Sun StorEdge™ 3510 FC and 3511 SATA Array Release Notes

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Contents

Sun StorEdge 3510 FC and Sun StorEdge 3511 SATA Array Release Notes

This document contains important information about the Sun StorEdge™ 3510 FC array and the Sun StorEdge 3511 SATA array that was not available at the time the product documentation was published. It also includes information about hardware and software products supported by these arrays.

Read this document so that you are aware of issues or requirements that can impact the installation and operation of the Sun StorEdge 3510 FC array and the Sun StorEdge 3511 SATA array.

See "New Features in This Release" on page 1 for a description of new functionality and changes from previous releases.

See "Upgrading to Software Version 2.5 and Controller Firmware Version 4.2x" on page 29 for information about downloading and installing the firmware package that contains the README file and other supplemental information.

Sun StorEdge 3510 FC array and the Sun StorEdge 3511 SATA array both use Fibre Channel technology but have important differences in their drive technology and purpose. Be sure to review key differences in the *Sun StorEdge 3000 Family Installation Manual* and the *Sun StorEdge 3000 Family Best Practices Manual*.

New Features in This Release

This release includes new versions of RAID controller firmware and related enclosure firmware, Sun StorEdge Configuration Service, Sun StorEdge Command-Line Interface (CLI), and Sun StorEdge Diagnostic Reporter. It incorporates requested enhancements as well as fixes to previously known issues.

Note – The Sun StorEdge 3000 Family of storage products, including the Sun StorEdge 3510 FC array and the Sun StorEdge 3511 SATA array, are now referred to as Sun StorageTek™ storage products. These are identical products. To avoid confusion, the manuals for these products will retain the old Sun StorEdge designation.

New Instructions for Migrating From RAID Controller Firmware 3.2x to 4.x

The RAID controller firmware upgrade procedure has been streamlined and simplified, and additional logging capabilities have been added to the upgrade script. Refer to the *Sun StorEdge 3000 Family RAID Controller Firmware Migration Guide*, 819-6573, for step-by-step procedures for upgrading RAID controller firmware version 3.2x to version 4.x.

Caution – These procedures must be followed when performing this major upgrade. Minor upgrades from earlier versions of 4.1x firmware do not require the use of this document and can be performed by following the instructions in the firmware patch README file.

Current NVRAM Version Displayed

The RAID controller's firmware now displays the current NVRAM version installed on the controller in the View System Information window. This helps diagnose any conflicts that might have occurred if a controller was replaced or new firmware installed without resetting NVRAM. Refer to the *Sun StorEdge 3000 Family RAID Firmware 4.2x User's Guide, 817-3711,* for instructions on how to use this feature.

Recently Added Clear Core Dump Firmware Menu Option

RAID controller firmware versions 4.23 and beyond include a Clear Core Dump firmware option on the **system Functions** menu.

In a redundant controller configuration, if an unrecoverable error condition occurs, the affected controller might write debug information to NVRAM. If this happens, an event message will be displayed each time the controller reboots, such as the following:

```
ALERT: Controller Unrecoverable Error 0001 00000000 00000000
45754677
```

This message is displayed each time a failed controller is restarted after a redundant controller failure and does not indicate a new controller failure. The date and time of the event message indicates the time the controller was restarted, not the time of the failure.

If the unrecoverable error recurs, clear the core dump only on the advice of your support representative.

Refer to the "System Functions" chapter and "Event Messages" appendix of the *Sun StorEdge 3000 Family RAID Firmware 4.2x User's Guide, 817-3711,* for details about clearing core dumps and about unrecoverable error messages.

Consequences of Unsupported Configurations Minimized When Using More Than One Sun StorEdge Configuration Service Monitor Console (ssmon)

Sun StorEdge Configuration Service uses a distributed architecture to monitor RAID arrays. One--and only one--Configuration Service console, a process called `ssmon` running on a host, gathers information from the array to which it is connected. Up to ten Configuration Service agents communicate this information as needed. Running more than one Configuration Service console is not supported. In previous releases, doing so could cause data loss.

Note – It might be possible to inadvertently set up more than one host session running a Configuration Service console if `ssmon` is used to communicate with an SNMP client such as OpenView. Refer to your platform's *RAID User's Guide* for the correct way to configure your array to use SNMP.

Previous Feature Changes in 4.1x RAID Controller Firmware and 2.x Software

A number of firmware and software changes occurred when RAID controller firmware 4.11 was introduced; they apply to all firmware 4.x versions. TABLE 1 describes these changes.

TABLE 1 Summary of Sun StorEdge 3000 Family 4.1x Firmware and 2.x Software Features

Feature	Description
Default IP address assigned by a DHCP server	By default, each chassis has an IP address assigned to it if your network uses a Dynamic Host Configuration Protocol (DHCP) server to automatically allocate IP addresses to attached devices. You can then access that IP address through the Sun StorEdge CLI, Sun StorEdge Configuration Service, or the firmware application. If you do not use a DHCP server and therefore have no IP address, you can set an IP address through serial connection to the firmware.
Logical Drive Capacity	The firmware allows up to 64 TB per logical drive configuration with sequential optimization and up to 16 TB per logical drive configuration with random optimization. These limits are further modified by available drive sizes and the maximum number of drives allowed per product.
Number of Logical Drives	You can configure up to 32 logical drives per configuration, with a maximum of 32 partitions per logical drive.
Configurable Parameters per Logical Drive	You can configure stripe size and write (cache) policy individually for each logical drive with a maximum limit of 1024 LUNs.
Optimization Mode and Stripe Size	This optimization mode applies to cache optimization, rather than stripe size. You can fine-tune performance by setting the most desirable stripe size for each logical drive to best match the application of that logical drive. For more information, see "Optimization Mode and Stripe Size Features" on page 7.

TABLE 1 Summary of Sun StorEdge 3000 Family 4.1x Firmware and 2.x Software Features *(Continued)*

Feature	Description
Media Scan	The media scan feature sequentially checks each physical drive in a selected logical drive, block by block, for bad blocks. If a bad block is encountered, the controller rebuilds the data from the bad block onto a good block if one is available on the physical drive. If no good blocks are available on the physical drive, the controller designates the physical drive "Bad," generates an event message, and if a spare drive is available, will begin rebuilding data from the bad physical drive onto the spare. The media scan feature generates informational event messages for each drive that is part of a logical drive. The informational event messages are also generated each time a controller is reset or a logical drive is created. During the media scan, the green front-panel LEDs blink rapidly for every active drive comprising the logical drive. After upgrading from 4.1x to 4.2x, an array reset is necessary for the new media scan default to take effect and automatic media scanning to stop.
SNMP Traps	Similar to Sun StorEdge Configuration Service, the controller firmware can send SNMP traps to an SNMP management console, send email messages, and broadcast events to specified servers, as defined in a text file called `agent.ini`.
Network Protocol Access	For security reasons, you can restrict the network protocols you want to support, which limits access. Protocol access that can be enabled or disabled includes `telnet`, HTTP, HTTPS, FTP, SSH, PriAgentAll, SNMP, DHCP, and `ping`.
Telnet Inactivity Timeout Time	Set this security measure so that any telnet connection automatically disconnects after the connection has been idle for a configurable period of time. The current setting is displayed with the menu option.
Online Initialization and Online Expansion	Enabling Online Initialization or Online Expansion enables you to use the logical drive while it is being initialized or expanded. However, the completion of the initialization or expansion takes longer than if these processes are run while the logical drives are not in use.
Logical and Physical Drive Safeguards	There are safeguards against combining physical drives of different types in logical drives, with accompanying explanatory error messages.
Fault-Management Safeguards	Automatically switch to write-through cache mode based on: • Low battery level • AC power loss • Fan failure • Power supply failure • High temperature in CPU/Enclosure • Failure of a redundant controller • Single-controller configuration • Automatic system shutdown based on critical environmental conditions

TABLE 1 Summary of Sun StorEdge 3000 Family 4.1x Firmware and 2.x Software Features *(Continued)*

Feature	Description
Ethernet and RS-232 Security	For added security, a password can be supplied for access to the array using a telnet session or tip session. If a password has not been established, pressing the RETURN key enables access to the firmware menu.
CLI Status Commands	The CLI `set led` and `show led-status` commands are supported on Sun StorEdge 3320, Sun StorEdge 3510 FC, Sun StorEdge 3511 SATA RAID arrays, and JBODs connected to RAIDs.
SMART Feature Enabled by Default	The Self-Monitoring, Analysis and Reporting Technology (SMART) feature is enabled by default in the firmware, with the Detect and Clone+Replace option turned on.
Default Configuration Parameter Settings	A number of default settings have changed to reflect various firmware changes. If you are upgrading from 3.2x to 4.2x firmware, these new defaults are applied once you reset NVRAM.
Upgrading Controller Firmware from 4.1x	When upgrading controller firmware from an earlier version of 4.1x, the Drive Predictable Failure Mode (SMART) will be set to 'Detect only' by default if the prior setting was 'Disabled.' The recommended setting is 'Detect and Clone+Replace' and must be set manually after the upgrade is complete.

