Sun StorEdge™ 3000 Family FRU Installation Guide

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Contents

Sun StorEdge 3000 Family FRUs

This document provides instructions for removing and installing field-replaceable units (FRUs) in Sun StorEdge™ 3120 SCSI arrays, Sun StorEdge 3310 SCSI arrays, and Sun StorEdge 3510 FC arrays.

Instructions are also included for FRUs which are common to all three arrays. These FRU components can be replaced by customers or by Sun service representatives.

This chapter covers the following topics:

■ "Available FRUs" on page 1-2

■ "Static Electricity Precautions" on page 1-4

Removal and installation instructions are provided for the following FRUs:

■ Disk drives

■ Power and fan modules

■ Card modules

■ Special-Use FRUs, such as batteries

1.1 Available FRUs

Most FRUs are hot-swappable except a few modules which are hot-serviceable. *Hot-serviceable* means that the module can be replaced while the RAID product and hosts are powered up but the connected hosts must be inactive.

Caution – Please follow the FRU procedures carefully to ensure successful FRU replacement.

The following tables list the FRUs that are currently available. For additional FRUs and X-options, consult your sales representative or the latest Release Notes for Sun StorEdge 3000 Family products on Sun web sites.

TABLE 1-1   List of Available FRUs for the Sun StorEdge 3120 SCSI Array

FRU Model Number	Description
F370-6195-xx	1U JBOD, LVD, Chassis + I/O board with SAF-TE
F370-6193-xx	AC power supply and fan module, 1U
F370-6192-xx	DC power supply and fan module, 1U
F370-5405-xx	Cable, LVD, 1-foot, jumper
F370-5528-xx	Cable, LVD, 1.5-foot, expansion
F540-6054-xx	Drive module, 36 GB LVD, 10K RPM
F540-6055-xx	Drive module, 36 GB LVD, 15K RPM
F540-6056-xx	Drive module, 73 GB LVD, 10K RPM
F540-6057-xx	Drive module, 73 GB LVD, 15K RPM
F540-6058-xx	Drive module, 146 GB LVD, 10K RPM
XTA-3000-AMBS	Air management blank sled

Caution – You can mix capacity in the same chassis, but not spindle speed (RPMs) on the same SCSI bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 10K RPM drives. Violating this configuration guideline leads to poor performance.

TABLE 1-2 List of Available FRUs for the Sun StorEdge 3310 SCSI Array

FRU Model Number	Description
F370-5394-xx	Event monitoring unit
F370-5396-xx	I/O module, LVD, expansion unit or JBOD
F370-5397-xx	I/O module, LVD, RAID
F370-5403-xx	Controller module, 512 memory, battery, 2U LVD
F370-5399-xx	Terminator module
F540-5522-xx	Drive module, 36GB LVD, 10K RPM
F540-5563-xx	Drive module, 73GB LVD, 10K RPM
F370-5398xxAC	AC power and fan module, 2U
F370-5527-xxDC	DC power and fan module, 2U
F370-5533-xx	Battery, LVD
F370-5405-xx	Cable, LVD, 1-foot, jumper
F370-5528-xx	Cable, LVD, 1.5-foot, expansion
F370-5393-xx	Box, 2U, JBOD, LVD
F370-5524-xx	Box, 2U, RAID, LVD
XTA-3310-DC-KIT	Power and fan module, 2U, DC

TABLE 1-3 List of Available FRUs for the Sun StorEdge 3510 FC Array

FRU Model Number	Description
F370-5535-xx	Box, 2U, FC, Chassis + Backplane (RAID/JBOD)
F370-5545-xx	Battery, FC, 2U
F370-5540-xx	Cable, FC, 1.5 FT, expansion
F370-5537-xx	I/O w/SES and RAID Controller FC, 1GB memory, battery, 2U
F370-5538-xx	I/O w/SES, JBOD FC, 2U
F370-5398-xx	AC power supply/fan module, 2U
XTA-3310-DC-Kit	DC power supply/fan module, 2U
XTA-3510-36GB-15K	Drive module, 36GB FC, 15KRPM
XTA-3510-73GB-10K	Drive module, 73GB FC, 10KRPM
XTA-3510-146GB-10K	Drive module, 146GB FC, 10KRPM

TABLE 1-3   List of Available FRUs for the Sun StorEdge 3510 FC Array *(Continued)*

FRU Model Number	Description
XTA-3000-AMBS	Air Management Sled
XSFP-SW-2GB	SFP, 2G, SW 850NM, FC, TRANS
XSFP-LW-2GB	SFP, 2G, LW 1310NM, FC, TRANS

1.2   Static Electricity Precautions

Follow these steps to prevent damaging the FRUs:

- Remove plastic, vinyl, and foam from the work area.
- Before handling a FRU, discharge any static electricity by touching a ground surface.
- Wear an antistatic wrist strip.
- Do not remove a FRU from its antistatic protective bag until you are ready to install it.
- When removing a FRU from the RAID product, immediately place it in an antistatic bag and in antistatic packaging.
- Handle a FRU only by its edges, and avoid touching the circuitry.
- Do not slide a FRU over any surface.
- Limit body movement (which builds up static electricity) during FRU installation.

