Sun StorageTek™ 2500 Series Array Firmware Upgrade Guide

for controller firmware version 7.35
and Common Array Manager version 6.2

Sun Microsystems, Inc.
www.sun.com

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CHAPTER 1

Upgrading the Controller Firmware

This guide explains how to use the utility to upgrade your Sun StorageTek™ 2500 Series Array controller firmware to version 7.35.xx.xx. This controller firmware version adds new capabilities (volume sizes over 2TB, IPV6, 1GB DIMM, and premium feature enhancement functionality) for your 2500 series array.

Note – To obtain the latest CAM version and information: From http://www.sun.com/storage/management_software/resource_management/cam, click the "Get It" tab.

Written for technicians, system administrators, and authorized service providers (ASPs), this guide explains how to install and run the utility, discover and register arrays, review array statuses, and download and activate your new controller firmware. This guide includes a Troubleshooting section that describes operations you can use to gather additional information on issues that might occur.

The upgrade utility is a stand-alone application you install independently of any storage management application. You can install the utility and use it to upgrade 2500 Series arrays (capable of being upgraded) that have a network management connection.

Before using the procedures described in this document, you must have a basic understanding of the topics and terminology discussed in these documents:

- *Sun StorageTek 2500 Series Hardware Installation Guide*
- *Sun StorageTek 2500 Series Software Installation Guide*
- *Sun StorageTek 2500 Series Product Release Notes, Release 1.4*

Note – You must ensure your storage array is ready to receive and accept the controller firmware upgrade. Read all the information in this document prior to upgrading the controller firmware on your 2500 Series array.

How the Upgrade Utility Works

The upgrade utility checks the current level of controller firmware, and then notifies you that the array is upgradeable.

This utility upgrades both the controller firmware and the NVSRAM. It also performs a migration of the current drive configuration databases (DACstore) to a new format and size supported by the new release of firmware.

The utility helps ensure that any storage array you select for upgrade has the following:

- condition identified that might prevent the upgrade from completing successfully
- supported controller model and controller firmware version
- condition identified that might prevent the upgrade from completing successfully
- saved configuration and event logs saved for later use, if required
- offline status for a minimal period of time

Note – Downgrading is not recommended. If you have questions, please contact customer support at see `http://www.sun.com/support/.`

ASR Registration Page Displays during CAM Installation

During the initial storage array registration process, CAM prompts you to register with the Auto Service Request (ASR) service by displaying the Setup page. This page continues to display until you either fill out the page and click OK, or click Decline to either decline or defer ASR service registration.

For more information about ASR, go to: http://www.sun.com/service/asr

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Note – You must register the array with ASR before using the Test button.

Overview: Upgrading Controller Firmware

The upgrade process includes the major steps described in this guide:

1. **Install the upgrade utility on a computer that has a management connection to the storage arrays requiring an upgrade.**

   See "Installing the Upgrade Utility" on page 4.

2. **Reset each controller using CAM.**

   See "Resetting Each Controller Using CAM" on page 7.

3. **Run the utility.**

   See "Running the Utility" on page 8.

4. **Add storage arrays.**

   See "Adding Storage Arrays" on page 9.

5. **Check the status of storage arrays.**

   See "Checking Storage Array Status" on page 12.

6. **Review conditions that could cause problems.**

   See "Reviewing Conditions that Prevent Firmware Upgrade" on page 12.

7. **Download and activate firmware.**

   See "Downloading and Activating Firmware" on page 15.

8. **Un-register each upgraded array, upgrade your CAM software to version 6.2.0 or later, and re-register each upgraded array.**

   See "Un-register Arrays, Upgrade CAM, Re-register Arrays" on page 19.

Note – To obtain the latest CAM version and information: From http://www.sun.com/storage/management_software/resource_management/cam, click the "Get It" tab.

Installing the Upgrade Utility

The upgrade utility is a GUI-based application. If the application is being installed on a stand-alone UNIX server without a monitor, you must export the display to a different computer so you can use the utility.

Prerequisite for Windows Storage Management Stations: If you have an earlier version of storage management software (other than CAM) loaded onto your Windows operating system, uninstall it before using the upgrade utility. The Common Array Manager software is the only supported storage management software for the 2500 Series array.

Note – Upgrading controller firmware is an offline procedure. The storage array is not able to receive I/O from the hosts when the new firmware is being activated.

