Sun StorEdge™ 6120 Array Release Notes

Release 1.2

Sun Microsystems, Inc.
www.sun.com

Part No. 817-0201-16
November 2003, Revision C

Submit comments about this document at: `http://www.sun.com/hwdocs/feedback`

Sun StorEdge 6120 Array 1.2 Release Notes

These release notes provide the latest information about the Sun StorEdge™ 6120 array. The information could affect the installation and operation of the array. Be sure to read this document before you begin the array installation or read other array documentation.

This document consists of the following sections:

Release 1.2 Features

This section Release 1.2 adds the following features:

Array Hot Spares

The *array hot spare* feature enables you to designate disks as hot standbys to substitute for failed drives. You can configure hot spares to either be global for the array or dedicated to a specific pool.

Disk Scrubber

The *disk scrubber* feature constantly reviews the volumes for consistency. As a result, you will see the disk LEDs flash regardless of I/O. Disk scrubber is enabled by default.

Caution – .Sun does not recommend disabling the disk scrubber. Disabling the disk scrubber may lead to latent disk block errors which could cause multiple disk failures and lose of data.

If the *disk scrubber* feature finds any inconsistencies, it sends messages to the array `syslog file`. View the array `syslog file` from the Storage Automated Diagnostic Environment software.

Fast Volume Initialization

The `fast volume initialization` feature modifies the Sun StorEdge 6120 and 6020 array RAID set initialization method to access volumes much quicker than in previous firmware releases.

For example, on a 2x6, 12 volume configuration, `fast volume initialization` improves RAID set initialization time as much as 90%.

Backend Fault Isolation Task (BEFIT)

The `BEFIT` feature, also known as `online loop diagnostic mode`, maintains the availability of backend drives at all times by detecting, isolating, and correcting faulty FRUs (Field Replaceable Units).

The `online loop diagnostics` controls the monitoring of `Loop Initialization Protocol (LIP)` storms and backend fault detection. This feature should always be on. If you encounter problems, it can be turned off.

`BEFIT` is enabled by default during system boot and automatically completes diagnostics on the system. If a faulty FRU is detected during system boot, it is isolated and corrective action is applied. Corrective action may include bypassing the faulty FRU. After the system is booted, `BEFIT` checks system health every five seconds.

Note – If `BEFIT` fails to detect and correct a problem, the system can reset itself to ensure that customer data is safe from corruption.

Note – There are many faults that occur on Fibre Channel loops. Many of these are addressed by the device retrying the I/O. `BEFIT` sees these faults and checks for bad FRU's to ensure there are no hardware failures. It is normal to see `BEFIT` initiate a test and then return no fault found. If there were a hardware issue, `BEFIT` would isolate the FRU and send the appropriate notice to the `syslog file`.

When a fault is detected, `BEFIT` halts I/O and executes diagnostics. When `BEFIT` is completed, host I/O is resumed. If a faulty FRU is disabled, diagnostic LEDs on the FRU are lit. `BEFIT` messages are also sent to the array `syslog file`. View the `syslog file` from the Storage Automated Diagnostics Environment software.

Explicit LUN Failover

During a new installation you set a failover mode of:

```
Fail Over Mode [Implicit, Explicit, None]
```

Explicit LUN failover provides a way for a multi-pathing host driver to manage the LUN ownership while avoiding the inadvertent switching (the ping-pong effect) that can occur in implicit LUN failover (ILF) implementation.

Explicit LUN failover and implicit LUN failover are mutually exclusive. Implicit LUN failover will be disabled when explicit LUN failover is used. For instance, implicit LUN failover cannot be used in a mixed environment where both explicit failover and Veritas DMP are used.

TABLE 1 lists the fail over mode to use with the host software.

TABLE 1 Setting Failover Mode

Host Software	Failover Mode
Sun StorEdge Traffic Manager (Solaris) Sun StorEdge Traffic Manager for Windows, AIX, and HPUX	Explicit
Veritas DMP	Implicit

Controller SAT Diagnostics

The `controller SAT diagnostics` feature is a ROM-based diagnostic tool that provides a robust and comprehensive test suite, offering maximum coverage on all hardware components within a FRU (Field Replaceable Unit). The `controller SAT diagnostics` targets hardware components at the chip, bit, and cell level.

During the diagnostic test, all status messages are displayed on the array console terminal. The display is updated with real-time status information about the running tests.

The following diagnostic tests are included in the test suite:

- RS-232 diagnostics
- Ethernet interface diagnostics
- Fibre Channel diagnostics

System Requirements

Sun StorEdge 6120 array hardware and software platform requirements, and other supported software, are detailed in the *Sun StorEdge 6120 Array Installation Guide.*

For information on the required software packages and patches for management and data host software, refer to the next section.

Required Software Packages and Patches

This section documents the software packages and patches for management and data host software that are required for this release.

The tasks *must* be completed in the following order:

1. **Install management software packages, if needed.**
2. **Install data host patches, if needed.**
3. **Install management software patches.**

Management Software Packages

You can manage the Sun StorEdge 6120 array with one of the following management software packages installed on a host with an Ethernet connection to the array.

- Sun StorEdge 6000 Family Host Installation Software

  This package can be used on a Solaris host and includes the Configuration Service software, the Storage Automated Diagnostic Environment (device edition) software, and the Remote Configuration CLI (sscs).

  Refer to the *Sun StorEdge 6000 Family Host Installation Software Guide* for additional information.

- VERITAS Array Support Library

  This is required if you have VERITAS Volume Manager support with the array.

▼ To Download the Management Host Software Packages

1. **Go to:**

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

2. **In the Browse By Category window, click the Search tab.**
3. **In the Search window, enter 6000.**
4. **Click the Sun StorEdge 6000 Family Host software link.**
5. **Follow the instructions on the site to download the software package.**
6. **Run the installation script (install.sh) procedure described in the** *Sun StorEdge 6000 Family Host Installation Software Guide***.**

Data Host Software Patches

TABLE 1 lists the minimum required level software patches that are necessary for the array. Install the patches on the data host.

TABLE 2 Data Host Software Patches

Platform	Patch Number/Source	Patch Description
Solaris 9 operating system, first release or later Solaris 8 operating system, Update 4 or later	http://www.sunsolve.sun.com	Sun StorEdge SAN Foundation 4.2 software: For patch and product information, refer to the *Sun StorEdge SAN Foundation 4.2 Installation Guide* at http://www.sun.com/storage/san
	112392-04 or later 113698-02	VERITAS VxVM 3.5 general patch[1] VERITAS VxVM 3.5 supplemental general patch* • VERITAS VxVM patches must be installed in the order listed. • If you install a later version of patch of 112392, such as the -05 revision, the supplemental patch (113698-02) is not required.
Microsoft Windows NT operating systems	Microsoft	Microsoft Windows NT Service Pack, SP 6A
	http://www.sunsolve.sun.com	Sun StorEdge Traffic Manager 3.0 NT
Microsoft Windows 2000 Server and Advanced Server	Microsoft	Microsoft Windows 2000 Service Pack, SP 3
	http://www.sunsolve.sun.com	Sun StorEdge Traffic Manager 3.0 Windows 2000
IBM AIX 4.3.3	IBM	ML 10
	http://www.sunsolve.sun.com	Sun StorEdge Traffic Manager 3.0 AIX
IBM AIX 5.1 32 and 64 bit	IBM	ML 03
	http://www.sunsolve.sun.com	Sun StorEdge Traffic Manager 3.0 AIX
HP-UX 11.00 and 11.i	Hewlett-Packard	Patch set, September 2002
	http://www.sunsolve.sun.com	Sun StorEdge Traffic Manager 3.0 HP-UX
Red Hat Linux 7.2 (single-path support only)	Red Hat Linux	Version 2.4.7-10

▼ To Install the Data Host Software Patches

1. **Determine the required data host software patches from the list in** TABLE 2**.**
2. **Go to** `http://www.sunsolve.sun.com`**.**
3. **Navigate to** Patchfinder**.**
4. **Download the required patches.**
5. **Use the** `patchadd`**(1M) command in a CLI session to install the data host software patches.**

   Refer to the README files for more patch information.