Performance Implications of Migrating to Firmware Version 4.x

Sun has made changes to the firmware for the StorEdge 3310 and 351x arrays between versions 3.2x and 4.x that can impact performance. The algorithm for aggregating small writes in the cache has been improved so that they can be written to disk at the same time. This results in improved performance under workloads that issue mostly small sequential writes, or many small random writes within the same region. The performance improvement is most dramatic under workloads that queue many commands to the array, giving it the most opportunities to aggregate writes. Users should tune their applications and host driver stacks to queue up to 32 commands whenever possible.

Sun has also added increased error and data integrity checking to firmware 4.11 and later versions that can have an adverse affect on performance for StorEdge 33x0 and 351x arrays when upgrading from firmware version 3.2x. Users might experience a decrease in performance under workloads that primarily issue sequential reads. To mitigate this impact, tune applications and host driver stacks to issue the largest reads and maintain the highest queue depths possible.

Users may also see a small performance decrease under workloads that primarily issue large sequential writes. These users should also tune their host to issue the largest writes possible and maintain a large command queue depth.

Note – Choosing sequential optimization, the default, almost always results in better performance than choosing random optimization, even if random optimization performed better for your configurations and applications in firmware versions 3.x. See "Optimization Mode and Stripe Size Features" on page 7 for explanatory details.

Firmware and software changes between 4.15 and 4.2x have no significant impact on performance.

Using cache write-through mode rather than write-back mode can have a significant impact on performance. To ensure that write-back cache is enabled for all LUNs after upgrading RAID controller firmware, from the RAID controller firmware Main Menu choose "view and edit Configuration parameters > Caching Parameters > Write-Back Cache." If it is disabled, choose 'Yes' to change the setting to Enabled.

Additional safety checks have been added to the 4.x firmware that will disable write-back cache and change the cache to write-through mode under certain error conditions. Conditions that can cause the array to switch to write-through mode include:

- Battery backup failure
- AC power loss
- Fan failure
- Power supply failure
- High temperature in CPU/Enclosure
- Failure of a redundant controller

Once the condition is corrected, write-back cache is automatically re-enabled.

In firmware versions 4.11 and later, these triggering events can be enabled or disabled, and the threshold limits can be set, using the RAID controller firmware's Main Menu. For more information about write-back cache, refer to Chapter 11, "Configuration Parameters," in the *Sun StorEdge 3000 Family RAID Firmware 4.2x User's Guide*.

Optimization Mode and Stripe Size Features

The optimization mode in firmware version 4.x controls cache block size only. This is a significant improvement in functionality and performance over earlier 3.x firmware, where the optimization mode chosen also determined stripe size for all logical drives.

With firmware version 4.x, when you specify sequential or random cache optimization, the controller determines and specifies a default stripe size for newly-created logical drives. However, you can specify a stripe size for each logical drive

when you create it, enabling you to maximize performance by matching stripe size with your application requirements. Since different applications can use different logical drives, this functionality provides you with greatly increased flexibility.

Because of this, sequential optimization, which is the default, is almost always the best optimization choice. You should use random optimization only when performance testing in your production environment demonstrates improvement over the default sequential optimization.

For sequential optimization, the cache block size is 128 Kbyte. Available stripe size options include 16 Kbyte, 32 Kbyte, 64 Kbyte, 128 Kbyte, and 256 Kbyte. The default stripe size for sequential optimization is 128 Kbyte for all logical drives except RAID 3, which is 16 Kbyte.

For random optimization, the cache block size is 32 Kbyte. Available stripe size options include 4 Kbyte, 8 Kbyte, 16 Kbyte, 32 Kbyte, 64 Kbyte, 128 Kbyte, and 256 Kbyte. The default stripe size for random optimization is 32 Kbyte for all logical drives except RAID 3, which is 4 Kbyte.

With firmware version 4.x, you can also specify a cache write policy for each individual logical drive, giving you further opportunities for performance tuning.

The following table summarizes the functionality described above:

TABLE 2 Summary of Optimization and Stripe Size Features

Feature	Description
Sequential or Random Cache Optimization Mode	Sets block size for cache in a chassis. Stripe size for each logical drive is user-selectable, but optimization mode determines default stripe size. Use the default sequential optimization unless real-world tests in your production environment show better results using random optimization.
Changing the optimization mode	To change the optimization mode without deleting logical drives, use the Sun StorEdge CLI `set cache-parameters` command.
Stripe Size	Using the controller firmware, you can now specify an appropriate stripe size for each logical drive when you create it.
Changing the stripe size	To change the stripe size of an individual logical drive, delete the logical drive and create a new logical drive with the desired stripe size.
Cache Write Policy	Specify a write-back or write-through cache policy for the entire RAID array. Specify a default write-back, or write-through policy for each logical drive. Specify event triggers that switch cache policy from write-back to write-through when specific environmental events occur, and switch back when the condition is rectified.

Obtaining Current Software and Documentation

A CD-ROM containing Sun StorEdge Configuration Service and Diagnostic Reporter software, installation and configuration documents, along with Sun StorEdge 3000 family documentation, is *not* automatically shipped with Sun StorEdge 3000 Family products. Contact your Sun sales representative if you need these contents made available on a CD-ROM.

You can download the related hardware and software documentation by clicking the appropriate Sun StorageTek 3xxx Array link on Sun Microsystems Documentation's Workgroup Storage web page:

`http://docs.sun.com/app/docs/prod/wkgrp.disk`

Release Documentation

These release notes supplement the documents shown in TABLE 3.

TABLE 3 Sun StorEdge 3510 FC Array and Sun StorEdge 3511 SATA Array Documentation

Title	Part Number
Sun StorEdge 3000 Family Installation, Operation, and Service Manual: Sun StorEdge 3510 FC and 3511 SATA Arrays	816-7300
Sun StorEdge 3000 Family Best Practices Manual: Sun StorEdge 3510 FC and 3511 SATA Arrays	816-7325
Sun StorEdge 3000 Family 2.5 Software Installation Guide	817-3764
Sun StorEdge 3000 Family RAID Controller Firmware Migration Guide	819-6573
Sun StorEdge 3000 Family Configuration Service 2.5 User's Guide	817-3337
Sun StorEdge 3000 Family Diagnostic Reporter 2.5 User's Guide	817-3338
Sun StorEdge 3000 Family CLI 2.5 User's Guide	817-4951
Sun StorEdge 3000 Family RAID Firmware 4.2x User's Guide	817-3711
Sun StorEdge 3000 Family FRU Installation Guide	816-7326
Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays	819-4026
Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual	816-7930

Service Contact Information

If you need help installing or using this product, call 1-800-USA-4SUN, or go to:

http://www.sun.com/service/contacting

System Requirements

The software and hardware identified in the following list have been tested and proven to work with the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array.

Supported Operating Systems and Software

TABLE 4 lists the operating systems supported for hosts connected to Sun StorEdge 3510 FC arrays and Sun StorEdge 3511 SATA arrays.