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1. **Download the upgrade utility from the Sun Download Center (SDLC).**
2. **Select View by Category, scroll down to Systems Administration, and then select Storage Management.**
3. **Scroll to find the StorageTek 2500 Series Upgrade Utility.**
4. **Download the utility and save it to a secure location.**
5. **Execute one of the following commands, depending on your OS.**

   Linux

   - `SMIA-LINUX-03.35.A1.16.bin or later`
   - `SMIA-LINUX64-03.35.A1.16.bin or later`

   Solaris

   - `SMIA-SOL-03.35.01.16.bin or later`
   - `SMIA-SOLX86-03.35.01.16.bin or later`

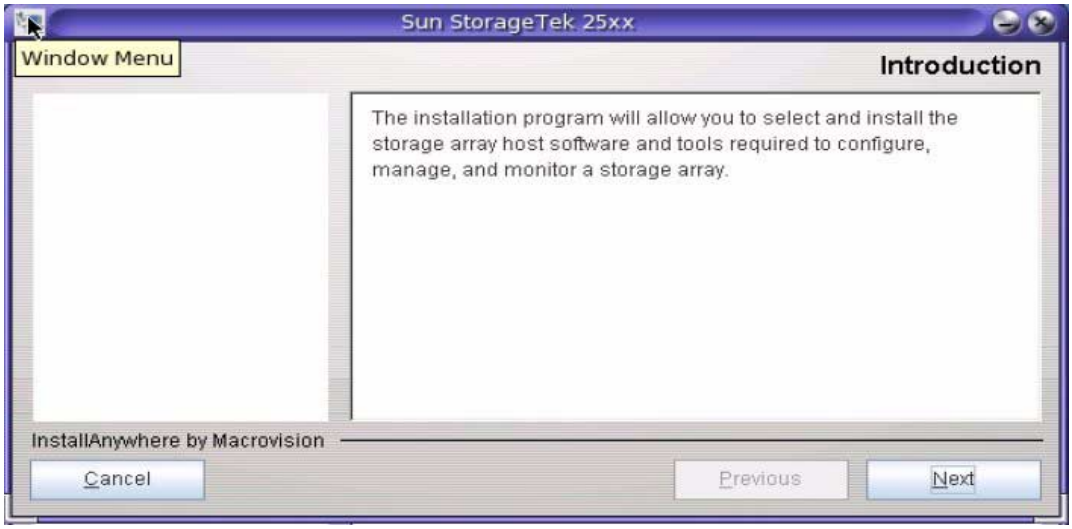
   Windows

   - `SMIA-WS32-03.35.31.16.exe or later`
   - `SMIA-WS64-03.35.31.16.exe or later`
   - `SMIA-WSX64-03.35.31.16.exe or later`

   For example, execute the following command for Solaris to display the Upgrade Utility Introduction screen:

   ```
   ./SMIA-SOL-03.35.01.16.bin
   ```

FIGURE 1-1 Upgrade Utility Introduction Screen



6. Follow the displayed instructions to install the Upgrade Utility application.

Note – This example shows the Upgrade Utility installation on the Solaris operating system. Your commands and displays might vary slightly.

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7. Click Next to display the Upgrade Utility License Agreement:

FIGURE 1-2 Upgrade Utility License Agreement Screen

8. **Read and accept the license agreement.**
9. **Click Next.**

   This action installs various files and folders into your directory structure and provides the path to the files you will need to perform the upgrade.

FIGURE 1-3 Upgrade Utility Installation Complete Screen

Note – Besides SMfwupgrade-SOL, you might also be instructed to install other packages; for example, SMfirmware-SOL and SMruntime-SOL.

10. **Note the location of the upgrade utility files displayed in the final screen.**
11. **Click Done.**

Resetting Each Controller Using CAM

It is important that you reset both controllers in the array before attempting the upgrade.

Resetting a controller makes it unavailable for I/O until the reset has been completed. If a host is using volumes owned by the controller being reset, the I/O directed to the controller will be rejected.

Prerequisite: Because the firmware upgrade is an offline procedure, all I/O to the storage array should be quiesced.

1. From the Sun StorageTek Common Array Manager's navigation pane, expand the array for which you want to reset the controller.
2. Expand Physical Devices and choose Controllers.
3. Click Reset Controller, and then click OK.