Management Software Patches

Note – Before installing Sun StorEdge Configuration Services software from CD on systems running Solaris 8, review Bug 4970813, “Software Installation Problem on Solaris 8 Hosts.” on page 12.

The following lists the management software patches needed to meet the baseline requirements for Release 1.2.

114950-04 - Management Software - Configuration Services and Storage Profiles. Install if Configuration Service is installed on the management host.

112945-19 -112945-19 - WBEM needed by 114960-04

116141-01 - WBEM patches for Solaris 8 needed by 114950-04.

114961-01 - Management Software - CLI Client

115179-03* - SE6120 FW 3.1 - Firmware

114590-18 - StorADE SUNWstade Support Patch (Host only. Install if Storage Automated Diagnostics Environment software version 2.2 is installed on the management host).

1. This firmware was not on the Sun StorEdge Family Host Installation Software CD, and requires an update from PatchPro or the Update CD. The Restore CD has 115179-01.

▼ To Install the Management Software Patches

1. **Determine the required management software patches.**
2. **Go to** `http://www.sunsolve.sun.com`**.**
3. **Click the** `Patch Finder` **link.**
4. **Download the required patches.**
5. **Use the** `patchadd`**(1M) command in a CLI session to install the management software patches.**

   Refer to the README files for more patch information.

Known Issues and Bugs

The following sections provide information about known issues and bugs filed against this product release:

Known Issues

This section includes known issues and guidelines about this product that are not categorized by a Sun bug ID number. This section contains the following topics:

Set Timezone Errors and u1 Controllers

There is an intermittent issue with u1 controllers becoming disabled in the storage arrays within the system racks.

The issue does not cause any data loss or corruption. The secondary controller takes over and the data can still be accessed, but trained personnel must perform a procedure to re-enable the master controller.

The error occurs intermittently after a sequence of `set` and `sys` commands, including `set timezone GMT` or from using the management software to set the timezone. Typically, these commands are issued only during initial system configuration, system reconfiguration, or new operating system installation. The error appears to be more common in systems with a higher number of arrays, such as racks with 5 2x2 arrays.

The error results in the following sequence of events:

1. A master controller fails over to the alternate master controller.

The array's architecture acts as designed to handle failures and prevent loss of data. The secondary controller takes over the LUNs and allows the host to continue accessing the data. There is no data corruption or loss: the original controller does not acknowledge the data transfer from the host until its cache is mirrored on the remote controller.

2. The master controller goes into a disabled state.

Recovery Procedure

Trained service personnel can re-enable the master controller to bring it back online and restore array redundancy with the following steps:

1. Issue the `enable` command to bring the failed controller back online.
2. Reissue the `set timezone` command.

   Since the `set timezone` command fails only intermittently, it is likely to work the second time.

Normal operations should resume.

Managing Sun StorEdge 6120s

You can manage Sun StorEdge 6120s through the management host that runs the Sun StorEdge Configuration Service software. This facility, once installed and configured, enables you to administer arrays using either a browser-based graphical user interface (GUI) for Solaris or a native host, thin-scripting CLI client for supported operating systems. Unlike the Sun StorEdge 6320 system management interface, this software must be loaded on a host that has an Ethernet connection to the array(s) being managed.

Caution – Because the Sun StorEdge Configuration Service software retains the array state and configuration service, do not use the array Telnet interface while an array is being managed by the Sun StorEdge Configuration Service.

If you add an array under Sun StorEdge Configuration Service management that had been managed previously with the Telnet interface, you must record and delete all existing LUN access control settings, such as initiator groups and LUN masking settings. After you have done so, you can register the array in the Sun StorEdge Configuration Service tool, reconfigure the storage pools and initiator groups, and set permissions.

Wherever possible, use the sscs CLI or web interface. However, some features may require that trained personnel access the array a using the array command line available through a serial connection.

Netscape Version 4.79

If you double click the top bar of the Netscape™ Version 4.79. or resize the window, there can be a loss of context on the screen. If this happens, bring up the window menu and select Reload.

Older Browser Versions

If you are managing Sun StorEdge 6120 arrays using an older generation (HTTP 1.0-based) Web browser such as Netscape 4.x or earlier, you could experience time-out conditions from the browser when configuring large configurations. In large configurations, older browsers need more time to calculate capacities and can time out before those calculations are complete. In this case, you might need to reload the browser page to continue working with the system.

If time-outs become an issue, update your browser to a version that supports HTTP 1.1 (Netscape 6 or higher).

Array Health Status

When using the Sun StorEdge Configurations Services administration to change network settings, the screen incorrectly displays the array health status as “Error.” If you change array network configurations, you must coordinate the new array network settings with network physical connections. First, update the array settings in the Sun StorEdge Configuration Services software, apply the settings, then change the physical network connection to the correct gateway subnet.

Updating FRU Versions

After adding a FRU, you must update the system with the latest patches to update the FRU to the correct version. See “Management Software Patches” on page 7

Bugs

This section contains a list of bugs for this release:

General Bugs

Software Installation Problem on Solaris 8 Hosts.

Bug 4970813 - Installing Sun StorEdge Configuration Services software from CD hangs hosts running Solaris 8.

Workaround - After installing the Configuration Services Software from the Host CD on any Solaris 8 machine, you must manually execute the following commands as root:

```
# cd /etc
# rm -f rc0.d/K95init.se6000 rc1.d/K95init.se6000
rc2.d/S95init.se6000 rcS.d/K95init.se6000
# ln init.d/init.se6000 rc0.d/K95init.se6000
# ln init.d/init.se6000 rc1.d/K95init.se6000
# ln init.d/init.se6000 rc2.d/S95init.se6000
# ln init.d/init.se6000 rcS.d/K95init.se6000
```

Failed Batteries and Rebooting

Bug 4965310 - When a battery fails, the system goes into write through mode. There is a bug which prevents the system from going into write through mode after a reboot on a system with a failed battery. The system does go into write through mode when a battery fails. If that system is then rebooted, it comes back up in write behind mode. You can manually place the system back into write through mode at this time.

Workaround - Replace batteries as soon as they fail to avoid this issue. There are two batteries in the system. Only one is required to backup the cache in the event of a power failure.

BEFIT Task Failure

Bug 4902352 - When Loop 1 is in split mode, the controller needs to access the disk drive that belongs to the other controller domain. If the mirrored path to that disk drive fails, the disk access will fail.

Workaround - Trained service personnel can use the `sys loop1_split off` diagnostic command to heal the loop. Refer to the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

Offline Diagnostics Results

Bug 4794710 - Due to known issues with the offline diagnostics (`ofdg`) facility on Sun StorEdge 6120 systems, inconsistent results are sometimes reported.

Workaround - Confirm results that are obtained from the output of the `ofdg` diagnostics command. Obtain other supporting evidence, such as corresponding `syslog` messages, or `fru stat` command output, or contact your Sun service representative (see "Service Contact Information" on page 34).

Loopcard Boot Message

Bug 4845755 - While booting the system, in a master and slave loopcard environment, you might see the following message:

```
"Unable to obtain mid-plane serial number"
```

This condition, however, should have no bearing on the operation of your system.

"Unfixable Error" Message Displays During Boot

Bug 4939758 - During booting an "unfixable error" message is displayed, as shown in the following example:

```
Initializing loop 2 to accept SCSI commands...
Mounting root volume...
Checking local file system...
Unfixable error: 0x2120 in block 0x2510 file id=0x13 path=
/Oct14.OLD
Verify volume fails on u1d1, error code = 0X2120
The File System in u1d1 is BAD
```

Workaround - You can ignore this message.