Disk Drive, Air Management Sled, and Tabletop Cover FRUs

This chapter provides instructions for removing and installing a disk drive, air management sled, and tabletop cover FRUs, and covers the following topics:

2.1 Replacing a Disk Drive

To replace a disk drive, you first remove the defective disk drive and then install a replacement drive. The drive module is hot-swappable. It is replaced while the RAID product is powered on.
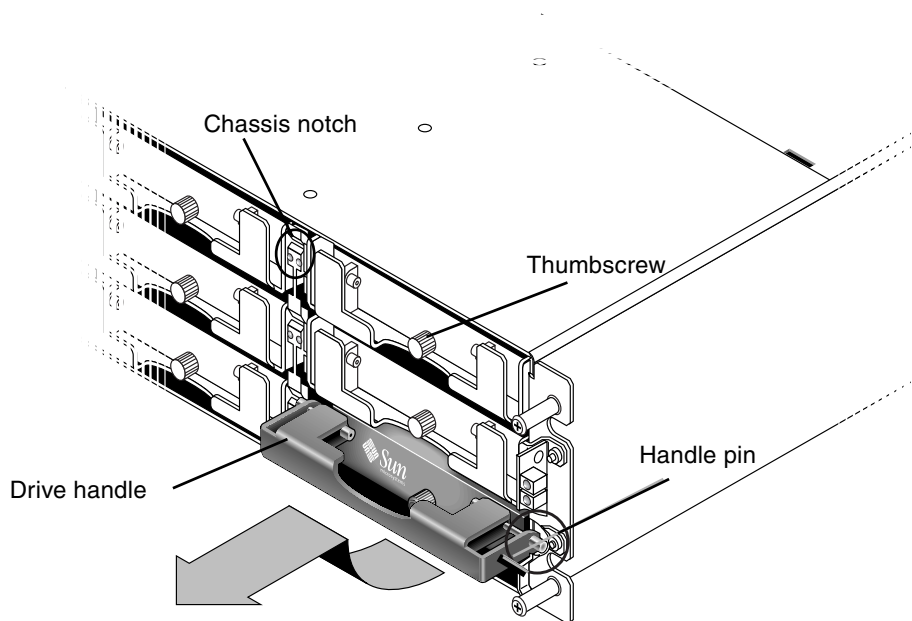
FIGURE 2-1 The Front View of a Drive Module Pulled Out of the Chassis

Caution – When you replace a disk drive, the disk drive must have the same capacity or greater of the defective disk drive which is being replaced. You can mix capacity in the same chassis, but not spindle speed (RPMs) on the same bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 10K RPM drives. Violating this configuration guideline leads to poor performance.

2.1.1 Identifying the Defective Disk Drive

Before replacing a disk drive, perform the following steps to ensure that you have identified the correct defective disk for removal.

!

Caution – To prevent any possibility of data loss, back up the data prior to removing disk drives.

1. **Examine the back of the RAID product and any attached expansion units, and record the cable connections.**

2. **Prepare the RAID product for the disk replacement:**

   a. **From the Main Menu, choose "view and edit Configuration parameters," then choose "Drive-side Parameters."**

   b. **Set the "Periodic Drive Check Time" option to 5 seconds, then confirm Yes when prompted.**

3. **Find the Channel number and SCSI target ID combination (i.e. Chl 0 ID 4) of the disk drive to be replaced:**

   a. **From the Main Menu, choose "view and edit scsi Drives."**

   b. **Locate the disk drive that has a status of *BAD* or *FAILED* in the Status column:**

   Write down the Channel number and SCSI target ID of the defective disk drive from the Chl and ID columns.

   Write down the number of the associated logical drive, as shown in the LG_DRV column, that the defective disk drive is a member of.

4. **Physically locate the defective disk drive using the Chl and ID numbers obtained in Step 3.**

   Refer to your *Sun StorEdge Product Installation, Operation, and Service Manual* for descriptions of ID locations.

!

Caution – Failure to identify the correct disk drive may result in replacing the wrong disk drive and could cause a loss of data. Be sure that you have identified the correct disk drive. Back up the data prior to removing disk.