Running the Utility

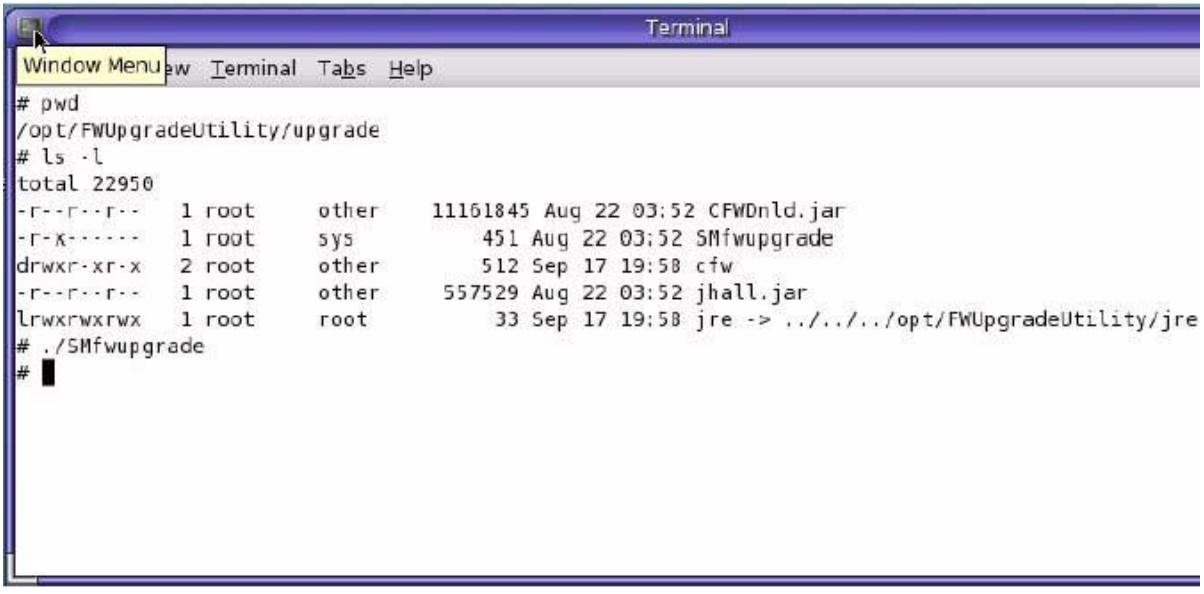
1. **To launch the utility, change to the following directory.**

   `/opt/FWUpgradeUtility/upgrade`

2. **Execute the `./SMfwupgrade` command, as shown in the figure below.**

Note – The directory path and command might vary, depending upon your particular firmware package and operating system.

FIGURE 1-4 Upgrade Utility Screen



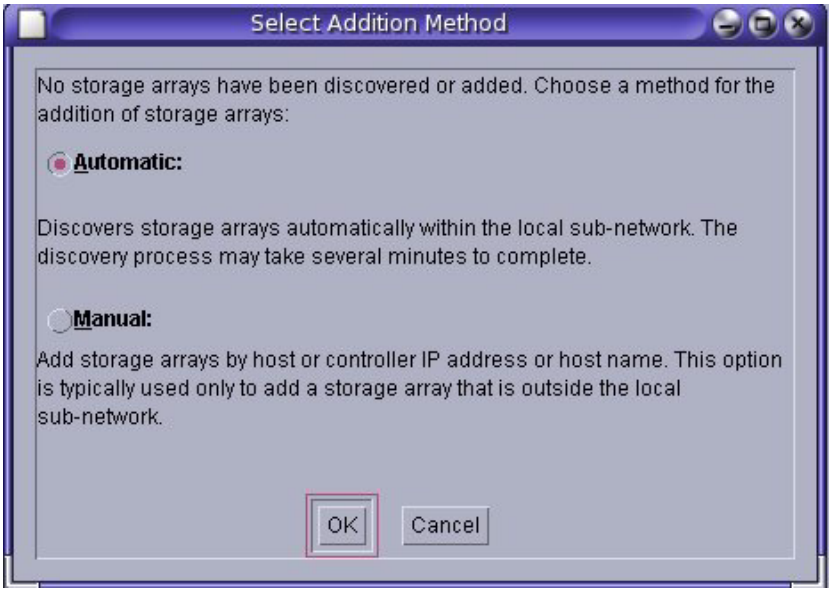
The `SMfwupgrade` command displays the Select Addition Method screen used to automatically discover all storage arrays registered with the CAM software.

Selecting a Discovery Method

You can select the automatic or manual method to discover storage arrays attached to your network.

Note – Before you begin the discovery process, it is recommended that you reboot the controllers of the arrays that you plan to update.