Fatal Timeout Error

Bug 4948762 - During a LUN failover, if a fatal timeout occurs and the buffer commands fail, the host commands will either fail or timeout.

```
12:14:11 ISR1[4]: N: u4ctr ISP2200[1] Fatal timeout on target 14.7
```

Workaround - Enable Sun StorEdge Traffic Manager support from the management software or enable the `sys mp_support mpxio` diagnostic command to support Sun StorEdge Traffic Manager Software.

```
sys mp_support mpxio
```

Array Enclosure LED Error

Bug 4952295 - This problem can be indicated by the following situations:

- An expansion unit which does not have a controller has the controller amber LED on. This causes the loopcard to light the enclosure amber LED. The LED could have left on when an older version of code was run and the system was not power-cycled.
- A unit with a controller has the enclosure amber LED forced on. The loopcard assumes the controller is taking control of this LED and therefore let it on. This too maybe a result of running older code without power-cycling.

Workaround - Contact your Sun service representative (“Service Contact Information” on page 43).

LED Command

Bug 4801209 - The `led` diagnostics command, which issues commands to array controller LEDs, works only for the first array in an array HA configuration. For example, the following command correctly turns off the amber, blue, and green LEDs on the first array’s controller:

```
led -e 1 -f controller -l busy
```

However, using the same command as follows does not change the second array’s controllers LEDs in an HA configuration:

```
 led -e 2 -f controller -l busy
```

Maximum Command Characters

Bug 4942689 - A CLI command string longer than 256 characters is not accepted.

Workaround - Enter command options in separate steps to reduce the CLI command size to less than 256 characters.

Adding a Volume Takes Too Long

Bug 4905278 - Adding a volume can take longer when volume initialization is taking place.

Enable Command

Bug 4845863 - If the `enable` array command fails to enable a drive in an array Telnet CLI session, an error message is not displayed on the console; however, an error message is recorded in the array *syslog file*.

Workaround - If you are using the `enable` command to enable a drive, check the *syslog file* to make sure the command executed correctly.

Documentation Bugs

Array Temperature Monitoring

Bug 4920151 - In the *Sun StorEdge 6020 and 6120 Arrays System Manual*, the temperature monitoring description in the Array Temperature Monitoring has section has changed.

- It reads:

  > If the temperature in the array reaches 65 degrees Centigrade, a warning message will be logged indicating this condition. If the internal array temperature reaches 75 degrees Centigrade, the system will consider this a critical over temperature condition. At this temperature, a log message will be generated and a graceful shutdown procedure will be initiated.

The actual conditions are:

TABLE 3 6020 and 6120 Array Temperature Warnings

Component	Warn Message Temp (°C)	Shutdown Temp (°C)
Controller	55	60
Disk drive	63	68
PCU-1	55	60

TABLE 3 6020 and 6120 Array Temperature Warnings

Component	Warn Message Temp (°C)	Shutdown Temp (°C)
PCU-2	60	65
PCU-3	55	60
LPC	58	65

- It reads:

  In the case of disk drives, if an individual disk drive reaches a temperature within 10 degrees Centigrade of the drive manufacture's preset over temperature threshold specification, the system will begin generating log messages referencing the disk drive experiencing the problem.

The actual condition is 5 degrees Centigrade.

Workaround - None required.

To Set the Cache Block Size

Bug 4924529 - The blocksize descriptions as listed in the Sun StorEdge 6020 and 6120 Arrays System Manual (817-0200-10), page 18 and 19 are incorrect.

- The first and second paragraphs on page 18 should read as:

The *data block size* is the amount of data written to each drive when striping data across drives. (The block size is also known as the *stripe unit size*.) The block size can be changed only when no volumes are defined. The block size can be configured as 4 Kbytes, 8 Kbytes, 16 Kbytes, 32 Kbytes, or 64 Kbytes. The default block size is 16 Kbytes.

A cache segment is the amount of data being read into cache. A cache segment is 1/8 of a data block. Therefore, cache segments can be 0.5 Kbytes, 1 Kbytes, 2 Kbytes, 4 Kbytes, or 8 Kbytes. Because the default block size is 16 Kbytes, the default cache segment size is 2 Kbytes.

For Steps 2 and 3b:

2. Use the management software or type `sys list` **to display the blocksize.**

Divide the blocksize by eight to determine the cache segment size.

Documentation of Product Features

This section documents the following Sun StorEdge 6120 array features for Release 1.2 that are not yet in the product documentation:

Note – The Sun StorEdge 6120 array manuals will be updated and posted on the web shortly after the initial release.

Array Hot Spares

The *array hot spare* feature enables you to designate disks as hot standbys to substitute for failed drives. You can configure hot spares to be global for the array or dedicated to a specific pool.

▼ To configure array hot spares:

1. **Open the Configure Array screen and specify between 0 and 8 global hot spares for the array, based on the available disks.**

▼ To configure a dedicated hot spare for a pool

1. **Apply a different profile to the storage pool.**
2. **Perform the steps in To View Storage Pool Details to view to the desired storage and click** `Apply Different Profile`**.**

   The `Apply Different Profile` window displays profiles that can be applied without affecting the pool.

3. **Add or remove a spare for a pool by changing the profile.**

▼ To configure array hot spares with the CLI

1. **Use the** `modify array` **command.**

```
sscs modify -h hot-spare-drive-count array array-name
```

You can specify 0-8 hot spare drives.

▼ To configure dedicated hot spares with the CLI.

1. **Use the** `modify profile` **command.**

```
sscs modify -D yes profile profile-name
```

Disk Scrubber

The *disk scrubber* feature constantly reviews the volumes for consistency. As a result, you will see the disk LEDs flash regardless of I/O. Disk scrubber is enabled by default.

Caution – .Sun does not recommend disabling the disk scrubber. Disabling the disk scrubber may lead to latent disk block errors which could cause multiple disk failures and lose of data.

If the *disk scrubber* feature finds any inconsistencies, it sends messages to the array `syslog file`. View the array `syslog file` from the Storage Automated Diagnostic Environment software.

The error messages sent to the `syslog file` includes volume or strip verification messages. For example:

- When volume verification fails, a message similar to the following is displayed:

  `"N " u?ctr verify failed in vol U1V1"`

- When a volume stripe verification fails, a message similar to the following is displayed:

  `"N: u1ctr Verify failed on stripe xxxx"`

▼ To Enable or Disable Disk Scrubber

1. **Select the Configuration → Array selection tab.**
2. **Select a storage array in the table and click Configure.**
3. **Select enable or disable Disk Scrubbing (firmware Version 3.1 only)**

▼ To Enable or Disable Disk Scrubber in the CLI:

1. **To enable disk scrubber, from the CLI, enter the following:**

```
sscs modify -k enabled array array-name
```

2. **To disable disk scrubber, from the CLI, enter the following:**

```
sscs modify -k disabled array array-name
```

Backend Fault Isolation Task (BEFIT)

The BEFIT feature, also known as online loop diagnostic mode, maintains the availability of backend drives at all times by detecting, isolating, and correcting faulty FRUs (Field Replaceable Units).

The online loop diagnostics controls the monitoring of Loop Initialization Protocol (LIP) storms and backend fault detection. This feature should always be on. If you encounter problems, it can be turned off.

BEFIT is enabled by default during system boot and automatically completes diagnostics on the system. If a faulty FRU is detected during system boot, it is isolated and corrective action is applied. Corrective action may include bypassing the faulty FRU. After the system is booted, BEFIT checks system health every five seconds.

Note – If BEFIT fails to detect and correct a problem, the system can reset itself to ensure that customer data is safe from corruption.

Note – There are many faults that occur on Fibre Channel loops. Many of these are addressed by the device retrying the I/O. BEFIT sees these faults and checks for bad FRU's to ensure there are no hardware failures. It is normal to see BEFIT initiate a test and then return no fault found. If there were a hardware issue, BEFIT would isolate the FRU and send the appropriate notice to the syslog file.