TABLE 4 Supported Operating Systems

Operating Systems	Notes and Requirements
Solaris 9 and Solaris 10 operating systems, SPARC Platform Edition.	Requires the appropriate version of the Solaris recommended patch cluster. See "To Download and Install the Solaris Recommended Patch Cluster" on page 28. SPARC platform systems running the Solaris 9 operating system must have the Sun StorEdge SAN Foundation software installed. The Sun StorEdge SAN Foundation software includes required patches and drivers for the supported host adapters and switches. The software also includes other SAN features, including the Sun StorEdge Traffic Manager software for the Solaris operating system. See "Installing Sun StorEdge SAN Foundation Software" on page 36.
Solaris 9 Update 6 x86 and Solaris 10 x86 Platform Edition	x86 platform systems running the Solaris 9 operating system must have the Sun StorEdge SAN Foundation software installed. The Sun StorEdge SAN Foundation software includes required patches and drivers for the supported host adapters and switches. The software also includes other SAN features, including the Sun StorEdge Traffic Manager software for the Solaris operating system. See "Installing Sun StorEdge SAN Foundation Software" on page 36.
HP-UX 11.0, 11i and later operating system	Supported
IBM AIX 5.1, 5.2, 5.3 and later operating system (32-bit and 64-bit)	Supported
Red Hat AS 3.0, 4.0 and later operating system	Supported
Windows 2003 Server, Windows 2003 Advanced Server and later operating systems	Supported
Novell Netware 5.1, 6.0, 6.5 and later Novell Cluster Services 1.6, 1.7 and later	Supported for the 3510 FC Array only
SUSE Linux Enterprise Server 9.0 and later (32-bit and 64-bit)	Supported

TABLE 5 lists the software components of the Sun StorEdge 3000 Family Professional Storage Manager software for Sun StorEdge 3000 Family SCSI, FC, and SATA arrays. See "Upgrading to Software Version 2.5 and Controller Firmware Version 4.2x" on page 29 for information about how to obtain this software.

TABLE 5 Sun StorEdge 3000 Family Professional Storage Manager Software

Management Software	Notes and Requirements
Sun StorEdge 3000 Family Configuration Service 2.x software[1]	This software provides centralized storage configuration, maintenance, and monitoring tools that can manage all Sun StorEdge 3000 family arrays from the same management host server.
Sun StorEdge 3000 Family Diagnostic Reporter 2.x software	This utility provides monitoring and notification.
Sun StorEdge CLI 2.x	This utility can be used for command-line and scripted management.

1 This software cannot be used to download SATA MUX and SATA router firmware to the Sun StorEdge 3511 array at the time of this release. Use the Sun StorEdge CLI for this purpose instead.

Java Runtime Environment Requirements

Before you install Sun StorEdge Configuration Service, Sun StorEdge Diagnostic Reporter, or the Sun StorEdge CLI, make sure that your system meets the Java Runtime Environment (JRE) prerequisites shown in the *Sun StorEdge 3000 Family Software Installation Guide* instructions for your operating system. In general, you can use Sun JRE version 1.2.2 or later for all platforms. IBM AIX and SUSE Linux can also use IBM JRE version 1.2 or later.

Other Supported Software

TABLE 6 lists backup, clustering, diagnostic, and other supported software.

TABLE 6 Other Supported Software

Type	Product Name
Backup Software	• VERITAS NetBackup 4.5, 5.0, 6.5 and later software • Sun StorEdge Enterprise Backup 6.1, 7.1 and later software (formerly Sun Solstice Backup software)
Clustering Software	• Sun Cluster 3.0, 3.1, 3.2 and later software • Microsoft Windows Cluster for Windows 2003 and later • Veritas Volume Manager (VxVM) 3.5, 4.0, 4.1, 5.0 and later
Diagnostic Software	• The Sun StorEdge Automated Diagnostic Environment 2.4 utility supports the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array. The SUNWstade 117650-3x (for the agent) and SUNWstade 117654-3x (for the management console) patches are required to support the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array. Sun Storage Automated Diagnostic Environment 2.4 software, Device Edition with patches (`SUNWstade` 117650-3x and `SUNWstade` 117654-3x) software is shipped separately without charge when a Sun StorEdge 3510 FC RAID array or Sun StorEdge 3511 SATA RAID array is ordered through WebDesk, and is also available through `www.sun.com/sunsolve`. To download Sun StorADE 2.4 today, please go to: `http://www.sun.com/download/products.xml?id=41c884fa` • Sun StorEdge Diagnostic Expert 2.4 and later software (bundled with Sun StorEdge Enterprise Storage Manager 2.1 and later software) **Note:** The Sun Storage StorEdge Automated Diagnostic Environment and Diagnostic Expert software products provide limited functionality for Sun StorEdge 3511 SATA arrays. The functionality primarily covers asset and device health information.
Point-in-Time Copying and Remote Mirroring Software	• Sun StorEdge Availability Suite 3.1 and later software (includes point-in-time copy service, formerly known as Sun StorEdge Instant Image software, and remote mirror service, formerly known as Sun StorEdge Network Data Replicator [SNDR] software).
Multipathing Software	• Sun StorEdge Traffic Manager software for the Solaris operating system (included in Sun StorEdge SAN Foundation 4.4 and later software) for Sun StorEdge 3000 family RAID controllers. Multipath support for JBODs directly attached to hosts is not provided. See "Installing Sun StorEdge SAN Foundation Software" on page 36 for information about how to obtain the SAN Foundation software. • Sun StorEdge Traffic Manager 3.0 and later software for HP-UX, IBM AIX, Linux, Windows 2003 Server and Advanced Server. To purchase Sun StorEdge Traffic Manager software for these platforms, contact Sun Sales or visit: `http://www.sun.com/sales` **Note:** Traffic Manager software for these operating systems must be purchased and installed from a CD.
Software-Based Volume Management Support	• Solaris Volume Manager software, bundled with the Solaris 9 and Solaris 10 operating systems.

TABLE 6 Other Supported Software *(Continued)*

Type	Product Name
File System Software	• Sun StorEdge Performance Suite 4.0 or later software (Sun StorEdge™ QFS software) • Sun StorEdge Utilization Suite 4.0 or later software (Sun StorEdge SAM-FS software) • VERITAS File System (VxFS) 3.5 and later
ESM Software Provider	• The Sun StorEdge 3510/3511 SMI-S Provider, versions 2.4 and 2.5, are used with Sun Enterprise Storage Manager Advanced Applications (ESM-AA) Management Software 4.1, the WBEM Solutions J WBEM Server (from the ESM-AA 4.1 Accessory CD), and require Sun StorEdge Configuration Service version 2.4 or later. Previous versions of the SMI-S provider that accompanied earlier versions of Sun StorEdge Configuration Service support earlier versions of ESM software.

Supported Platforms and Connection Methods

TABLE 7 through TABLE 13 list the Sun systems and HBAs that are supported by the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array.

Note – For the Sun StorEdge 3511 SATA array, only channels 0 and 1 support 1-Gbit and 2-Gbit connections. Channels 4 and 5 and the drive ports support only a 2-Gbit data transfer rate.

TABLE 7 Supported Sun SPARC Servers and 1-Gb Connection Methods

Servers	(X)6799A 1Gb PCI Single FC Network Adapter	(X)6727A 1Gb PCI Dual FC Network Adapter	(X)6757A 1Gb Sbus Dual FC Network Adapter[1]
Ultra™ 60 workstation	Yes	Yes	No
Ultra 80 workstation	Yes	Yes	No
Sun Blade™ 1000 workstation	Yes	Yes	No
Sun Blade 1500 workstation	No	No	No
Sun Blade 2000 workstation	Yes	Yes	No
Sun Blade 2500 workstation	No	No	No
Netra™ 20	Yes	Yes	No
Netra 120	Yes	Yes	No
Netra 240	Yes	Yes	No
Netra 440	Yes	Yes	No
Netra 1280	Yes	Yes	No

TABLE 7 Supported Sun SPARC Servers and 1-Gb Connection Methods *(Continued)*

Servers	(X)6799A 1Gb PCI Single FC Network Adapter	(X)6727A 1Gb PCI Dual FC Network Adapter	(X)6757A 1Gb Sbus Dual FC Network Adapter[1]
Netra t 1120	Yes	Yes	No
Netra t 1125	Yes	Yes	No
Netra t 1400 server	Yes	Yes	No
Netra t 1405 server	Yes	Yes	No
Sun Enterprise 220R server	Yes	Yes	No
Sun Enterprise 250 server	Yes	Yes	No
Sun Enterprise 420R server	Yes	Yes	No
Sun Enterprise 450 server	Yes	Yes	No
Sun Enterprise 3500 server	Yes	Yes	Yes
Sun Enterprise 4500 server	Yes	Yes	Yes
Sun Enterprise 5500 server	Yes	Yes	Yes
Sun Enterprise 6500 server	Yes	Yes	Yes
Sun Enterprise 10000 server	Yes	Yes	Yes
Sun Fire™ 280R server	Yes	Yes	No
Sun Fire V120 server	Yes	Yes	No
Sun Fire V210 server	Yes	Yes	No
Sun Fire V240 server	Yes	Yes	No
Sun Fire V250 server	Yes	Yes	No
Sun Fire V440 server	Yes	Yes	No
Sun Fire V480 server	Yes	Yes	No
Sun Fire V490 server	Yes	Yes	No
Sun Fire V880 server	Yes	Yes	No
Sun Fire V890 server	Yes	Yes	No
Sun Fire V1280 server	Yes	Yes	No
Sun Fire E2900 server	Yes	Yes	No
Sun Fire 4800 server	Yes	Yes	No
Sun Fire 4810 server	Yes	Yes	No
Sun Fire E4900 server	Yes	Yes	No
Sun Fire 6800 server	Yes	Yes	No

TABLE 7 Supported Sun SPARC Servers and 1-Gb Connection Methods *(Continued)*

Servers	(X)6799A 1Gb PCI Single FC Network Adapter	(X)6727A 1Gb PCI Dual FC Network Adapter	(X)6757A 1Gb Sbus Dual FC Network Adapter[1]
Sun Fire E6900 server	Yes	Yes	No
Sun Fire 12K server	Yes	Yes	No
Sun Fire 15K server	Yes	Yes	No
Sun Fire E20K server	Yes	Yes	No
Sun Fire E25K server	Yes	Yes	No

1 See the following note about setting the data rate for this adapter to 1 GHz. This note is applicable to the Sun Enterprise 3500 server, Sun Enterprise 4500 server, Sun Enterprise 5500 server, Sun Enterprise 6500 server, and Sun Enterprise 10000 server.