FIGURE 1-5 Select Addition Method Screen



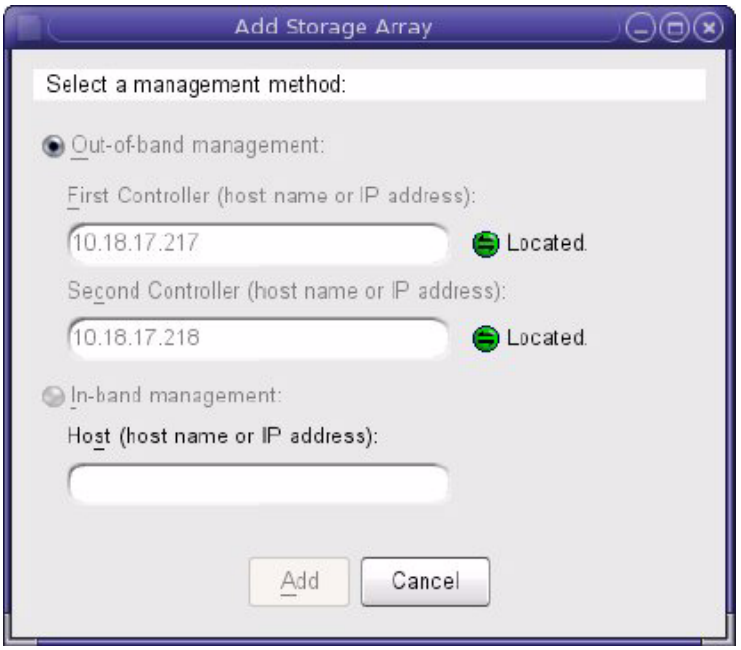
Adding Storage Arrays

1. **Because the upgrade procedure takes the array offline, be certain that you stop all data to the array.**
2. **From the Select Addition Method screen, select the method you want to use to discover the storage arrays that will be upgraded.**

Note – If there is more than one password-protected array in the network, you must register them one at a time using the Manual option. This enables you to enter the specific password for each of your password-protected arrays.

Use the Manual method when you do not want to upgrade all your storage arrays. For example, if a storage array is not currently in an optimal status, manually select the others now and upgrade this array later, when it has returned to optimal status.

FIGURE 1-6 Add Storage Array Screen



If you select the Automatic method, the Firmware Upgrade Tool screen appears (FIGURE 1-7), from where you can select the storage arrays you want to add (to the controller firmware upgrade list).

Note – If your array is not discovered, you may need to use the Manual method to explicitly specify the IP address of your controller.

All storage arrays discovered on the network appear in a table on the Controller Firmware Upgrade (Utility) Tool. Next to each storage array is status information that indicates the current condition of the array.

FIGURE 1-7 Firmware Upgrade Tool-Select Arrays

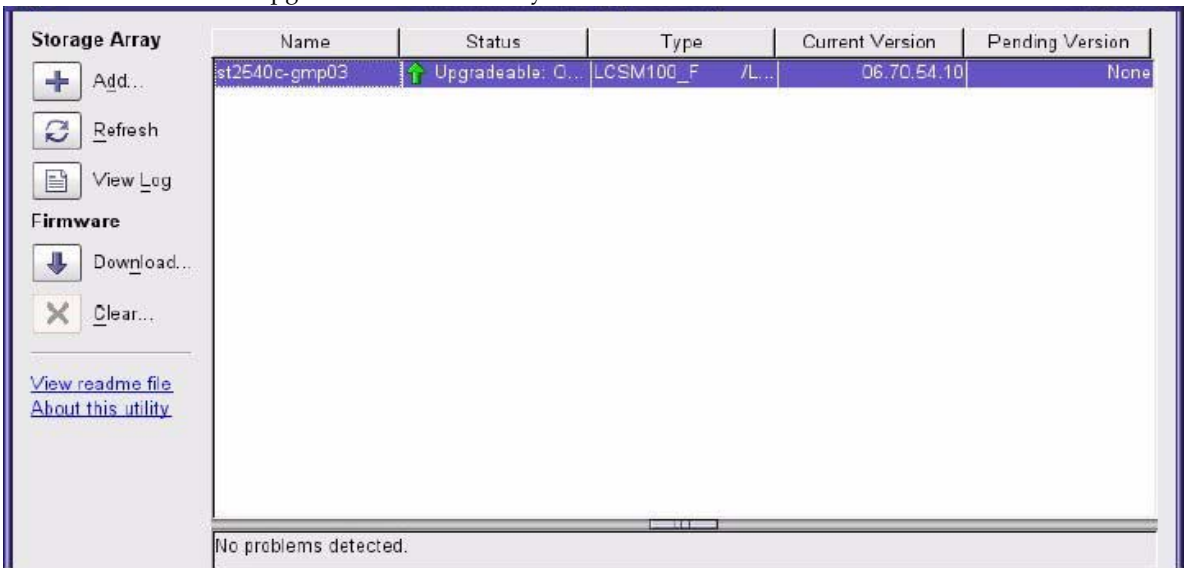
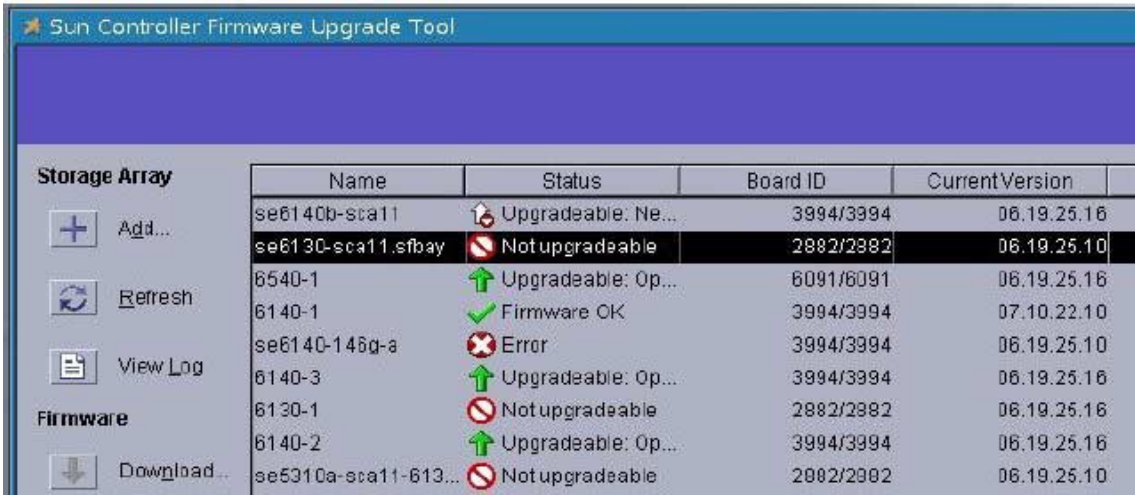