5. **If you are uncertain about the drive location of the defective drive, check your installation manual for drive ID locations or perform the following steps.**

Note – The following steps only work if there is no I/O activity.

   a. **On the Main Menu, choose "view and edit scsi Drives" and press Return.**

   b. **Select the drive you want to identify and press Return.**

   c. **Choose the "Identifying scsi drive" function.**

d. **Choose "flash all But selected drive" to flash the activity LEDs of all of the drives in the drive channel except the selected drive, and press Return.**

e. **Select a time interval and press Return.**

```
view│Slot│ Chl│ ID│Size(MB)│Speed│LG_DRV│ Status │Vendor and Product ID
view│    │    │   │        │     │      │        │
view│    │   0│  0│  34732 │160MB│     0│ ON-LINE│SEAGATE ST336607LSUN36G
view│    │    │   │        │     │      │        │
view│    │   0│  1│  34732 │160MB│     0│ ON-LINE│SEAGATE ST336607LSUN36G
view│    │    │   │        │     │      │        │
syst│    │   0│  2│  34732 │160MB│     0│ ON-LINE│SEAGATE ST336607LSUN36G
view│    │    │   │        │     │      │        │
view│    │    │   │        │     │      │ ON-LINE│SEAGATE ST336607LSUN36G
```
```
        V  │ flash All drives    │
        S  │ flash Selected driv │  Flash All But Channel:0 ID:3 SCSI Drive ?
        a  │ flash all But selec │
        Iden                       │      Yes              No
        clon│ Flash Drive Time(Second) : 15 │E│SEAGATE ST336607LSUN36G
        Pred                                 │
        disk                               │E│SEAGATE ST336607LSUN36G
```

FIGURE 2-2   Identify Drive Option with Flashing LEDs on Drives

f. **Confirm your choice by selecting Yes and pressing Return.**

The read/write LED of all drives except the selected hard drive flash.

2.1.2   Removing a Defective Disk Drive

Caution – Failure to identify the correct disk drive may result in replacing the wrong disk drive and could cause a loss of data. Be sure that you have identified the correct disk drive.

Caution – To prevent any possibility of data loss, back up the data prior to removing disk drives.

Caution – Do not remove a defective module unless you have a replacement FRU module to immediately replace the defective module. If you remove a module and do not replace it, you alter the air flow inside the chassis and could overheat the chassis as a result.

> **Note –** When a failed drive is replaced, the system rebuilds the logical drive by restoring data that was on the failed drive onto a new or spare drive. If you replace more than one drive at a time, the logical drive cannot be rebuilt. If more than one drive fails in a logical drive (except RAID 1+0), the logical drive fails and data from the logical drive is lost.

Remove the defective disk drive with the following steps.

1. **Unlock the locks with the provided key, and gently pull the plastic front bezel away from the front of the unit so that it drops down and is supported by the two hinged brackets on the sides.**

2. **Turn the thumbscrew of the defective disk drive counterclockwise several full turns until the thumbscrew and drive module are loosened.**

3. **Gently pull the release handle upward.**

4. **Pull the drive module out until the drive connector has fully disconnected from the midplane.**

5. **Wait 20 seconds for the drive to stop spinning and then remove it from the chassis.**

2.1.3   Installing a New Disk Drive

To install the replacement disk drive, perform the following steps.

> **Caution –** When you replace a disk drive, the disk drive must have the same capacity or greater of the defective disk drive which is being replaced. You can mix capacity in the same chassis, but not spindle speed (RPMs) on the same SCSI bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 10K RPM drives. Violating this configuration guideline leads to poor performance.

1. **Gently slide the drive module into the drive slot until the handle pins slip into the chassis notch.**

2. **Lower the disk drive handle until it is vertical.**

3. **Press and hold the drive handle in while you press the thumbscrew in until it engages the threads.**

4. **Turn the thumbscrew clockwise until it is finger-tight.**

5. **Push the plastic front bezel onto the front of the unit until it is seated firmly, and use the key to lock the locks.**

6. **If the replaced drive is in a JBOD directly attached to a server, perform any operations your host software requires to recognize the new drive and bring it under software control.**

7. **Go to .**

2.1.4　Scanning the New Drive and Related Procedures

2.1.4.1　Scanning the New Drive

After you have replaced a disk drive, perform the following steps.

1. **Check to see if the drive was automatically scanned onto the bus.**

   a. **From the Main Menu, choose "view and edit scsi Drives."**

   b. **Check the drive status of the disk drive.**

      The status field will specify NEW_DRV or USED_DRV until it is assigned as a GLOBAL or LOCAL spare with STAND-BY status.