When a fault is detected, BEFIT halts I/O and executes diagnostics. When BEFIT is completed, host I/O is resumed. If a faulty FRU is disabled, diagnostic LEDs on the FRU are lit. BEFIT messages are also sent to the array syslog file. View the syslog file from the Storage Automated Diagnostics Environment software.

Messages can include information on the fault detection, faulty FRU, and BEFIT completion. For example:

- When a fault is detected, messages similar to the following are displayed in the syslog file:

  Console:
  ```
  RAS: Backend Loop fault detected, initiating
   diagnostics
  ```

  Syslog:
  ```
  RASE[2]: Backend Loop fault detected, initiating
  diagnostics
  ```

- When a drive is identified as the faulty FRU, messages similar to the following are displayed in the syslog file:

  Console:
  ```
  Faulty Drive Port(s):
          u1d09: port 1 port 2
  ```

  Syslog:
  ```
  BFIT[2]: E: [BFIT] u1d09 - Has bad port on Loop 1
  BFIT[2]: E: [BFIT] u1d09 - Has bad port on Loop 2
  BFIT[2]: E: u1d09 has faulty ports, drive bypassed.
  ```

- When a loopcard is identified as a fault FRU, messages similar to the following are displayed in the syslog file:

  Console:
  ```
  Fault detected on Loop 1: u211 disabled
  ```

  Syslog:
  ```
  BFIT[2]: E: Fault detected on Loop 1
  BFIT[2]: E: Diagnosed u211 faulty, disabled.
  ```

- When BEFIT completes diagnostics without finding a fault, the following messages are displayed in the syslog file:

  Console:
  ```
  RAS: Backend Loop fault diagnostics completed -
   No fault found.
  ```

Syslog: `RASE[2]: N: Backend Loop fault diagnostics completed - No fault found.`

You can enable or turn off the BEFIT feature by using the `ondg` option of the `modify array` command.

▼ To Enable or Disable BEFIT in the CLI:

1. **To enable online loop diagnostic mode, enter the following:**

```
sscs modify -o on array array-name
```

2. **To disable online loop diagnostic mode, enter the following:**

```
sscs modify -o off array array-name
```

Fibre Channel Fault Diagnostics

To better detect and isolate array faults and to provide additional support for expansion units, the `sim_diag` diagnostic command has been enhanced to allow multiple iterations. (Diagnostic commands are for use by Sun-authorized personnel.)

The `sim_diag` command can now specify the number of times to execute the `sim_diag echo` and `sim_diag loopback` commands.

When running multiple iterations of the `sim_diag echo` command, the diagnostic test repeatedly checks for data corruption and other Fibre errors. When running multiple iterations of the `sim_diag loopback` command, the diagnostic test repeatedly checks for transient errors with front-end connectivity.

The `sim_diag echo` command syntax is shown below.

```
array:/:<1>sim_diag echo <ctrlr> <echo test> <payload pattern1> <payload pattern2>
<payload size> [<iterations>]
```

The `sim_diag loopback` command syntax is shown below.

```
array:/:<1>sim_diag loopback <ctrlr> <ISP> <Loopback test> <payload pattern1>
<payload pattern2> <payload size> <iterations>
```

The following table describes the arguments associated with the `sim_diag echo` and `sim_diag loopback` commands.

TABLE 0-1 Fibre Channel Fault Diagnostics Options

Argument	Description
`sim_diag echo`	Specifies that you are executing the sim_diag echo command.
`sim_diag loopback`	Specifies that you are executing the sim_diag loopback command.
ctrlr	Specifies a unit number with a valid online controller on which the diagnostic test is to be executed.
echo test	Specifies echo command arguments: 0 - vendor unique ELS (not recommended) 1 - Echo ELS
ISP	Specifies the Backend (e.g., 0 | 1) or Frontend (e.g., 2) ISP.
Loopback test	Specifies loopback command arguments: 0 - Internal 10-bit 1 - Internal 1-bit 2 - External loop back
payload pattern1	Specifies any 4-byte hexadecimal number.
payload pattern2	Specifies any 4-byte hexadecimal number.
payload size	Specifies the payload size. • If you are executing the “sim_diag echo” command, the maximum payload size is 220 bytes if *<echo test>* = 1; if *<echo test>* = 0, the maximum is 2k bytes. • If you are executing the “sim_diag loopback” command, the maximum payload size is 65528 bytes.
iterations	Specifies the number of times to execute the command. This argument is optional for the “sim_diag echo” command.

▼ Run Fibre Channel Fault Diagnostics:

1. **To execute Fibre channel fault diagnostics and check for data corruption, from the array diagnostics command line, enter the following:**

```
:/:<1> sym_diag echo 1 1 1a7tj6ed 2bor8ttb 220 100
```

2. **To execute Fibre channel fault diagnostics and check for transient errors, from the array diagnostics command line, enter the following:**

```
:/:<2> sym_diag loopback 1 0 0 1a7tj6ed 2bor8ttb 65528 100
```

Controller SAT Diagnostics

Controller SAT is a ROM-based diagnostic tool that provides a robust, thorough, and comprehensive test suite, offering maximum coverage on all hardware components within a FRU (Field Replaceable Unit). The controller SAT diagnostic targets hardware components at the chip, bit, and cell level.

During the diagnostic test, all status messages are displayed on the array console terminal. The terminal is constantly updated with real-time status information indicating what tests are currently running.

The following diagnostic tests are included in the test suite:

- RS-232 diagnostics
- Ethernet interface diagnostics
- Fibre Channel diagnostics

▼ To Setup and Run Controller SAT Diagnostics

1. **Plug the controller boards into the sockets on the SAT backplane.**

   Ensure that all connectors on the controller board front-end are connected to the harness consisting of the 1 Gig Fibre Channel, the 100bt Ethernet, and the nine pin RS-232.

2. **Attach the array controller console serial interface to the SAT test station.**

   The output of the SAT test suite is sent to the controller front-end serial port which is connected to the Controller SAT test station.

3. **Once all connections are made, apply power to the SAT backplane.**

   This starts the diagnostic test suite. Diagnostic testing will continue to cycle until power is removed from the SAT test stand. The output of the SAT test suite is sent to the controller front-end serial port.

4. **To stop the test suite, remove power from the SAT test stand.**

   Once testing is complete, results can be written to each controller's FRU ID by plugging the controller into the array and entering the `seg` command.

Array Configuration Changes

Sun StorEdge Configuration Service software supports the addition and removal of expansion units (trays without controller cards) on existing array configurations through wizards in the web interface. This software supports the following array configuration changes:

- The addition of expansion units to an existing array 2x2 or 2x4 HA configuration.
- The removal of expansion units from an existing array 2x4 or 2x6 HA configuration.

Figure 1 illustrates the HA configurations and the corresponding tray numbers in the Sun StorEdge Configuration Service software.

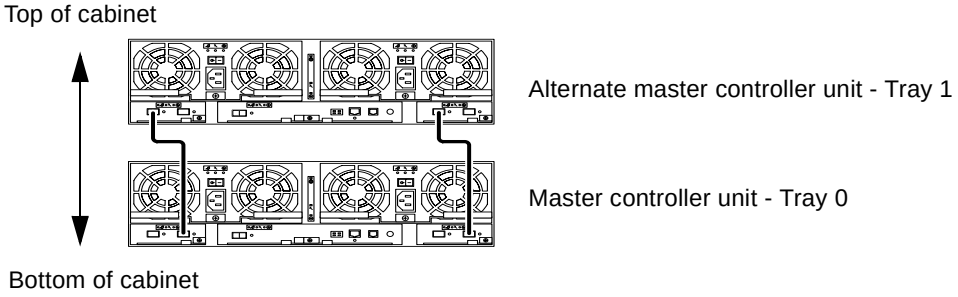


FIGURE 1 2x2 HA Configuration and Corresponding Tray Numbers

FIGURE 2 illustrates a Sun StorEdge 6120 array 2x4 HA configuration and corresponding tray numbers.