FIGURE 1-8 Firmware Upgrade Tool with Arrays selected



Click the Readme file link on the left side of the screen to display the restrictions and limitations of this upgrade utility. This information is particularly useful if one of the storage arrays is unable to successfully upgrade the controller firmware.

Checking Storage Array Status

The utility displays a status for each array, shown by an icon and text description.

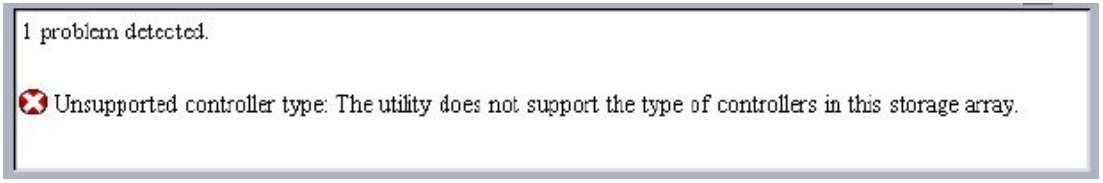
Select the name of an array to display more information in the lower half of the screen.

1. **Select one or more arrays.**

   If all the arrays you have selected are in the Upgradeable: Optimal status, follow the procedure in "Downloading and Activating Firmware" on page 15.

2. **If any array you have selected shows a status that is not Upgradeable: Optimal, you will need to review conditions that could prevent the firmware upgrade.**

   For example, if the array indicates a status of Not-upgradeable, the message in the lower half of the screen might look like this:



Reviewing Conditions that Prevent Firmware Upgrade

In cases where the firmware upgrade is not possible, the status is shown as Not-upgradeable for the applicable storage array. The status description area at the bottom of the main application window displays information that describes why the storage array will not upgrade. Conditions that can prevent successful upgrade can include the following:

- Data validation error
- Drives with DACstore infringing on the 512MB space required for migration to the format supported by the new firmware
- Either controller in a state other than optimal
- Exclusive operations in progress for any virtual disk (such as defragmenting a volume group, copy-back to a drive, initialization of a volume, and others)
- Failed assigned drives
- In-use hot spare drives
- Incomplete virtual disks and volumes due to missing associated drives
- Missing volumes

- Storage partitions database corruption
- Unsupported controller type
- Unsupported firmware version

1. **Use the Sun StorageTek Common Array Manager software to address problems.**
2. **Contact your technical support representative on issues you can not resolve.**

Upgradeable: Needs Attention

It is possible for an array to require attention even while it is in upgradeable status.

If you see an Upgradeable: Needs Attention status for an array, it is strongly recommended that you resolve any storage array problems before attempting the upgrade. Failure to resolve storage array problems prior to the upgrade may result in a failed upgrade and/or inadvertent data loss.