2. **If the disk drive was not automatically scanned, scan the replaced disk drive into the configuration with the following steps:**

   a. **From the Main Menu, choose "view and edit scsi Drives." Select any disk drive in the list and press Return.**

   b. **Choose "Scan scsi drive" and press Return. Select the Channel number, then the ID number of the replaced disk drive, and confirm Yes when prompted.**

   c. **Verify that the message "Scanned SCSI drive successfully" is displayed.**

3. **From the Main Menu, choose "view and edit Logical drives" and use the following table to continue.**

TABLE 2-1   Decision Table for Selecting Disk Drive Procedure

If this drive status occurs	Perform this task
If the *target logical drive* status is GOOD, the spare disk has successfully protected it and is now integrated into the logical drive, and the replacement disk drive is available to be assigned.	Go to "Assigning a Disk Drive as a Spare" on page 2-8
If the *target logical drive* status is FATAL FAIL. two or more disk drives have failed	All data in the logical drive is lost. Rebuild the logical drive and restore backup data.
The logical drive status of DRV ABSENT or INCOMPLETE only occurs at chassis powerup. DRV ABSENT indicates that one drive is bad. INCOMPLETE indicates that two or more drives are bad.	Go to "Checking and Performing the Correct Powerup Sequence" on page 2-7.
If the *target logical drive* status is DRV FAILED	If this occurs after a new drive has replaced the defective drive, it indicates a bad midplane. Replace the chassis.
If the *target logical drive* status is REBUILDING,	Go to "If the Logical Drive Status is REBUILDING" on page 2-9.

4. **After replacing a failed drive, save the configuration settings to NVRAM as described in "Saving the Configuration Settings to NVRAM" on page 5-2. The NVRAM procedure applies to all drives.**

When you save the NVRAM to file, you save the configuration of the array onto each of the hard drives. This step saves the current configuration onto the new hard drive.

2.1.4.2   Checking and Performing the Correct Powerup Sequence

Review the power-up sequence which you most recently used with the RAID product. If you are uncertain about the powerup sequence used, repeat the power-up sequence in the following order and see if it changes the logical drive status to GOOD.

1. **Power up the RAID product and associated server as follows:**
   - Expansion unit(s) first
   - RAID array next
   - Host server(s) last (if they had been powered down for maintenance purposes)

2. **Check the logical drive status in the "view and edit Logical drive" window. If the status is GOOD, no further steps are needed.**

3. If the logical drive status is FATAL FAIL, two or more disk drives may have failed, data may be lost, and you may have to create a new logical drive.

4. If the logical drive status is DRV ABSENT, replace the defective disk drive and assign the replacement drive as a global spare. See "Assigning a Disk Drive as a Spare" on page 2-8.

5. If the logical drive status is DRV ABSENT and the drive replacement is delayed, try to recover the defective drive so that it is operational during the wait period and you can make a full backup of the data.

    a. On the firmware Main Menu, choose "view and edit Configuration parameters" and press Return.

    b. Choose "Drive-side Parameters" and press Return.

    c. Choose "Disk Access Delay Time" and press Return.

    d. Change the value to 60 seconds and press Return.

    e. Select Yes to confirm the setting.

    f. Reboot the system.

    g. Check the logical drive status in the "view and edit Logical drive" window.

       If the status is GOOD, the drive has recovered and the logical drive is no longer in a critical state. The original defective disk drive should work correctly for a time but should still be replaced.

       If the status is DRV ABSENT or DRV FAILED, replace the drive as soon as possible.

    h. Back up the logical drive data onto another storage medium.

2.1.4.3   Assigning a Disk Drive as a Spare

1. From the Main Menu, choose "view and edit scsi Drives."

2. Select the replaced disk drive and press Return (its LG_DRV membership should be NONE or an empty field).

3. Choose "Add global spare drive." Then select Yes to confirm when prompted.

4. Disable Periodic Drive Check Time:

       From the Main Menu, choose "view and edit Configuration parameters," then choose "Drive-side Parameters."

       Set the "Periodic Drive Check Time" option to Disabled, then confirm Yes. This procedure is now complete.

2.1.4.4   If the Logical Drive Status is REBUILDING

The rebuilding process refers to the rebuilding of the logical drive in which the data from a defective disk drive is restored to a global spare.

When you see the REBUILDING status, perform one of the two following procedures.

- Wait until the rebuild process is completed, then replace the defective disk drive. The benefit is that the logical drive is fully restored before you replace the defective drive. This eliminates the possibility of lost data if the wrong drive is removed.

  or

- Replace the defective drive and make the new drive a global spare while the rebuilding process continues.

  This procedure installs the new drive and assigns it as a global spare so that automatic rebuild of a logical drive will occur if a drive fails on any other logical drive.

Note – If a disk drive fails on another logical drive prior to the assignment of a new global spare, you will have to manually rebuild the logical drive.

2.1.4.5   Automatic Rebuild and Automatic Global Spare Assignments After a Failed Drive is Replaced

You can enable one or both of the following firmware features to expedite the rebuilding of a logical drive after a defective drive has been replaced:

- Auto-Assign Global Spare Drive (automatically assigns the next unused drive as a global spare so that an automatic rebuild can occur when the next failed drive event occurs)
- Periodic Auto-Detect Failure Drive Swap Check Time (periodically polls the drives, detects when a bad drive has been replaced, and automatically begins the rebuilding logical drive process as soon as the bad drive has been replaced)

Note – These features are Disabled by default. These features requires system resources and can impact performance. If you

Periodic Auto-Detect Failure Drive Swap Check Time

This menu option periodically polls the unit to detect a replacement of a bad drive. If no spare drive is present within the array, the logical drive begins an automatic rebuild of a degraded RAID set if the firmware detects a bad drive replacement.