Note – The (X)6757A 1-Gbit SBUS Dual FC Network Adapter does not support the latest auto-negotiation protocols. To avoid difficulties, use the "view and edit Scsi channels → Data rate" menu option to set the data rate for channels connected to this HBA to 1 GHz rather than to Auto.

Note – Connecting the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array to Fibre Channel HBAs on the same channel that use different connection methods (1 Gbit and 2 Gbit) is not supported. This limitation is due to the design of the RAID array's port bypass circuitry and the inability of Fibre Channel to support auto-negotiation in a multi-drop loop configuration. You can, however, mix 1-Gbit and 2-Gbit FC HBAs on different channels (though for the Sun StorEdge 3511 SATA array, only channels 0 and 1 are capable of supporting 1-Gbit connection methods).

Note – For the Sun StorEdge 3511 RAID controller, (X)PCI1FC-EM2, SG-(X)PCI2FC-EM2, SG-(X)PCIE1FC-EM4, and SG-(X)PCIE2FC-EM4 Emulex HBAs are not supported in direct-attach configurations. Directly connecting these HBAs to Sun StorEdge 3510 JBODs or Sun StorEdge 3511 JBODs is also not supported.

TABLE 8 Supported Sun SPARC Servers and 2-Gb or 4-Gb Connection Methods

Servers	SG-(X)PCI1FC-QF2 (X6767A) 2Gb PCI Single Channel and SG-(X)PCI2FC-QF2 or SG-(X)PCI2FC-QF2-Z (X6768A) 2Gb PCI Dual Channel	SG-(X)PCI1FC-QF4 4Gb PCI Single Channel and SG-(X)PCI2FC-QF4 RoHS-compliant 4Gb PCI Dual Channel	SG-(X)PCIE1FC-QF4 and SG-(X)PCIE1FC-EM4 4Gb PCI Single Channel SG-(X)PCIE2FC-QF4 and SG-(X)PCIE2FC-EM4 4Gb PCI Dual Channel	SG-(X)PCI1FC-EM2 2Gb PCI Single Channel and SG-(X)PCI2FC-EM2 2Gb PCI Dual Channel
Ultra 60 workstation	Yes	No	No	No
Ultra 80 workstation	Yes	No	No	No
Sun Blade 1000 workstation	Yes	Yes	No	No
Sun Blade 1500 workstation	Yes	Yes	No	No
Sun Blade 2000 workstation	Yes	Yes	No	No
Sun Blade 2500 workstation	Yes	Yes	No	No
Netra 20	Yes	Yes	No	Yes[1]
Netra 120	Yes	No	No	No
Netra 240	Yes	Yes	No	Yes[1]
Netra 440	Yes	Yes	No	Yes[1]
Netra 1280	Yes	Yes	No	Yes[1]
Netra t 1120	No	No	No	No
Netra t 1125	No	No	No	No
Netra t 1400 server	Yes	Yes	No	Yes[1]
Netra t 1405 server	Yes	Yes	No	Yes[1]
Sun Enterprise 220R server	Yes	No	No	No

TABLE 8 Supported Sun SPARC Servers and 2-Gb or 4-Gb Connection Methods *(Continued)*

Servers	SG-(X)PCI1FC-QF2 (X6767A) 2Gb PCI Single Channel and SG-(X)PCI2FC-QF2 or SG-(X)PCI2FC-QF2-Z (X6768A) 2Gb PCI Dual Channel	SG-(X)PCI1FC-QF4 4Gb PCI Single Channel and SG-(X)PCI2FC-QF4 RoHS-compliant 4Gb PCI Dual Channel	SG-(X)PCIE1FC-QF4 and SG-(X)PCIE1FC-EM4 4Gb PCI Single Channel SG-(X)PCIE2FC-QF4 and SG-(X)PCIE2FC-EM4 4Gb PCI Dual Channel	SG-(X)PCI1FC-EM2 2Gb PCI Single Channel and SG-(X)PCI2FC-EM2 2Gb PCI Dual Channel
Sun Enterprise 250 server	Yes	No	No	No
Sun Enterprise 420R server	Yes	No	No	No
Sun Enterprise 450 server	Yes	No	No	No
Sun Enterprise 3500 server	Yes	No	No	No
Sun Enterprise 4500 server	Yes	No	No	No
Sun Enterprise 5500 server	Yes	No	No	No
Sun Enterprise 6500 server	Yes	No	No	No
Sun Enterprise 10000 server	Yes	No	No	No
Sun Fire 280R server	Yes	Yes	No	Yes[1]
Sun Fire V120 server	No	No	No	No
Sun Fire V210 server	Yes	Yes	No	Yes[1]
Sun Fire V240 server	Yes	Yes	No	Yes[1]
Sun Fire V250 server	Yes	Yes	No	Yes[1]

TABLE 8 Supported Sun SPARC Servers and 2-Gb or 4-Gb Connection Methods *(Continued)*

Servers	SG-(X)PCI1FC-QF2 (X6767A) 2Gb PCI Single Channel and SG-(X)PCI2FC-QF2 or SG-(X)PCI2FC-QF2-Z (X6768A) 2Gb PCI Dual Channel	SG-(X)PCI1FC-QF4 4Gb PCI Single Channel and SG-(X)PCI2FC-QF4 RoHS-compliant 4Gb PCI Dual Channel	SG-(X)PCIE1FC-QF4 and SG-(X)PCIE1FC-EM4 4Gb PCI Single Channel SG-(X)PCIE2FC-QF4 and SG-(X)PCIE2FC-EM4 4Gb PCI Dual Channel	SG-(X)PCI1FC-EM2 2Gb PCI Single Channel and SG-(X)PCI2FC-EM2 2Gb PCI Dual Channel
Sun Fire V440 server	Yes	Yes	No	Yes[1]
Sun Fire V480 server	Yes	Yes	No	Yes[1]
Sun Fire V490 server	Yes	Yes	No	Yes[1]
Sun Fire V880 server	Yes	Yes	No	Yes[1]
Sun Fire V890 server	Yes	Yes	No	Yes[1]
Sun Fire V1280 server	Yes	Yes	No	Yes[1]
Sun Fire T2000 server	Yes	Yes	Yes[1]	Yes[1]
Sun Fire E2900 server	Yes	Yes	No	Yes[1]
Sun Fire 4800 server	Yes	Yes	No	Yes[1]
Sun Fire 4810 server	Yes	Yes	No	Yes[1]
Sun Fire E4900 server	Yes	Yes	No	Yes[1]
Sun Fire 6800 server	Yes	Yes	No	Yes[1]
Sun Fire E6900 server	Yes	Yes	No	Yes[1]
Sun Fire 12K server	Yes	Yes	No	Yes[1]

TABLE 8 Supported Sun SPARC Servers and 2-Gb or 4-Gb Connection Methods *(Continued)*

Servers	SG-(X)PCI1FC-QF2 (X6767A) 2Gb PCI Single Channel and SG-(X)PCI2FC-QF2 or SG-(X)PCI2FC-QF2-Z (X6768A) 2Gb PCI Dual Channel	SG-(X)PCI1FC-QF4 4Gb PCI Single Channel and SG-(X)PCI2FC-QF4 RoHS-compliant 4Gb PCI Dual Channel	SG-(X)PCIE1FC-QF4 and SG-(X)PCIE1FC-EM4 4Gb PCI Single Channel SG-(X)PCIE2FC-QF4 and SG-(X)PCIE2FC-EM4 4Gb PCI Dual Channel	SG-(X)PCI1FC-EM2 2Gb PCI Single Channel and SG-(X)PCI2FC-EM2 2Gb PCI Dual Channel
Sun Fire 15K server	Yes	Yes	No	Yes[1]
Sun Fire E20K server	Yes	Yes	No	Yes[1]
Sun Fire E25K server	Yes	Yes	No	Yes[1]

1 For the Sun StorEdge 3511 RAID controller, (X)PCI1FC-EM2, SG-(X)PCI2FC-EM2, SG-(X)PCIE1FC-EM4, and SG-(X)PCIE2FC-EM4 Emulex HBAs are not supported in direct-attach configurations. Directly connecting these HBAs to Sun StorEdge 3510 JBODs or Sun StorEdge 3511 JBODs is also not supported.