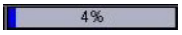
Use the CAM software to resolve any problems before starting the upgrade or contact Sun Microsystems Support Services at:
`http://www.sun.com/contact/support.jsp`.

Keep in mind that CAM is unable to upgrade 6.70.xx.xx firmware to 07.xx.xx.xx. For the 6.2.0 release, firmware upgrade must be performed using the upgrade utility described in this document.

When you have successfully upgraded from 6.70.xx.xx.xx to 07.xx.xx.xx using the instructions in this guide, you'll be able to automatically upgrade CAM versions from that point.

The following table describes array status and shows the corresponding icons.

TABLE 1-1 Storage Array Status

Icon	Status	Description
	Not-upgradeable	You can not upgrade the storage array for one or more reasons. See "Downloading and Activating Firmware" on page 15.
	Upgradeable: Optimal	No problems are detected. You can upgrade the storage array.
	Upgradeable: Needs Attention	You can upgrade the storage array even though problems were detected.
	Downloading	Controller firmware is downloading to the storage array and indicating progress.
	Firmware pending	The storage array has pending firmware that is ready for activation.
	Firmware activating	The new controller firmware is activating (i.e. replacing the current firmware).
	Firmware OK	The storage array has the required version of firmware.
	Refreshing	Storage array status is refreshing.
	Connecting	The utility is connecting to the storage array.
	Error	There was an error during the operation. See the Service Advisor for this particular storage array.
	Unresponsive	The storage array cannot be contacted. Look for fault LEDs on the storage array and consult the Service Advisor for information.

Downloading and Activating Firmware

When you select a controller firmware file to download, the upgrade utility performs compatibility-checking to ensure the file is compatible with the controller model for the selected storage array. The download process involves transferring files and activating them. The files are activated after the transfer is complete and the storage array becomes offline during the activation process.

1. **Read the confirmation dialog carefully before you proceed with the download.**
2. **Select storage arrays that have an Upgradeable status.**
3. **Click Download.**

Note – Files are located under /opt/FWUpgradeUtility/upgrade/cfw

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4. **Complete the menu items for the file transfer.**

   The firmware activates after the download completes. Within the directory where you install the firmware, the file `README_2500.txt` defines the firmware baseline.

Note – Be sure you select the checkbox in the UI to upgrade the NVSRAM firmware. Even though this appears to be optional, it is not optional. You must select the NVSRAM file that supports your array.

The estimated time to download controller firmware files is a few minutes, depending on network conditions, the current workload of the storage array, and the number of storage arrays to which files are downloaded.

Selecting firmware files

Firmware files are located under /opt/FWUpgradeUtility/upgrade/cfw

For the latest firmware information, see the "Baseline Firmware for Sun StorageTek 2500 Series Arrays" section in *Sun StorageTek Common Array Manager Release Notes.*

Selecting the NVSRAM file

NVSRAM is non-volatile memory used to store the instructions needed to manage failover and other communication path issues that might arise

NVSRAM files are located under /opt/FWUpgradeUtility/upgrade/cfw

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Note – Be sure you select the checkbox in the UI to upgrade the NVSRAM firmware. Even though this appears to be optional, it is not optional. You must select the NVSRAM file that supports your array.

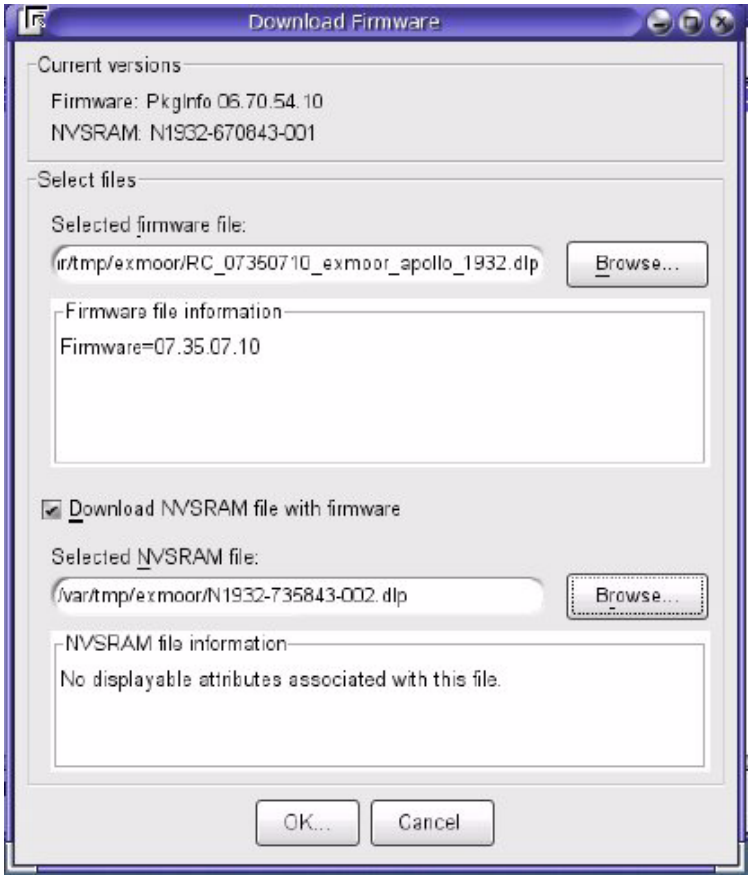
There are two versions of NVSRAM files, one for single-controller and one for dual-controllers. Navigate to the available files, and select the NVSRAM that matches your array configuration.