The drive-swap check time is the interval at which the controller checks to see whether a failed drive has been swapped. When a logical drive's member drive fails, the controller detects the failed drive (at the specified time interval). Once the failed drive has been swapped with a drive that has adequate capacity to rebuild the logical drive, the rebuild begins automatically.

The default setting is "Disabled," meaning that the controller does not auto-detect the swap of a failed drive. When "Periodic Drive Check Time" is set to "Disabled," the controller is not able to detect any drive removal that occurs after the controller has been powered on. The controller detects drive removal only when a host attempts to access the data on the drive.

1. **Choose "view and edit Configuration parameters → Drive-side SCSI Parameters → Periodic Auto-Detect Failure Drive Swap Check Time."**

   A list of intervals is displayed.

2. **Choose the interval you want.**

   A confirmation message is displayed.

3. **Choose Yes to confirm the setting.**

   By choosing a time value to enable the periodic drive check time, the controller polls all connected drives in the controller's drive channels at the assigned interval. Drive removal is detected even if a host does not attempt to access data on the drive.

   Auto-Assign Global Spare Drive

   This feature is Disabled by default. When you enable the "Auto-Assign Global Spare Drive" menu option, the system automatically assigns a global spare to the minimum drive ID in unused drives. This enables the Fibre Channel array to rebuild automatically without user intervention if a drive is replaced.

1. **Choose "view and edit Configuration parameters → Drive-side SCSI Parameters → Auto-Assign Global Spare Drive."**

2. **When the prompt *Enable Auto-Assign Global Spare?* appears, select Yes.**

   As soon as a faulty drive is replaced, the replacement drive is identified as a global spare drive.

2.2 Installing an Air Management Sled

An air management sled looks identical to the disk drive module; however, it is an empty box and is used to maintain optimum airflow in a chassis.

If you remove a disk drive and do not replace it, you can insert an air management sled to maintain the optimum airflow inside the chassis. You can install the air management sled by using the same procedure as "Installing a New Disk Drive" on page 2-5.

2.3 Adding or Removing the Tabletop Cover

You can make a rack-ready array into a tabletop array or make a tabletop array into a rack-ready array. These procedures require attaching or removing a tabletop cover, also known as a tabletop skin. See FIGURE 2-3.

Screw holes in the back center back

Holes to attach to chassis ears

(Front view of tabletop cover)
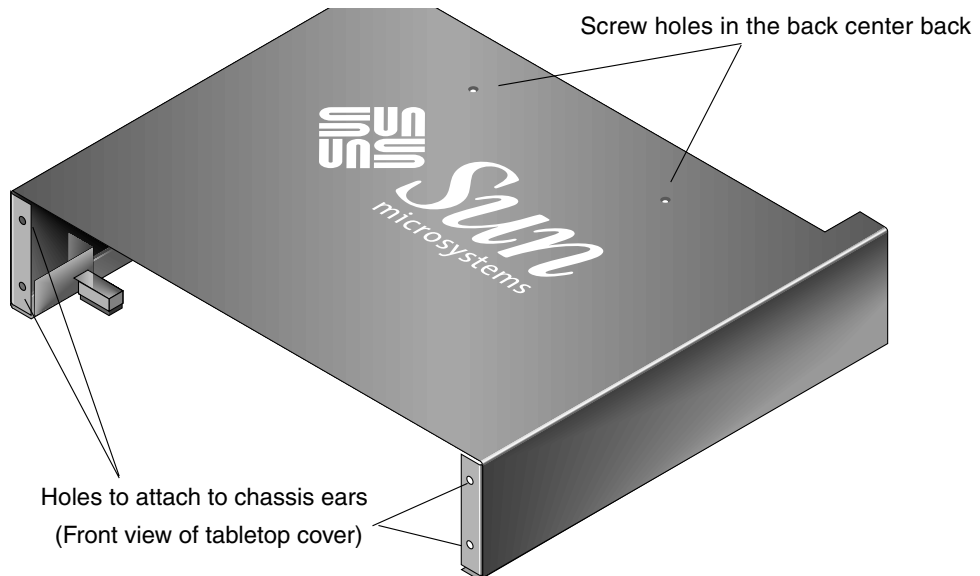
FIGURE 2-3   Tabletop Cover

2.3.1 Converting a Rack-Ready Array to a Tabletop Array

Perform the following steps to convert a rackmounted or rack-ready array to a tabletop array.