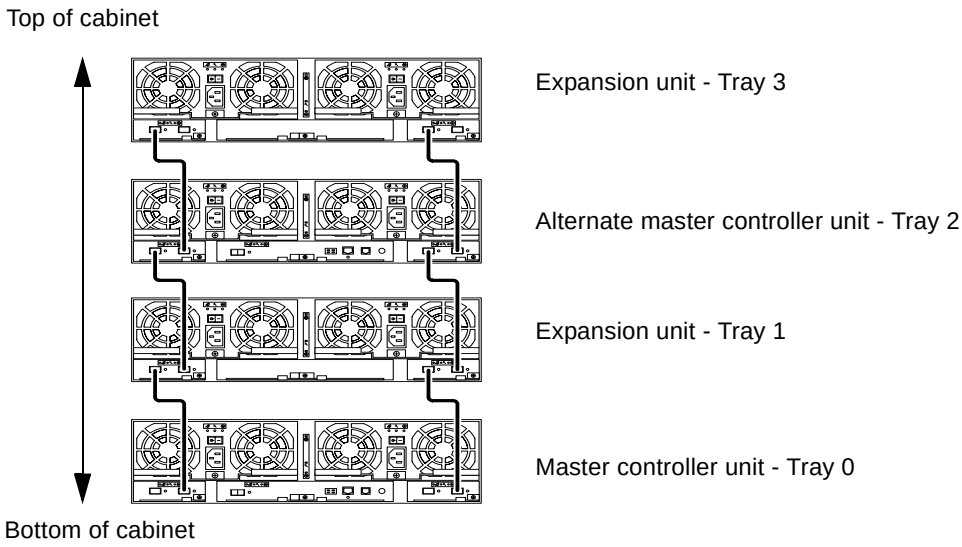


FIGURE 2 2x4 HA Configuration and Corresponding Tray Numbers

FIGURE 3 illustrates a Sun StorEdge 6120 array 2x6 HA configuration and corresponding tray numbers.

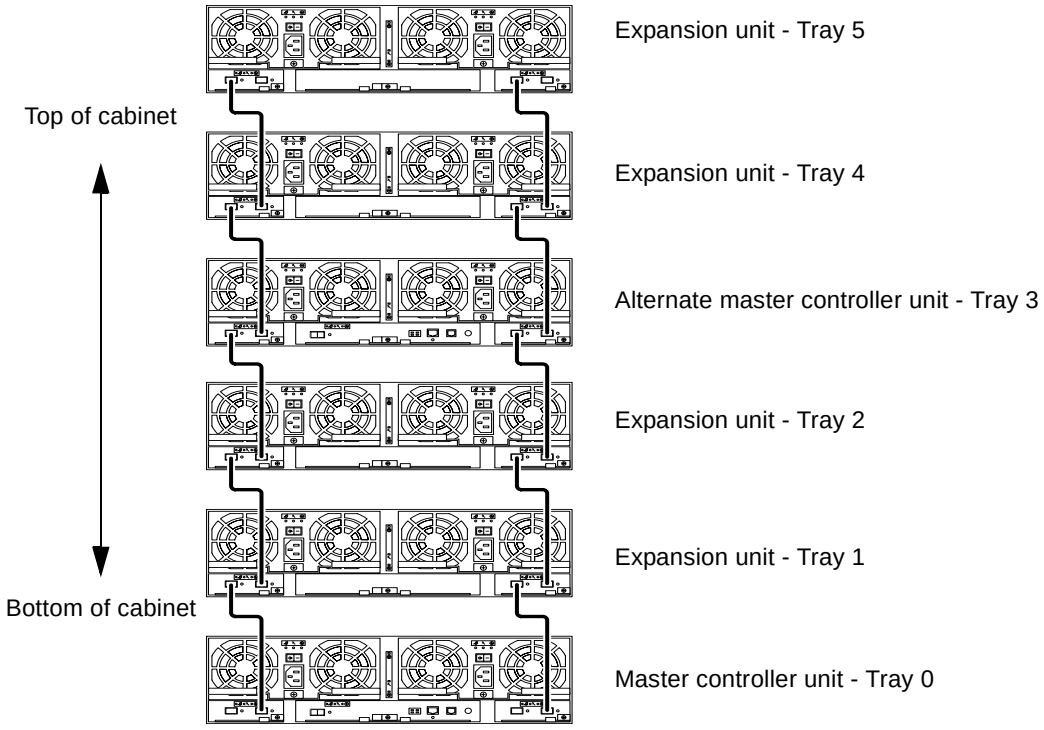


FIGURE 3 2x6 HA Configuration and Corresponding Tray Numbers

Note – If you use the management software to change the array configuration, make sure that the master controller unit is identified as Tray 0 before you begin. If the master controller unit has failed over, the alternate master controller unit assumes the master controller unit status. When this happens, the master controller unit tray numbers updated to the tray number of the alternate master controller unit. To change back to the original configuration and tray numbering, you must reset the array controller.

▼ To View the Expansion Unit Online Help

1. **Click the online help link in the Sun StorEdge Configuration Service browser.**
2. **Navigate to Administering Your System → Array Details and Tray Reconfiguration.**
3. **Select one of the following options:**
   - To Add an Expansion Unit to an Array
   - To Remove an Expansion Unit from an Array

Thin-Scripting CLI Client

A CLI client is available for the supported operating systems. The thin-scripting client provides a CLI that enables access to Sun StorEdge 6120 and management facilities.

▼ To Retrieve the Client

1. **Go to the** `http://www.sun.com` **home page and click Downloads.**
2. **Go to Browse by Category and click System Administration.**
3. **Go to Storage Management and click Sun StorEdge 6120 Array - Related Software (the "download" listing appears to be for the Windows platform but actually links you to downloads for all platforms).**
4. **Provide the user name and password to log in.**
5. **Download the appropriate files for your operating system.**

   For example, the files for the Linux operating system are:

   - `linux_se6x20.tar`
   - `linux_README.txt`

   The README file contains the client installation instructions.

Installing the Sun StorEdge 6120 Array in a Sun Rack 900

This section describes the procedure to install the expansion rails from the Sun StorEdge 6120 Array 3U Rack Kit into the Sun Rack 900 (X6876A). Refer to Chapter 3 of the Sun StorEdge 6120 Array Installation Guide for details on placing the array in the rack.

Rail Expansion Kit for the Sun Rack 900

To install the array into a Sun Rack 900 cabinet, you must order the Sun StorEdge 6120 Array 3U Rack Kit, Sun Rack 900 (X6876A).

The rail expansion hardware is 3 rack units (RU) high. You can install up to 10 arrays into a Sun Rack 900.