TABLE 1-2 NVSRAM Information: Sun StorageTek 2500 Series Arrays

NVSRAM	Version	Firmware File
2510 (iSCSI)-Duplex	N1532-735843-002	N1532-735843-002.dlp
2510-Simplex	N1532-735843-902	N1532-670843-902.dlp
2530 (SAS)-Duplex	N133X-735843-002	N133X-0735843-002.dlp
2530-Simplex	N133X-735843-902	N133X-670843-902.dlp
2540 (FC)-Duplex	N1932-735843-002	N133X-0735843-002.dlp
2540-Simplex	N1532-735843-902	N1532-670843-902.dlp

The NVSRAM file you download makes modifications that handle the intricacies of your particular operating system, shown below:

FIGURE 1-9 Firmware and NVSRAM File Selection Screen



Result: When the download starts, a progress bar will display in the status column in the main application window.

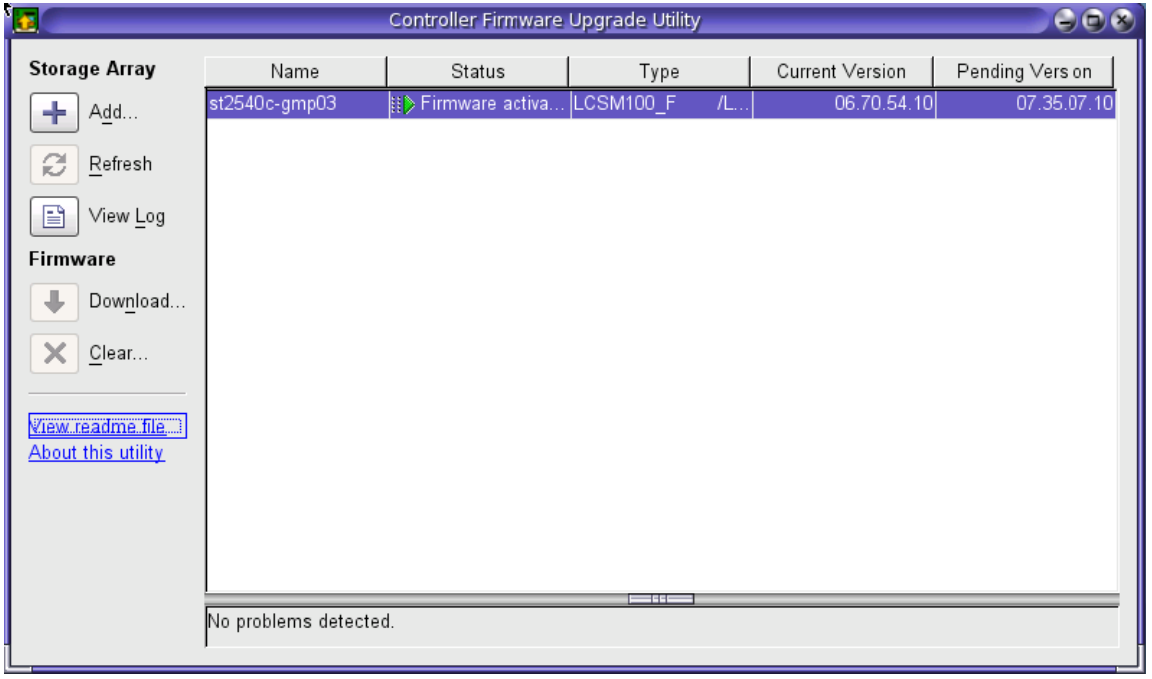
Note – The estimated time to download controller firmware files is a few minutes, depending on network conditions and the number of storage arrays to which files are downloaded.

After the download completes, the storage array status will change to Firmware activating.

When the activation process begins, the storage array is offline and unable to receive I/O from hosts. During the activation process, the current controller firmware is replaced, and the storage array is rebooted.