Note – The Fibre Channel on-board (HSSDC port) controllers on Sun Fire 280R, V480, and V490 systems are not supported. For these systems you must use one of the supported Sun host adapters shown in TABLE 7 and TABLE 8.

Note – Before connecting the array to a SPARC platform host running the Solaris 9 operating system, download and install the Sun StorEdge SAN Foundation software on the host where the adapter is installed. The SAN software includes the driver for the host adapter. See "Installing Sun StorEdge SAN Foundation Software" on page 36. Installation is mandatory for this operating systems because the driver is not included in the Solaris operating system. Without the driver, any array connected to the adapter cannot be seen by the host.

TABLE 9 Supported Sun x86 Servers and Connection Methods

Servers	(X)5133A 1Gb PCI Single Channel FC HBA	(X)9279A 2Gb PCI Single Channel FC HBA
Sun Fire V60x server	Yes	No
Sun Fire V65x server	Yes	No
Sun Fire V20z server	No	Yes
Sun Fire V40z server	No	Yes

TABLE 10 Supported HBAs For Sun x86 Servers in Red Hat AS 3.0 and 4.0 and SUSE Linux Using QLogic Native Driver

Servers	SG-(X)PCI1FC-QF2 (X6767A) 2Gb PCI Single Channel FC HBA	SG-(X)PCI2FC-QF2 (X6768A) 2Gb PCI Dual Channel FC HBA
Sun Fire V60x server	Yes	Yes
Sun Fire V65x server	Yes	Yes
Sun Fire V20z server	Yes	Yes
Sun Fire V40z server	Yes	Yes

TABLE 11 Supported HBA For Sun x86 Servers In Solaris 9 Update 6 and Solaris 10 x86 Platform Edition Using Emulex's Native Driver =

Servers	Emulex LP10000DC-M2 Light Pulse PCI/PCI-X HBA
Sun Fire V60x server	Yes
Sun Fire V65x server	Yes
Sun Fire V20z server	Yes
Sun Fire V40z server	Yes

TABLE 12 Supported HBA For Sun x86 Servers Using Solaris 10 x86 Platform Edition, Linux, or Microsoft Windows

Servers	SG-PCI1FC-QLC 2Gb PCI FC HBA (Qlogic QLA210)
Sun Fire 60x server	No
Sun Fire V65x server	No
Sun Fire V20z server	Yes
Sun Fire V40z server	Yes

Note – Connecting the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array to Fibre Channel HBAs on the same channel that use different connection methods (1 Gbit and 2 Gbit) is not supported. This limitation is due to the design of the RAID array's port bypass circuitry and the inability of Fibre Channel to support auto-negotiation in a multi-drop loop configuration. You can, however, mix 1-Gbit and 2-Gbit FC HBAs on different channels (though for the Sun StorEdge 3511 SATA array only channels 0 and 1 are capable of supporting 1-Gbit connection methods).

TABLE 13 lists information and connection methods supported for the Windows, Linux, Novell NetWare, HP-UX and IBM AIX operating systems.

TABLE 13 Other Supported Operating Systems and Connection Methods

Operating System	HBA Name
HP-UX 11.00, 11i and later	HP A5158A, HP A6795A
Red Hat 3.0, 4.0 and later	QLogic QLA2310, QLA2340, and QLA2342
SUSE Linux	QLogic QLA2310, QLA2340, and QLA2342
Microsoft Windows 2003 Server and Advanced Server and later	Emulex LP952L, LP982, LP9002L, and LP9802 QLogic QLA2310, QLA2340, and QLA2342
IBM AIX 5.1, 5.2, 5.3 and later	IBM FC 6227 and 6228
For the 3510 FC Array only: Novell Netware 5.1, 6.0, and 6.5 Novell Cluster Services 1.6 and 1.7	QLogic QLA2342

Note – Channel sharing between different operating systems (attaching HBAs from two different operating systems to the top and bottom ports of the same channel) is not supported.

Supported FC Switches

TABLE 14 lists the FC switches that are supported by the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array.

Note – To avoid problems in mixed 1-Gbit and 2-Gbit SANs with QLogic switches, run the Sun StorEdge FC 3510 array in point-to-point mode.

TABLE 14 Supported FC Switches

FC Switch	Part Number
Sun StorEdge 8-Port 1-Gb Redundant Pair[1]	X6746A
Sun StorEdge 16-Port 1-Gb Redundant Pair[1]	SG-XSW16-32P
Sun StorEdge 8-Port 2-Gb FC Switch	SG-XSW8-2GB
Sun StorEdge 16-Port 2-Gb FC Switch	SG-XSW16-2GB
Sun StorEdge Network 2-Gb 64-Port FC Switch Base Unit	SG-XSW64-Base

TABLE 14 Supported FC Switches *(Continued)*

FC Switch	Part Number
Brocade Silkworm 200E 4-Gb 16-Port FC Switch, RoHS-compliant	SG-XSWBRO200E-xx
Brocade Silkworm 3200 2-Gb 8-Port FC Switch	SG-XSWBRO3200
Brocade Silkworm 3250 2-Gb 8-Port FC Switch	SG-XSWBRO3250 and SG-XSWBRO3250VL2
Brocade Silkworm 3800 2-Gb 16-Port FC Switch	SG-XSWBRO3800
Brocade Silkworm 3850 2-Gb 16-Port FC Switch	SG-XSWBRO3850 and SG-XSWBRO3850VL2
Brocade Silkworm 3900 2-Gb 32-Port FC Switch	SG-XSWBRO3900
Brocade Silkworm 4100 4-Gb 32-Port FC Switch, RoHS-compliant	SG-XSWBRO4100-xx
Brocade Silkworm 12000 2-Gb 32-Port FC Switch	SG-XSWBRO12000-32P
Brocade Silkworm 12000 2-Gb 64-Port FC Switch	SG-XSWBRO12000-64P
Brocade Silkworm 24000 2-Gb 64-Port FC Switch	SG-XSWBRO24K-32P
Brocade Silkworm 48000 4-Gb 256-Port FC Switch, RoHS-compliant	SG-XSWBRO48K-xx
QLogic SANBox 5200 2-Gb 16-Port FC Switch	SG-XSWQLG5200-20P
Qlogic SANbox 5600 4-Gb 16-Port FC Switch, RoHS-compliant	SG-XSWQLG5600-xx
Qlogic SANbox 5602 4-Gb 16-Port FC Switch, RoHS-compliant	G-XSWQLG5602-xx
McData Sphereon 4300 2-Gb FC Switch	SG-XSWMD4300-12P
McData Sphereon 4500 2-Gb 24-Port FC Switch	SG-XSWMD4500-8P
McData 6064 2-Gb Director 64-Port FC Switch	SG-XSWMD6064-32P
McData Intrepid 6140 140-Port 2-Gb FC Switch, RoHS-compliant	SG-XSWM6140-64P

1 For the Sun StorEdge 3511 SATA array, only channels 0 and 1 are capable of supporting 1-Gbit connection methods.

Supported Disk Drives

TABLE 15 and TABLE 16 lists the disk drives that are supported by the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array.

