More than 8 logical drives
- Customized parameter settings - Record all custom settings prior to the downgrade. The CLI show configuration command does not include all firmware parameters. Be sure to record settings that are in the firmware only, namely sector/head/cylinder parameters and host LUN filter parameters.

To downgrade from controller firmware 4.1x to 3.27 firmware, perform the following steps.

1. **Change your working directory to the directory in which the patch was unpacked and confirm that the 3.27 controller firmware file is present using the `ls` command. The file must be one of the following:**
 - SUN327R-3510.bin for the 3510 FC array (in patch 113723-09)
 - SUN327R-3511.bin for the 3511 SATA array (in patch 113724-03)
2. **Invoke `sccli`, and verify that you are running `sccli` version 1.6.2 or 2.x with the `version` command.**
3. **Verify the product and revision of the array. Type the command:**

```
sccli> show inquiry
```

Confirm that the correct product name is displayed. Otherwise, this patch does not apply. Select a different device or discontinue installation of this patch. If the firmware version reported is 411G or later, continue with [Step 4](#).

4. **Version 3.27 only supports 8 logical drives. To confirm that the array has no more than 8 logical drives, at the `sccli>` prompt, type:**

```
sccli> show logical-drive
```



Caution – If you have more than 8 logical drives, do not perform this downgrade. You will lose all data above the 8 logical drive limit.

5. **If you are downgrading due to an emergency and if feasible, save the configuration in a separate location. If you are unable to restore the 3.27 configuration, you can reference this file. At the `sccli>` command prompt, type the following commands:**

```
sccli> show configuration filename.txt
```

```
sccli> show configuration --xml filename.xml
```

Note – These commands may take several minutes to complete.

6. **Stop all I/O to the array before beginning the controller firmware downgrade and unmount any filesystems or volumes mounted from the array.**

Since the SSCS agent may interfere with firmware downloads, it is necessary to stop any SSCS agent that may be running on any host connected to the array controller. To stop the SSCS agent, log in as root on each host connected to the array and on which the SUNWsscs package has been installed, and issue the shell command `/etc/init.d/ssagent stop`.

If the SSCS agent is running on a Microsoft Windows system connected to the array, use the Services application (Start> Run> `services.msc`) to stop the SSCS Agent service.

StorADE, or any other application which monitors the status of the enclosure, may also interfere with controller or SAF-TE firmware downloads. Stop the StorADE agent software, or any other software that monitors the array, following the procedures described in the documentation for that application.

7. **At the `sccli>` prompt, type:**

```
sccli> download controller-firmware -r filename
```

where *filename* is `SUN327R-3510.bin` for the 3510 FC array or `SUN327R-3511.bin` for the 3511 SATA array.

Note – Disregard the CLI message that a script is available to automate the download; the script is only for upgrades.

The `sccli` command will display messages indicating that it is downloading the firmware, programming the controller's flash memory, and "engaging" the new firmware. Wait until the `sccli>` prompt appears again, which may take 10 minutes or more, before proceeding.

8. **To re-establish communication with the array, use the serial connection to restore the IP address, netmask, and gateway.**

9. **To complete the downgrade, access the CLI and enter two more commands. Type:**

```
sccli> reset nvram
```

```
sccli> reset controller
```

10. **To re-establish communication with the array, use the serial connection to restore the IP address, netmask, and gateway.**

11. **Verify the revision of the array. Type the following command.**

```
sccli> show inquiry
```

Verify that the firmware revision is now reported as `327R` for FC and SATA arrays.

12. **Reconfigure your array to the desired configuration. If you saved a 3.27 configuration file to restore, type:**

```
sccli> download nvram filename
```

where *filename* is the name of the file that contains the configuration. Otherwise, configure the array using the CLI or the firmware application.



Caution – Do not restore a 4.1x configuration on a 3.27 controller. This may cause data loss.

13. Confirm that the Controller Unique Identifier parameter value is correct.

- 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.

14. If the SSCS agent was stopped, restart it. On Solaris and other UNIX systems, use the command `/etc/init.d/ssagent start`. On Microsoft Windows, use the Services utility (Start > Run > `services.msc`). If other software such as StorADE was stopped, restart it following the procedures in the documentation for that software.

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