1. **If attached, remove the bezel front cover by pulling it forward and downward. Then press the right bezel arm (hinge) towards the left side to release it from the chassis hole. The left hinge will release also. Note the location of the chassis bezel holes on each ear.**

2. **Remove the caps from the front left and right ears of the array by squeezing the left and right sides of each cap, and pressing the cap so that you turn the cap inward towards the center of the array until it is free.**

3. **Remove the array from the rack if it is rackmounted with the following steps. If it is not rackmounted, proceed with step 4.**

   a. **Remove the screws which attach the front ears to the rack and which attach the array to the back brackets of the rack.**

   b. **Slide the array out of the rack.**

   c. **Remove the screws which attach the side rails to the array and store the rails and related screws.**

4. **On the top of the array, remove the top two back center screws with a Phillips No. 1 screwdriver and discard these screws.**

5. **Slide the back of the array into the front of the tabletop cover until the front of the array is flush with the front of the tabletop cover. See** FIGURE 2-4**.**

Note – As you slide the array into the cover, keep the back of the array tilted slightly upward to avoid bumping the edge of the array on the metal feet of the cover.

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6. **Loosely attach the front of the tabletop cover to the front ears of the array with two 10-32 x 1/4-inch Phillips panhead screws on each side. See** FIGURE 2-5**.**

7. **Attach the top center back of the tabletop cover to the array with two new black flathead 4-40 x 1/4-inch screws and a Phillips No. 1 screwdriver.**

8. **Tighten the front screws (in step 6) with a Phillips No. 2 screwdriver.**
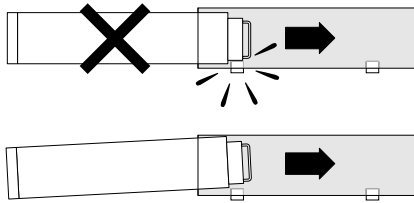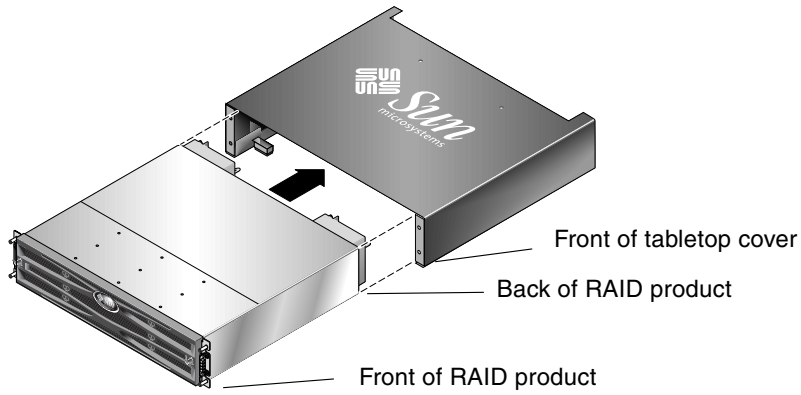
FIGURE 2-4   Sliding the Chassis Into the Tabletop Cover

Front of tabletop cover

Back of RAID product

Front of RAID product

Screws to attach the cover to the chassis ears
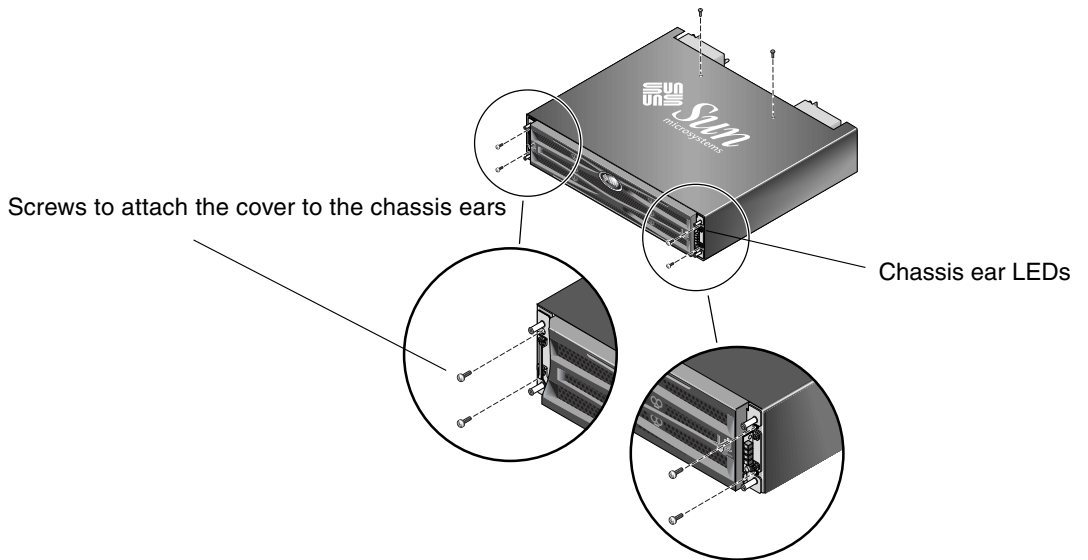
Chassis ear LEDs

FIGURE 2-5   Attaching the Chassis Ears to the Tabletop Cover

9. Put the caps back onto the ears:

a. Align the top and bottom edges of each cap with the top and bottom edges of each chassis ear.

b. While holding the side of the chassis with one hand, push the cap onto the ear with the other hand. Be sure to place the cap with LED labels on the right ear.