TABLE 15 Supported Disk Drives for the Sun StorEdge 3510 FC Array

Drive Description	Part Number	FRU ID Number
36-GByte 15000-RPM, FC	XTA-3510-36GB-15K	F540-5628
73-GByte 10000-RPM, FC	XTA-3510-73GB-10K	F540-5629
73-GByte 10000-RPM FC, ROHS	XTA-3510-73GB-10KZ	F540-6570
73-GByte 15000-RPM, FC	XTA-3510-73GB-15K	F540-6098
73-GByte 15000-RPM, FC RoHS	XTA-3510-73GB-15KZ	F540-6571
146-GByte 10000-RPM, FC	XTA-3510-146GB-10K	F540-5626
146-GByte 10000-RPM, FC RoHS	XTA-3510-146GB10KZ	F541-6572
146-GByte 15000-RPM, FC	XTA-3510-146GB-15K	F540-6495
146-GByte 15000-RPM, FC RoHS	XTA-3510-146GB15KZ	F540-6495
300-GByte 10000-RPM, FC	XTA-3510-300GB-10K	F540-6367
300-GByte 10000-RPM, FC RoHS	XTA-3510-300GB10KZ	F540-6574
300-GByte 15000-RPM, FC RoHS-5	XTA-3510-300GB15KZ	F540-7159

TABLE 16 Supported Disk Drives for the Sun StorEdge 3511 SATA Array

Drive Description	Part Number	FRU ID Number
250-GByte 7200-RPM, Serial ATA	XTA-ST1NC-250G7K	F540-6180
400-Gbyte 7200 RPM, Serial ATA	XTA-ST1NC-400G7K	F540-6364
500-Gbyte 7200 RPM, Serial ATA	XTA-ST1NC-500G7K	F540-6365

Note – The array is not a slot-dependent device and can be shipped with fewer than 12 drives, with each empty slot in the array containing an air management sled to correctly handle the air flow and heat. Make sure that each drive slot has either a disk drive or an air management sled, part number XTA-3000-AMBS. In a minimum configuration of five drives, these drives occupy drive slots 1-5. However, there is no restriction on the slot placement of drives as long as air management sleds are used in the empty slots.

Note – Disk drive firmware is provided through Sun disk firmware patches, which include the required download utility. Sun disk firmware patches are separate from the Sun StorEdge 3000 family firmware patches. Do not use Sun StorEdge Configuration Service or the Sun StorEdge CLI to download disk drive firmware.

Supported Cabinets

TABLE 17 shows the supported cabinets with their associated rackmount kits and other required kits. See the *Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays* for installation instructions.

TABLE 17 Supported Cabinets and Associated Rackmount Kits

Cabinet Name	Cabinet Part Number(s)	Required Kit(s)	Required Kit Part Number	Maximum Number of Arrays Supported per Cabinet
Sun StorEdge 72-inch Expansion Cabinet	SG-(X)ARY030A	Rackmount Kit	(X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	14
Sun Fire Cabinet	SF-(X)CAB, SFE-(X)CAB	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	5
Sun Rack 900-38 Cabinet	SR9-(X)KM038A-IP	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	18
Sun Rack 1000-38 Cabinet	SRK-(X)RS038A-IP	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	18
Sun Rack 1000-42 Cabinet	SRK-(X)AZ042A-IP	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	18
Sun Fire 6800 System	F6800-1	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	3
Sun Fire E6900 System	E6900-BASE	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	2
Standard EIA Cabinets	Not Applicable	Rackmount Kit	X)TA-3000-2URK-19U, (X)TA-3000-2URK-19UZ	Varies
Telco flushmount racks	Not Applicable	Telco Front Mount Rackmount Kit	XTA-3000-2URK-19F, XTA-3000-2URK-19FZ	Varies
Telco center-of-gravity racks	Not Applicable	Telco Center Mount Rackmount Kit	XTA-3000-2URK-19C, XTA-3000-2URK-19CZ	Varies

Note – For more information about using Sun StorEdge arrays with the Sun Rack 900 and 1000 cabinets, refer to the Sun Rack 900 Qualified Products web page at http://www.sun.com/servers/rack/approved.html

Supported Cables for Sun Systems

TABLE 18 lists the supported Fibre Channel cables for connecting to the host adapters that are supported for Sun systems. You can order cables using the marketing part numbers in the following table.

TABLE 18 Supported Cables

Cable Type and Length	Marketing Part Number	Manufacturing Part Number
0.8-meter LC to LC Fibre Channel optical cable	X9730A	595-7110-01
0.8-meter LC to LC FC optical cable RoHS-5 compliant	X9730A-Z	
2-meter LC to LC Fibre Channel optical cable	(X)9732A	595-6417-01
2-meter LC to LC FC optical cable RoHS-5 compliant	(X)9732A-Z	
5-meter LC to LC Fibre Channel optical cable	(X)9733A	595-6418-01
5-meter LC to LC FC optical cable RoHS-5 compliant	(X)9733A-Z	
15-meter LC to LC Fibre Channel optical cable	(X)9734A	595-6419-01
15-meter LC to LC FC optical cable RoHS-5 compliant	(X)9734A-Z	
25-meter LC to LC Fibre Channel optical cable	X9736A	595-6730-01
25-meter LC to LC FC optical cable RoHS-5 compliant	X9736A-Z	
50-meter LC to LC Fibre Channel optical cable	X9738A	595-6733-01
50-meter LC to LC FC optical cable RoHS-5 compliant	X9738A-Z	
100-meter LC to LC Fibre Channel optical cable	X9740A	595-7109-01
100-meter LC to LC FC optical cable RoHS-5 compliant	X9740A-Z	
0.4-meter SC to LC Fibre Channel optical cable	X9721A	595-6036-01
2-meter SC to LC Fibre Channel optical cable	(X)9722A	595-6035-01
2-meter SC to LC FC optical cable RoHS-5 compliant	(X)9722A-Z	
5-meter SC to LC Fibre Channel optical cable	(X)9723A	595-6037-01
5-meter SC to LC FC optical cable RoHS-5 compliant	(X)9723A-Z	
15-meter SC to LC Fibre Channel optical cable	(X)9724A	595-6038-01

TABLE 18 Supported Cables *(Continued)*

Cable Type and Length	Marketing Part Number	Manufacturing Part Number
15-meter SC to LC FC optical cable RoHS-5 compliant	(X)9724A-Z	
25-meter SC to LC Fibre Channel optical cable	X9735A	595-6729-01
25-meter SC to LC FC optical cable RoHS-5 compliant	X9735A-Z	
50-meter SC to LC Fibre Channel optical cable	X9737A	595-6731-01
50-meter SC to LC FC optical cable RoHS-5 compliant	X9737A-Z	

Standard Network Connectivity Practices

It is extremely important for the proper operation and reliability of the equipment that all network connectivity adhere to Ethernet and facility wiring standards IEEE 802.3 and EIA/TIA 568B. Make sure that the cabling and patch cords for your facilities are up to these specifications, and protect the cables from excessive stress and damage. The best practice, and the one that is recommended by all facilities wiring standards, is to test your structured cable system end-to-end with a quality cable test set. Adherence to these practices will help eliminate almost all connectivity issues.

Other related standards are ISO/IEC IS 11801 (International), Cenelec EN 50173 (Europe), CSA T529 (Canada), and SAA/SNZ HB27:1996 (Australia and New Zealand).

Bootability

Bootability is not supported for the Sun StorEdge 3511 SATA array as it is not intended for use as a boot device.

Booting from the Sun StorEdge 3510 FC array is supported and requires no special procedures, as long as the appropriate Solaris patches and SAN Foundation Suite software components (for Solaris 9 operating systems) are installed, as described in TABLE 4. The Solaris 10 operating system does not require SAN Foundation Suite software. Refer to "Installing Sun StorEdge SAN Foundation Software" on page 36 and the Sun StorEdge SAN Foundation Software documentation for more information about bootability requirements.

Bootability is not supported with the Sun StorEdge 3510 FC array connected to x86 Linux operating systems or the Solaris 9 x86 Platform Edition operating system, since they do not use the SAN Foundation Suite. The Solaris 10 x86 Platform Edition operating system does not require the SAN Foundation Suite.

Installing Required Solaris Patches

Make sure the Solaris Recommended Patch Cluster is installed on a Solaris host before connecting the host to the array.