The new firmware becomes active after the storage array reboots. The controller must reboot to move from a Firmware pending status to a Firmware activating status.

FIGURE 1-10 Controller Firmware Upgrade Utility - Firmware Activating



If the activation process has not completed within 30 minutes, check the controller fault LEDs on the storage array and contact technical support personnel if there appears to be a fault.

Result: After the activation completes, the storage array status will change to Firmware OK, and host I/O can resume.

Note – The Pending Version and Current Version will require an additional few minutes to update.

Un-register Arrays, Upgrade CAM, Re-register Arrays

Be sure to do the following:

1. **Un-register each upgraded array within CAM.**
   For instructions, click Help.
2. **Upgrade your CAM software to version 6.2.0 or later.**

Note – To obtain the latest CAM version and information: From http://www.sun.com/storagetek/management_software/resource_management/cam, click the "Get It" tab.

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3. **Re-register each upgraded array within CAM.**

Troubleshooting

The following are additional operations you can use to improve the process or to gather additional information on issues.

Note – See the Readme file for more information.

Clearing Controller Firmware

Select a storage array and click Clear to remove the pending controller firmware version.

This has no effect on the current version of controller firmware; it simply removes the pending version and does not require the storage array to be offline. You might want to clear controller firmware to ensure the pending version is not inadvertently activated.

Closing and Restarting the Application

Storage arrays do not persist in the utility after you close the application. If you exit and restart the utility, any storage arrays that were added previously will no longer be displayed in the table. You will have to add them again. Since storage arrays do not persist if you close the utility, it is advisable to complete all upgrades in a single session, especially if you have several storage arrays to upgrade.

Performing a Parallel Clear

It is possible to clear pending controller firmware on multiple storage arrays simultaneously, provided that all selected storage arrays have pending controller firmware present.

Performing Parallel Downloads

It is possible to download controller firmware files to multiple storage arrays simultaneously. Parallel upgrading is possible only when all selected storage arrays have the same controller model and an upgradeable status.

Recovering from Upgrade Errors

Prior to activation, storage array configuration data is saved, in order to assist in recovery should the upgrade fail. The following data is saved within the directory where the upgrade utility was installed, within a directory of the same name as the storage array:

- Storage array configuration data
- Read Link Status Diagnostics (Fibre Channel storage arrays only) data
- Recovery profile
- Major Event Log data

This data can be used to reconfigure a storage array in the event of a failed upgrade, or by technical support personnel to assist with upgrade problems.

Refreshing Storage Array Data

You can click the Refresh button to re-check the status of storage arrays and update the table. Also, storage array status is checked immediately prior to performing an operation to ensure that the storage array is still eligible for the selected operation.

Storage array data shown within the table in the main application window refreshes automatically only when an operation completes (such as downloading controller firmware). The data does not refresh automatically when a storage array event occurs nor for any type of polling schedule.

Viewing the Log

Click the View Log button to view the informational log for a storage array.

The log includes a list of all actions that take place while the utility is running, and it may be helpful in diagnosing problems that might prevent an upgrade. The log is kept in the directory location noted in the log viewer window. A new log file is created every time the utility is started. Log files are text files, and they can be viewed using any application that can read files in text format.

Note – All information pertaining to restrictions, recommendations, and instructions for using the utility are contained in the Readme file, which is a part of the SMfwupgrade package. Some of this Readme information has been added to this document as well.

Related Documentation

TABLE 1 2500 Array Series and CAM Documentation

Title
Sun StorageTek 2500 Series Array Getting Started Guide
Sun StorageTek 2500 Series Array Release Notes
Sun StorageTek 2500 Series Array Site Preparation Guide
Sun StorageTek 2500 Series Array Regulatory and Safety Compliance Manual
Sun StorageTek 2500 Series Array Hardware Installation Guide
Sun StorageTek Common Array Manager Release Notes
Sun StorageTek Common Array Manager CLI Guide
Sun StorageTek Common Array Manager Software Installation Guide
Sun StorageTek Common Array Manager Array Monitoring Guide

To locate a document: From `http://www.sun.com/documentation`

Sun Microsystems Support

If you need help installing or using a product, contact Sun Microsystems Support Services at `http://www.sun.com/contact/support.jsp`.

For the latest patches available for your system, check SunSolve at: `http://sunsolve.sun.com/show.do?target=patchpage`

To download Common Array Manager software, go to `http://www.sun.com`, click the New Downloads tab, and scroll down the list to find the link.

Note – Downgrading firmware is not recommended. If you have questions, please contact Sun Microsystems Support.