Caution – Do not use force when placing a cap on an ear.

---

10. Insert the bezel arms into the chassis holes, and then lift and push the bezel onto the front of the chassis until it clicks and is secure.

2.3.2 Converting a Tabletop Array to a Rack-Ready Array

Perform the following steps to convert a tabletop array to a rack-ready array.

1. If attached, remove the bezel front cover by pulling it forward and downward. Then press the right bezel arm (hinge) towards the left side to release it from the chassis hole. The left hinge will release also. Note the location of the chassis bezel holes on each ear.

2. Remove the caps from the front left and right ears of the array by squeezing and pressing each cap towards the center of the chassis until it is free.

3. Remove the 10-32 x 1/4-inch Phillips panhead screws which attach the tabletop cover to the array, with a Phillips No. 2 screwdriver, and discard these screws.

4. On the top of the array, remove the top two back center black flathead 4-40 x 1/4-inch screws with a Phillips No. 1 screwdriver and keep these screws.

5. Pull the front of the chassis until the chassis is completely removed from the tabletop cover.

6. Re-insert and secure the two black screws from Step 4 into the top center back of the rack-ready array with a Phillips No. 1 screwdriver.

7. Follow the rack kit installation instructions of the rackmount kit to install the array into a rack. After the RAID product is mounted in the rack, you can re-install the caps onto the ears and the bezel onto the front of the RAID product; these steps are also included in the rack kit instructions.

Power and Fan Module FRUs

Topics covered in this chapter are:

- "Replacing Power Supply/Fan Modules for 2U Arrays" on page 3-1
- "Replacing Power Supply and Fan Modules for 1U Arrays" on page 3-5

The following power specifications apply to the power supply and fan modules:

TABLE 3-1   Power Specifications

AC power:	Voltage and frequency 90 to 264 VAC, 47 to 63 Hz
Input current:	5A max
Power-supply output voltages:	+5 VDC and +12 VDC
DC power:	−48V DC (−36 VDC to −72 VDC)

3.1   Replacing Power Supply/Fan Modules for 2U Arrays

Caution – To avoid damage to equipment, do not remove a power supply/fan module without a working replacement.

3.1.1 Removing an AC Power Supply/Fan Module

Be sure to follow "Static Electricity Precautions" on page 1-4.

1. **Turn off the power, and then remove the AC cord locks (if applicable) and the power cable.**

2. **Turn the thumbscrew at the top of the power supply latch counterclockwise until the thumbscrew is disengaged from the power supply.**

FIGURE 3-1   The Power Supply Partially Pulled out of the Chassis

3. **Pull the latch forward about 45 degrees to disconnect the power supply/fan module from the midplane.**

4. **Use the power supply handle to pull the power supply/fan module out of the chassis.**

3.1.2 Installing an AC Power Supply/Fan Module

1. **Slide the new module into the fan and power supply slot.**

2. **Push the latch back so that the power supply is fully inserted into the chassis.**

3. **Turn the thumbscrew at the top of the power supply latch clockwise until it is finger-tight, to secure the module.**

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

4. **Attach the power cable and reinstall the AC cord locks if applicable.**

5. **Turn the power back on.**

3.1.3 Replacing a DC Power Supply/Fan Module

Caution – To avoid damage to equipment, do not remove a power supply/fan module without a working replacement.

3.1.3.1 Removing a DC Power Supply/Fan Module

Be sure to follow "Static Electricity Precautions" on page 1-4.

1. **Use a flatblade screwdriver to loosen the two screws that secure the power cable to the power supply and then disconnect the cable from the supply.**

2. **Turn the thumbscrew at the top of the power supply latch counterclockwise until the thumbscrew is disengaged from the power supply.**

3. **Pull the latch forward about 45 degrees to disconnect the power supply/fan module from the midplane.**

4. **Use the power supply handle to pull the power supply/fan module out of the chassis.**

3.1.3.2 Installing a DC Power Supply/Fan Module

1. **Slide the new module into the fan and power supply slot.**

2. **Push the latch back so that the power supply is fully inserted into the chassis.**

3. **Turn the thumbscrew at the top of the power supply latch clockwise until it is finger-tight to secure the module.**

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

4. **Connect the DC power cable to the DC source.**

Note – Use only DC power cables provided with the array.

Check the DC cable part number and wire labels carefully before connecting the cable to the source (see the table below). GND = Chassis Ground.