▼ To Download and Install the Solaris Recommended Patch Cluster

1. **Log in to the host that you want to connect to the array.**
2. **Go to:**

   `http://www.sun.com/sunsolve`
3. **Under Support Resources, click Patches and Updates.**
4. **Under Recommended and Security Patches, click Recommended Patch Clusters.**
5. **Find your version of Solaris 9 or Solaris 10 in the Recommended Solaris Patch Clusters list, make sure the Readme checkbox is checked, and then click Go.**
6. **Print or save the README file from the browser window.**
7. **Click the browser's Back icon to return to the previous page.**
8. **Select the format you want in the row that begins with Solaris 9 or Solaris 10 in the Recommended Solaris Patch Clusters list, click either Download HTTP or Download FTP, and then click Go.**
9. **In the File Download dialog box, click Save.**
10. **In the Save As dialog box, type a destination directory for the patch cluster, and then click OK.**
11. **Follow the procedure in the INSTALLATION INSTRUCTIONS section in the README file to install the patches.**

Upgrading to Software Version 2.5 and Controller Firmware Version 4.2x

The upgrade process includes:

Downloading and Installing Software Applications

Use a recent version such as 2.*x* of the Sun StorEdge Configuration Service agent, Sun StorEdge Configuration Service console, Sun StorEdge Diagnostic Reporter, and Sun StorEdge Command-Line Interface (CLI) utility to download the firmware for your controller. If you are not using a recent version of this software, download and install it, using the following instructions, before downloading the controller firmware.

Note – Because the communication protocol changes from version to version, you must install the `SUNWsscs` package on all systems that manage the storage when upgrading.

Note – If different versions of the agent and console co-exist, Sun StorEdge Configuration Service is not able to discover previously configured arrays.

▼ To Download the Software

To download the software from the Sun Download Center web site, perform the following steps.

1. **Go to:**

   `http://www.sun.com/software/download/`

2. **Under System Administration → Storage Management, click the StorageTek 3000 Family Storage Products - Related Software link.**

   You are taken to the Sun StorEdge 3000 Family Storage Products - Related software page.

3. **Click Download.**

   A Sun Download Center page is displayed.

4. **If not previously registered, register.**

   a. **Click the Register Now link at the bottom of the left column.**

   b. **On the registration page, enter applicable data in the required fields and click Register.**

5. **Log in.**

   a. **Type your Username and Password in the left column, and click Login.**

   b. **On the Terms of Use page, read the license agreement, click Yes next to Accept, and click the Continue button.**

6. **On the software download page, click the link for your array and operating system.**

7. **In the dialog box that is displayed, specify a destination directory and save the file.**

▼ To Install or Upgrade the Software on Solaris Operating Systems

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Note – For installation or upgrading instructions for other operating systems, refer to the *Sun StorEdge 3000 Family 2.5 Software Installation Guide*.

To install or upgrade the software on Solaris operating systems, perform the following steps.

Note – Make sure that Java runtime environment (JRE) software is installed on the computer or workstation on which you are installing Sun StorEdge Configuration Service. The earliest release of Java runtime environment software that is compatible with Sun StorEdge Configuration Service on a Solaris 9 or Solaris 10 host is 1.2.2.

---

1. **Login as superuser to install the package.**

2. **If you are upgrading, uninstall all current versions of Sun StorEdge Configuration Service, Sun StorEdge Diagnostic Reporter, and Sun StorEdge CLI. To uninstall earlier versions of the software, type:**

```
# pkgrm filename
```

The single package for software versions 2.x is `SUNWsscs`.

The package names for software versions 1.x are listed in TABLE 19.

TABLE 19 Software Version 1.x Packages

Application	File Name
Configuration Service Agent	`SUNWscsd`
Configuration Service Console	`SUNWscsu`
Diagnostic Reporter Agent	`SUNWscsa`
Diagnostic Reporter Config Tool	`SUNWscui`
CLI	`SUNWsccli`

3. **To install the software package, type:**

```
# pkgadd -d . SUNWsscs
```

The Solaris installation package, `SUNWsscs`, includes the following components:

- Sun StorEdge Configuration Service agent
- Sun StorEdge Configuration Service console
- Sun StorEdge Diagnostic Reporter agent (daemon)
- Sun StorEdge Diagnostic Reporter Config Tool (UI)
- Sun StorEdge CLI

Note – The following software is also available on the Sun Download Center for these products but is installed as a separate package. It should be used only in conjunction with the ESM-AA software.

- Sun StorEdge 3510/3511 SMI-S Provider

4. **Provide appropriate responses to each of the installation prompts.**

a. If asked if you want to restore the agent configuration, type y. (If you type n, you will need to re-enable the managing servers.)

```
The previous configuration was saved. Do you want to restore the
configuration [y,n,?,q]: y
```

b. To continue with the installation, type `y` and press Return.

```
Do you want to continue with the installation [y,n,?] y
```

After the package is installed, the following message is displayed, indicating it was installed successfully.

```
Installation of <SUNWscsd> was successful.
```

The Sun StorEdge Configuration Service components are installed in the following directories:

- `/opt/SUNWsscs/ssagent`
- `/opt/SUNWsscs/sscsconsole`

The Sun StorEdge Diagnostic Reporter components are installed in the following directories:

- `/opt/SUNWsscs/ssdiagreporterd`
- `/opt/SUNWsscs/ssdiagreporterui`

The CLI is installed in `/opt/SUNWsscs/sbin/sccli`.

5. If you are using Sun StorEdge Configuration Service and Diagnostic Reporter to manage and monitor the storage, the following additional steps are required.

a. You must set passwords for all Sun StorEdge Configuration Service users.

Note – User passwords are deleted when Sun StorEdge Configuration Service is uninstalled. Even if you had a previously saved configuration, you still have to reenter the `ssmon`, `ssadmin`, and `ssconfig` passwords.

---

b. Before starting the Sun StorEdge Configuration Service console, you must run the following command to specify the web browser to access online help.

```
/opt/SUNWsscs/sscsconsole/config_sscon
```

c. The Sun StorEdge Configuration Service agent and the Sun StorEdge Diagnostic Reporter agent (daemon) have been installed but are not configured to start at boot time by default. To enable the Sun StorEdge Configuration Service agent to start automatically when the system boots, and to start it now, type:

```
/etc/init.d/ssagent enable start
```

d. To enable the Sun StorEdge Diagnostic Reporter to start automatically when the system boots, and to start it now, type:

```
/etc/init.d/ssdgrptd enable start
```

Downloading and Installing Firmware

Firmware patches for the Sun StorEdge 3510 FC array and Sun StorEdge 3511 SATA array are available from SunSolve to upgrade firmware for the array controller, PLD firmware, and firmware for the SCSI Enclosure Services (SES) processor. For the Sun StorEdge 3511 SATA array, the patch also includes firmware for the SATA Router and the SATA MUX module. TABLE 20 shows the most recent firmware versions available.

TABLE 20 Latest Firmware Patches

Sun StorEdge 3510 FC Array	Sun StorEdge 3511 SATA Array
Firmware patch ID # 113723-21 with the following firmware: Controller firmware 423A SES firmware 1103 PLD firmware 1000	Firmware patch ID # 113724-12 with the following firmware: Controller firmware 423A SES firmware 0430 PLD firmware 1100 SATA Router firmware DP0579 SATA MUX firmware BB42

To determine the current firmware versions for your array, see:

- "To Determine Your Current Controller Firmware Version" on page 34
- "To Determine Your Current SES and PLD Firmware Versions" on page 35
- "To Determine the Current SATA Router and MUX Firmware Versions" on page 35

To download the firmware patch, see "To Download and Install the Firmware Patch" on page 35.

For information about installing the firmware, refer to the patch README file provided with the firmware patch. If you are upgrading RAID controller firmware from versions 3.2x, see "New Instructions for Migrating From RAID Controller Firmware 3.2x to 4.x" on page 2.

Caution – Review all procedures and release notes for this major upgrade prior to upgrading your array. DO NOT attempt to downgrade firmware back to controller firmware version 3.27. Such downgrades are NOT supported except when installing a new RAID controller FRU. If you feel you must downgrade your RAID controller firmware, contact authorized Sun service personnel for assistance. Time and materials charges may apply if not currently covered under warranty/support contract.

Note – Disk drive firmware is provided through Sun disk firmware patches which include the required download utility. Sun disk firmware patches are separate from the Sun StorEdge 3000 family firmware patches. Follow the instructions in the disk firmware patch README.

▼ To Determine Your Current Controller Firmware Version

To determine your current controller firmware version, use one of the following methods:

- Using the controller's serial or `telnet` interface, select the "view system Information" firmware menu option. The current firmware version is displayed as "Firmware Version."
- In Sun StorEdge Configuration Service, highlight any component of the desired array, click on the View menu and the View Controller command, and then check the "FW Rev" checkbox.
- Using the CLI, enter the `show inquiry` command.