The following items are shipped with the Sun Rack 900 rail expansion kit:

- Two cabinet expansion rails
- Ten mounting screws for cabinet rails: 6 X M6 - 4 x 10-32
- Eight mounting screws for the array: 4 X M6 - 4 X 10-32

▼ Preparing the Cabinet

1. **Prepare the cabinet for the installation.**

   Refer to the `Sun Rack Installation Guide` for specific instructions.

   a. **Stabilize the cabinet as described in the** `Sun Rack Installation Guide` **and adjust the leveling feet with the wrench to level the vertical position.**

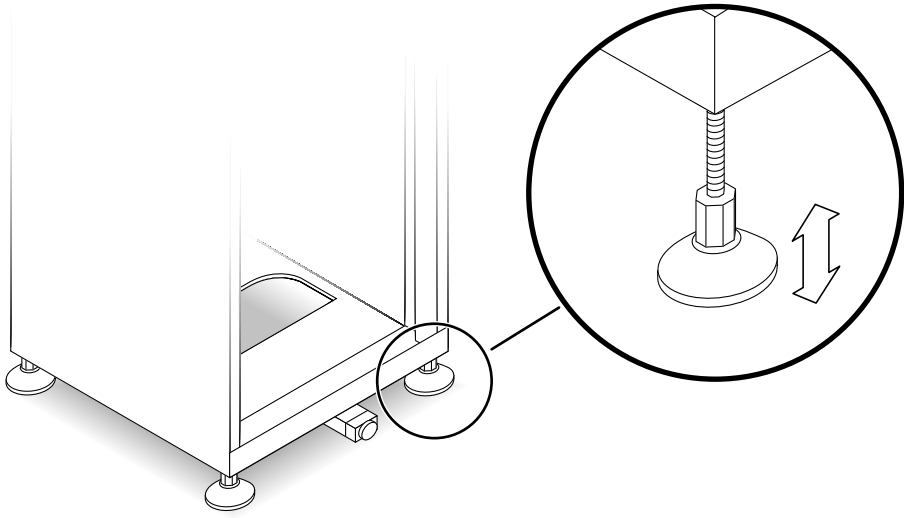


FIGURE 4 Adjusting a Leveling Foot

b. Deploying the antitilt bar.

i. Pull out the end of the antitilt bar to its fully extended position.

ii. Rotate the foot 90 degrees and adjust its height to rest on the floor.

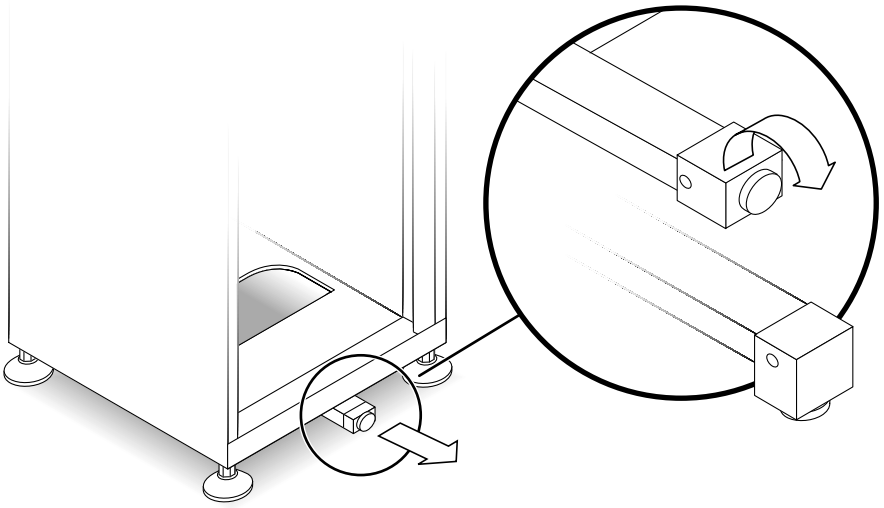


FIGURE 5 Deploying the Antitilt Bar

c. Remove or open the top front panel.

d. Remove or open the vented back panel.

▼ Attaching the Side Rails to the Rack

1. **Place the left side rail in the cabinet in the first available position from the bottom.**

   Loosely align the side rail's back bracket over the *outside* face of the cabinet's back rail. At the same time, align the side rail's front bracket to the *inside* face of the front rail.

2. **If the rail fits, proceed to Step 4. If the array does not fit, adjust the rail size with the back brackets**:

   a. Measure the depth of the cabinet from the inside face of the front mounting rail to the outside face of the back mounting rail.

   b. Measure the distance from the outside face of the side rail's front bracket to the inside face of the rail's back bracket. Adjust the back bracket with Steps c to e, as necessary.

   c. Loosen the four expansion screws holding the back bracket to the side rail (FIGURE 6**).**

   d. Slide the back bracket to accommodate the depth of the cabinet.

e. Tighten the screws to resecure the back bracket to the side rail.

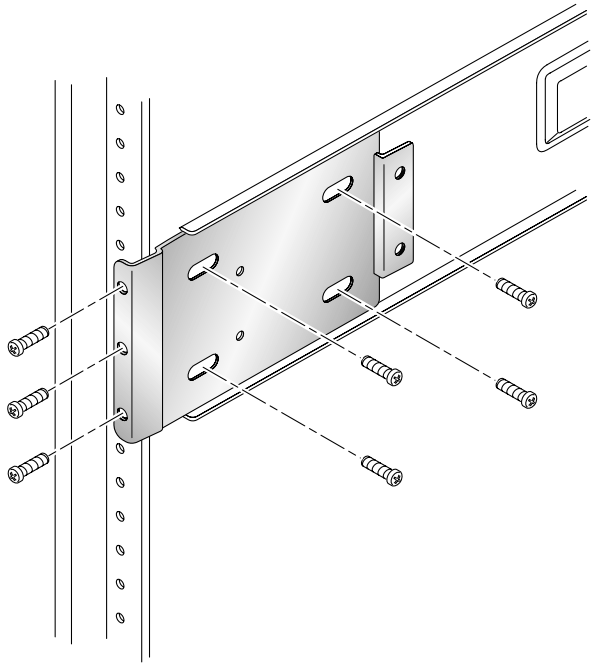


FIGURE 6 Mounting the Back Expansion Bracket of the Side Rail

3. **Align the three back holes of the side rail with the holes for three rack units (RU) in the back mounting rail of the cabinet (**FIGURE 6**).**
4. **Install three mounting screws into the back rail holes. Tighten all screws.**
5. **Repeat Steps 2 through 5 for the right side rail.**

6. **From the front of the Sun Rack 900, align the front bracket of the left side rail *behind* the vertical mounting rail (**FIGURE 7**).**

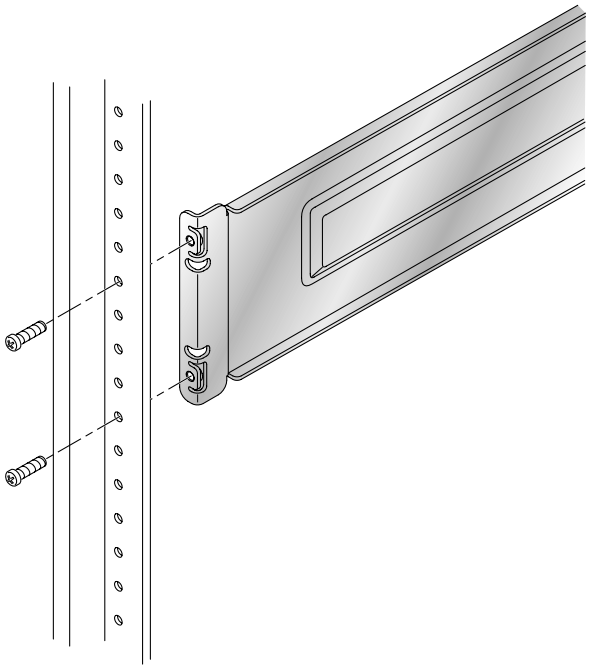


FIGURE 7 Attach the Front Bracket of the Side Rail Behind the Mounting Rail.

7. **Insert and tighten two screws through the vertical mounting rail to the front bracket of the side rail.**

8. **Repeat Steps 7 and 8 for the right side rail.**

▼ Installing the Array Into the Rack

Caution – Use two people to lift and move the array for Step 10. Use care to avoid injury. An array can weigh up to 90 pounds (41 kg).

Caution – The cabinet can become front-heavy while an array is being installed. Unless your cabinet is bolted to the floor, ensure that the stabilizer legs are extended before proceeding. Failure to extend the legs can result in the cabinet tipping forward and injuring personnel.