▼ To Determine Your Current SES and PLD Firmware Versions

To determine your current SES and PLD firmware versions, use the CLI and enter the `show ses` command. The SES version of each controller is displayed in the `Rev` column. The PLD version is displayed in the `PLD` column. See TABLE 20 in the section "Downloading and Installing Firmware" on page 33 for the latest version of SES and PLD code.

▼ To Determine the Current SATA Router and MUX Firmware Versions

To determine your current SATA multiplexer (MUX) board firmware version, using Sun StorEdge CLI enter the `show sata-mux` command. The MUX version of each board is displayed in the `PC150/Rev` column.

To determine your current SATA router firmware version, using Sun StorEdge CLI enter the `show sata-router` command. The router version is displayed in the `Rev` column.

For the latest SATA router and MUX version information, see TABLE 20 in the section "Downloading and Installing Firmware" on page 33.

▼ To Download and Install the Firmware Patch

1. **Go to**

   `http://sunsolve.Sun.com`

2. **Under Support, click Patches and Updates.**
3. **Use PatchFinder to locate the appropriate 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 HTTPS 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. **Follow the instructions in the README file to install the patch.**

Installing Sun StorEdge SAN Foundation Software

Before a Sun host running the Solaris 9 operating system on SPARC platforms can communicate with the Sun StorEdge 3510 FC array or Sun StorEdge 3511 SATA array through any of the host adapters that are supported for Sun servers, you must install Sun StorEdge SAN Foundation software.

The Sun StorEdge SAN Foundation software is required for these operating system versions because it provides drivers for the supported host adapters. (See "Supported Platforms and Connection Methods" on page 14 for listings of the applicable host adapters.)

The Sun StorEdge SAN Foundation software also contains patches, firmware, and software packages that support switches and other optional SAN features, including the Sun StorEdge Traffic Manager multipathing software for the Solaris operating system described in TABLE 6 in section "Other Supported Software" on page 13.

Note – Sun StorEdge SAN Foundation software is not supported for x86 platforms running Linux, Microsoft Windows. Sun StorEdge SAN Foundation software is supported for Solaris 10 x86 Platform Edition

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Note – Sun StorEdge SAN Foundation 4.1 is not supported. Instead, use the current version of Sun StorEdge SAN Foundation software.

The following procedure explains how to download the SAN Foundation software without charge.

▼ To Download and Install the Sun StorEdge SAN Foundation Software

1. **Log in as superuser on the Sun server to be connected to the array.**
2. **Go to:**

   `http://www.sun.com/storage/san`
3. **At the bottom of the page, below "Get the Software," select the "SAN 4.4 release Software/Firmware Upgrades & Documentation" link.**

4. **If not previously registered, register.**

   a. **Click the Register Now link at the bottom of the left column.**

   b. **On the registration page, enter appropriate data in the required fields and click Register.**

5. **Log in.**

   a. **Type your Username and Password in the left column, and click Login.**

   b. **Click Continue on the Sun Download Center Welcome page to see the Terms of Use page.**

   c. **On the Terms of Use page, read the license agreement, click Accept and then click the Continue button.**

6. **On the Download page, download the Solaris 9 SFS Base Package appropriate for the version of the Solaris Operating System you are running.**

7. **You can also download the SFS Base Packages README file for software download instructions.**

8. **Once you uncompress and untar the SFS Base Packages archive, follow the instructions in the** *Sun StorEdge SAN Foundation Software Installation Guide* **to manually install the packages.**

Downloading the VERITAS Volume Manager ASL

This section describes what you need to do to enable VERITAS Volume Manager 3.5, 4.0, and 5.0 software to work with the Sun StorEdge 3510 FC array or Sun StorEdge 3511 SATA array on Sun hosts. VERITAS has provided an Array Support Library (ASL) that must be installed on the same host system as the Volume Manager 3.5, 4.0, or 5.0 software to enable the software to recognize the Sun StorEdge 3510 FC array or Sun StorEdge 3511 SATA array. Follow the procedure to download the ASL and the accompanying installation guide for the Sun StorEdge 3510 FC array or Sun StorEdge 3511 SATA array from the Sun Download Center.

Note – In addition to the ASL that is specifically intended for your array, a recent ASL works with all Sun StorEdge 3000 family arrays. The title shown in the link for this ASL is *VERITAS VOLUME MANAGER ARRAY SUPPORT LIBRARIES (ASLs).*

▼ To Download the ASL

1. **Log in as superuser on the Sun server to be connected to the array.**
2. **Go to the All Products listing at the Sun Download Center.**

   http://www.sun.com/software/download/products.html
3. **Click the Downloads A-Z tab.**
4. **Under the V heading, click on VERITAS Volume Manager Array Support Libraries (ASLs).**
5. **Click Download to go to the Sun Download Center.**

   The page identifies the product you selected to download as VERITAS Volume Manager Array Support Library (ASL) for your platform and language.
6. **If not previously registered, register.**

   a. **Click the Register Now link at the bottom of the left column.**

   b. **On the registration page, enter the required fields and click Register.**
7. **Log in.**

   a. **Type your Username and Password in the left column, and click Login.**

   b. **On the Terms of Use page, read the license agreement, click Yes next to Accept, and click the Continue button.**
8. **Download the Readme file for ASLs**
9. **Download the appropriate ASL file for your array and version of VERITAS Volume Manager (VxVM) software.**
10. **See the README file for the name and location of installation instructions.**
11. **Download the installation instructions and follow them to install the ASL.**

Known Issues

- **CR 6357118: Controller should not mark disks as "bad" after FC errors on one drive channel (loop).** In RAID controller firmware 4.21, under certain error conditions the controller firmware can declare disk drives bad and remove them from a RAID volume, resulting in an unnecessary RAID reconstruct and unnecessary disk replacement. This occurs when the controller is unable to identify a few back-end FC communication error conditions and therefore does

not failover to the alternate channel. In an extreme case, this can cause multiple disks to be reported as “bad,” which can cause the logical drive to go offline, reported as a “fatal fail.” When the logical drive is failed, unwritten data is purged from cache without being written to media.
The controller interacts with drives through a redundant back-end fiber channel arbitrary loop. In rare circumstances, a failing component or bad connection on the back-end Fibre Channel loop—such as bad SFPs or bad cables or bad drives—might result in the controller being unable to communicate with some of the drives on one of the channels. Prior to this release, no firmware logic was available to try alternative drive channels if communication through the current drive channel was unsuccessful. In this release, an alternate drive channel is used when one of the drive channel goes bad.
Workaround: Use the firmware Main Menu to bring the logical drive back online manually. If multiple disks were marked as “bad” and removed from a logical drive by the controller, contact your technical support organization. Have them help identify the cause of the multiple disk failures and provide the necessary actions to rectify the error condition before attempting to reconstruct the logical drive to the state where the error occurred. Since some data might have been lost from the controller's write cache, check the validity of the data on the logical drive after reconstructing it. Successful reconstruction is not guaranteed.

- **CR 6890196: Request to document "0" value for Maximum Drive Capacity in serial port menu.** Logical drives can be created using either the firmware main menu or the CLI command line interface. Both interfaces enable you to specify a Maximum Drive Capacity if you want to use less than the full capacity of the physical drives in the logical drive. Otherwise, the default is to use the entire available capacity. However, due to a difference in the methods used by the two interfaces, a small size difference can exist between their default sizes. This can cause discrepancies when a logical drive created using one interface is mirrored or recreated using the other interface. This is true for all Sun StorageTek 3000 family RAID controllers since they share the same firmware and software interfaces.
Workaround: When using the firmware to create a logical drive that uses the full capacity of the physical drives that comprise it, do not accept the default. Instead, specify a Maximum Drive Capacity of 0. This ensures that the resulting logical drive size will be identical with one created using the CLI and accepting the default drive size.

Known Issues Specific to Sun StorEdge 3511 SATA Arrays

- **CR 6433420: Mailbox or IOCB interrupt timeout occurred after reset-all with PCI-X HBAs**.When testing a V215 server attached to a Sun StorEdge 3511 with expansion unit, issuing a `probe-scsi-all` command at the OBP prompt caused the server to hang with this error message:

```
Mailbox or IOCB interrupt timeout occurred.
Non recoverable Error: Aborting QLA2422 driver execution
(4000 )(0 )(ff00 )(0 )(0 )(0 )(0 )(0 )
```

This issue appears to be specific to certain HBAs.

Workaround: To recover from the hang condition, issue a break sequence and then issue a `reset-all` command at the OBP prompt prior to a `probe-scsi-all` command. To prevent this issue from recurring, ensure your HBA is running the latest available firmware and fcode.