1. **Lift the array and align the forked ends of the array back brackets with the rack rails (**FIGURE 8**).**

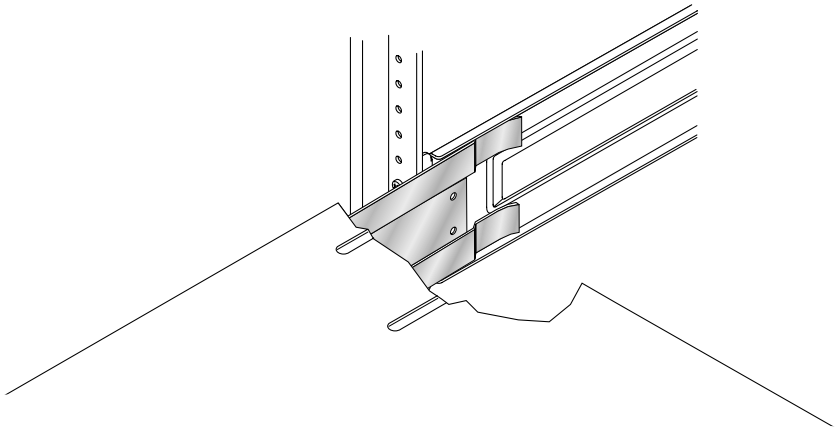


FIGURE 8 Inserting the Array Back Bracket Into the Rack Rail

2. **Insert the brackets of the array into the rails.**
3. **Slide the array into the cabinet until the front brackets touch the front mounting rails.**

   The array should slide into the cabinet smoothly.

4. **Secure the array by tightening the screws to hold the array bracket to the front mounting rail (**FIGURE 9**).**

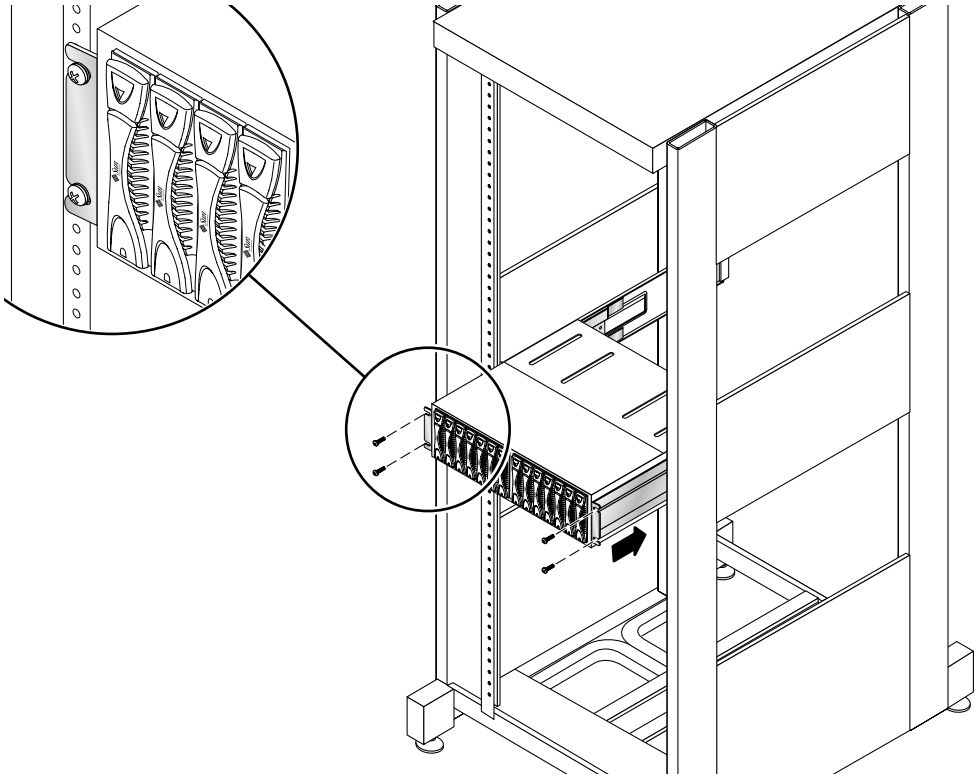


FIGURE 9 Securing the Array with the Front Screws

5. **Secure the left back bracket of the array to the side rail using two screws (**FIGURE 10**).**

   The screw holes on the array back bracket should align with the holes on the side rail. The screw holes are located on the side rail next to the four expansion screws used in Step 3. Access them from the back of the cabinet.

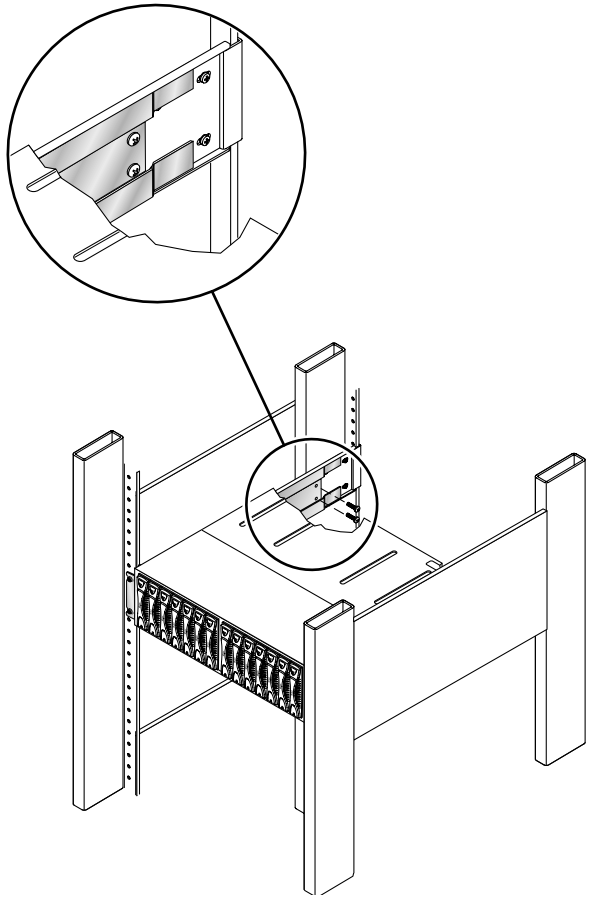


FIGURE 10 Securing the Back Array Bracket to the Side Rail with Two Screws

6. **Repeat Step 14 for the right rail.**
7. **Repeat these procedures for each Sun StorEdge 6120 array and expansion unit that you install.**

Adding FC Switches and Ethernet Hubs to the Sun StorEdge Expansion Cabinet

You can now add two Sun StorEdge Network 2Gb Switch-16s to a Sun StorEdge 72" Expansion Cabinet with built-in Ethernet hub.

FIGURE 11 shows a mapping of:

- Ethernet connections between hub ports and the array

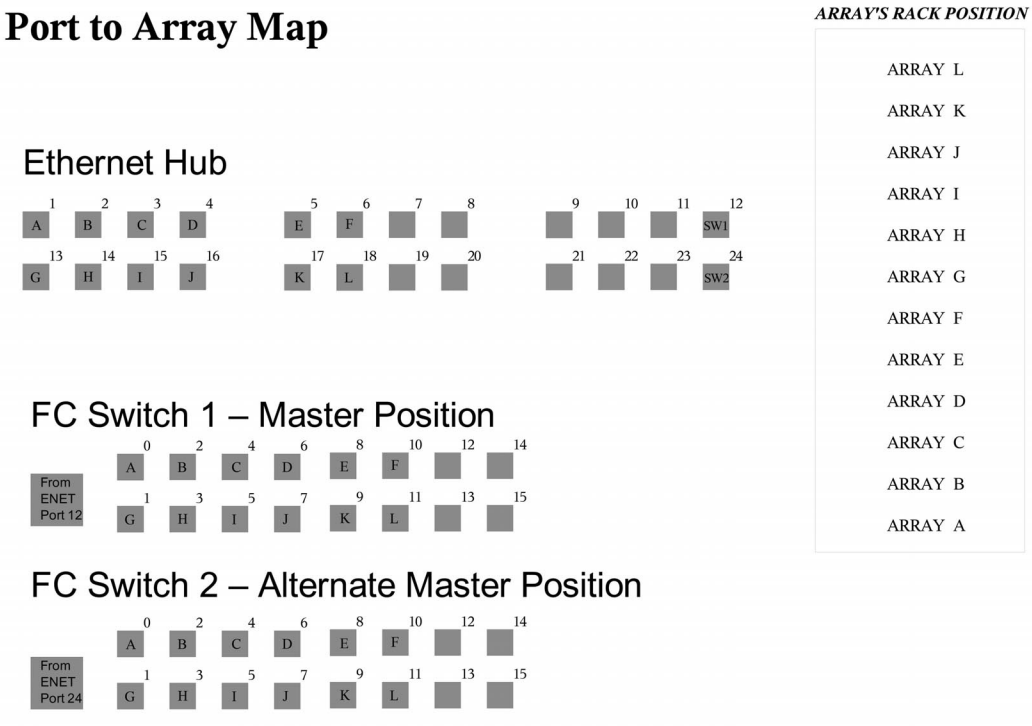
  Example - Hub Port 1 maps to the Ethernet port on Array A in the lowest rack position.

- FC connections between master and alternative master switch port and the array.

  Example - Switch 1, Port 0 and Switch 2, Port 0 map to FC connectors in Array A in the lowest rack position.

- Two connections between the hub and FC switches

FIGURE 11 Port to Array Cable Map for Ethernet Hubs and FC Switches in the Expansion Cabinet



Cable Labels

FIGURE 11 lists the array position in the rack by using alphabetic letters. The letters are also used to label the cables for connecting the switches and hub to the arrays. For example, ENET-OA connects to the array in Position A.

TABLE 4 Ethernet and Fibre Channel Labels

Ethernet Labels	FC Labels
ENET-OA	FC-OA
ENET-OB	FC-OB
ENET-OC	FC-OC
ENET-OD	FC-OD
ENET-OE	FC-OE
ENET-OF	FC-OF
ENET-OG	FC-OG
ENET-OH	FC-OH
ENET-OI	FC-OI
ENET-OJ	FC-OJ
ENET-OK	FC-OK
ENET-OL	FC-OL

TABLE 5 Ethernet Connections to Switches

Label	Connection)
TO FC SW1	Switch 1
TO FC SW2	Switch 2

Array Configuration

The maximum number of array controller trays that the Sun StorEdge 72 inch Expansion Cabinet can hold are:

- Without dual 16 port switches 12
- With dual 16 port switches 10*

*11 trays, but 10 controller trays

Racks with dual 16 port switches installed can be configured with various controller to tray combinations, including

- 1x1
- 0x1
- 2x2
- 0x3
- 2x4
- 2x6

TABLE 6 shows some valid controller to tray configuration examples..

TABLE 6 Valid Array Configurations

# of 1 Controller 1 Tray	2 Controllers 2 Trays	2 Controllers 4 Trays	1 Controller 6 Trays	Array Total
1 (1x1)	-	1 (2x4)	1 (2x6)	5 controllers, 11 trays
1 (1x1)	2 (2x2)	-	1 (2x6)	5 controllers, 11 trays
8 (1x1)	1 (2x2)	-	-	10 controllers, 10 trays
2 (1x1)	4 (2x2)	-	-	10 controllers, 10 trays

TABLE 7 shows controller to tray configuration examples.

TABLE 7 Invalid Array Configurations

# of 1 Controller 1 Tray	2 Controllers 2 Trays	Array Total
11 (1x1)	-	11 controllers, 11 trays
1 (1x1)	5 (2x2)	11 controllers, 11 trays
9 (1x1)	1 (2x2)	11 controller, 11 trays

Note – An array of 11 1x1 tray combinations is not a valid configuration due to cabling restrictions.

Installing Switches into the Sun StorEdge 72" Expansion Cabinet with Built-in Ethernet Hub

The following McData and Brocade switches can now be installed in the field into the Sun StorEdge 72" Expansion Cabinet with Built-in Ethernet Hub for the Sun StorEdge 6120 array.

- Brocade 3200, 3800, 3900
- McData 4300, 4500

Brocade Switches

Refer to the *Sun StorEdge Network 2 Gb Brocade SilkWorm 3200, 3800, 3900, and 12000 Switches Rackmounting Guide* at the following site:

http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Hubs_and_Switches/index.html

McData Switches

For the rackmounting procedures, refer to the McDATA® Sphereon™ 4300 or 4500 Switch Rack-Mount Kit guide shipped with the rackmounting kit.

For preparation and general switch-installation steps, refer to the following documents in the CD shipped with the switches:

- *620-000171 McData Sphereon 4300 Switch Installation and Service Manual*
- *620-000159 McData Sphereon 4500 Fabric Switch Installation and Service Manual*

Release Documentation

TABLE 6 lists the documentation for the Sun StorEdge 6120 and related products. Documents that cite the suffix *nn*, imply that you should use the most current version. This documentation is available online at:

- `http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Midrange/6120/index.html`
- `http://www.sun.com/documentation`
- `http://www.docs.sun.com`

TABLE 8 Sun StorEdge 6120 Array and Related Documentation

Application	Title	Part Number
Site preparation	*Sun StorEdge 6120 Array Site Preparation Guide*	817-0960-*nn*
Safety requirements	*Sun StorEdge 6120 Array Regulatory and Safety Compliance Manual*	817-0961-*nn*
Array install procedures	*Sun StorEdge 6120 Array Installation Guide*	817-0199-*nn*
Management software installation	*Sun StorEdge 6000 Family Host Installation Software Guide*	817-1739-*nn*
Overview, service, reference, and CLI administration	*Sun StorEdge 6020 and 6120 Arrays System Manual*	817-0200-*nn*
Management and configuration help (on Solaris host)	*Sun StorEdge Configuration Service online help*	n/a
	Sun StorEdge SSCS (1M) man page	n/a
Troubleshooting and diagnostics	*Storage Automated Diagnostic Environment 2.2 User's Guide, Device Edition*	817-0822-*nn*
	Storage Automated Diagnostic Environment 2.2 Release Notes, Device Edition	817-0823-*nn*
SAN Foundation	*Sun StorEdge SAN Foundation 4.2 Release Notes*	817-1246-*nn*
	Sun StorEdge SAN Foundation 4.2 Installation Guide	817-1244-*nn*

TABLE 8 Sun StorEdge 6120 Array and Related Documentation *(Continued)*

Application	Title	Part Number
Multipathing support	*Sun StorEdge Traffic Manager Software Release Notes*	817-0385-*nn*
Cabinet information	*Sun StorEdge Expansion Cabinet Installation and Service Manual*	805-3067-*nn*
Sun Rack information	*Sun Rack Installation Guide*	816-6386-*nn*

Sun StorEdge 6120 Array Terminology

The Storage Networking Industry Association (SNIA) is developing a standard set of terminology. When it has been adopted by all storage manufacturers, this terminology standard will make it easier for customers to understand terms used by different vendors.

Sun Microsystems is adopting the SNIA terms now. The first storage product to use the new SNIA terminology is the Sun StorEdge 6000 family product line.

TABLE 9 shows a comparison (mapping) of the array Telnet terms to the terms used by the Sun StorEdge Configuration Service management software.

TABLE 9 Sun StorEdge 6120 Array Terminology

Sun StorEdge 6120 Array CLI Terminology	Sun StorEdge Configuration Service Software Terminology
Volume	Storage pool
Slice	Volume
LUN	Volume
Administrative domain	Storage array
Partner group	HA configuration
Array	Tray
Enclosure	Tray
Expansion unit	Expansion unit

Service Contact Information

If you need help installing or using this product, go to:

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