TABLE 3-2   DC Cable Wiring

Cable 35-00000148			Cable 35-00000156		
Pin #	Voltage	Color	Pin #	Voltage	Color
A3	Return	Red	A3	L+	White
A2	GND	Green/yellow	A2	GND	Green/yellow
A1	-48V	Black	A1	L-	White

5. **To extend the length of the DC power cable as needed: Strip the last 1/4-inch of the cable, insert it into a provided Panduit tube, and crimp the tube.**

6. **Attach the power cable to the RAID product.**

7. **Turn the power on.**

3.2 Replacing Power Supply and Fan Modules for 1U Arrays

The following power specifications apply to the power supply and fan modules:

TABLE 3-3   Power Specifications

AC power:	Voltage and frequency 90 to 264 VAC, 47 to 63 Hz
Input current:	5A max
Power-supply output voltages:	+5 VDC and +12 VDC
DC power:	−48V DC (−36 VDC to −72 VDC)

3.2.1 Replacing an AC Power Supply/Fan Module

Caution – To avoid damage to equipment, do not remove a power supply/fan module without a working replacement.

3.2.1.1 Removing an AC Power Supply/Fan Module

1. Be sure to follow "Static Electricity Precautions" on page 1-4.

2. Turn off the power, and then remove the AC cord locks (if applicable) and the power cable.

3. Turn the thumbscrew at the top of the power supply latch counterclockwise until the thumbscrew is disengaged from the power supply.

Turn the thumbscrew counterclockwise.

Pull the latch forward.
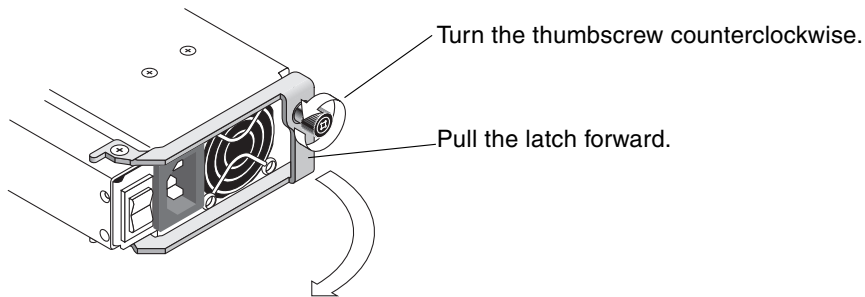
FIGURE 3-2   The Power Supply Partially Pulled out of the Chassis

4. Pull the latch forward about 90 degrees to disconnect the power supply/fan module from the midplane.

5. Pull the power supply/fan module out of the chassis.

3.2.1.2   Installing an AC Power Supply/Fan Module

1. Slide the new module into the fan and power supply slot.

2. Push the latch back so that the power supply is fully inserted into the chassis.

3. Turn the thumbscrew at the top of the power supply latch clockwise until it is finger-tight, to secure the module.

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

4. Attach the power cable and reinstall the AC cord locks if applicable.

5. Turn the power back on.

3.2.2   Replacing a DC Power Supply/Fan Module

Caution – To avoid damage to equipment, do not remove a power supply/fan module without a working replacement.

3.2.2.1 Removing a DC Power Supply/Fan Module

1. **Be sure to follow "Static Electricity Precautions" on page 1-4.**

2. **Turn off the power and remove the power cable.**

3. **Turn the thumbscrew at the top of the power supply latch counterclockwise until the thumbscrew is disengaged from the power supply.**
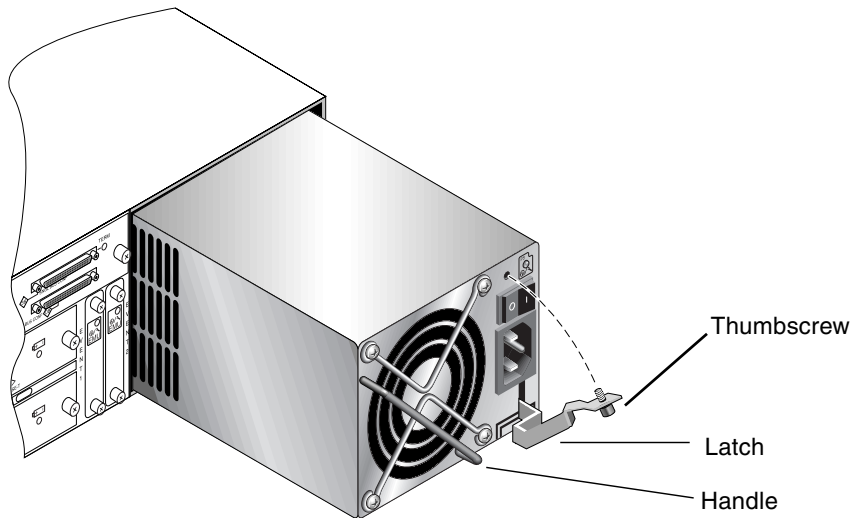

Turn the thumbscrew counterclockwise.

Pull the latch forward.
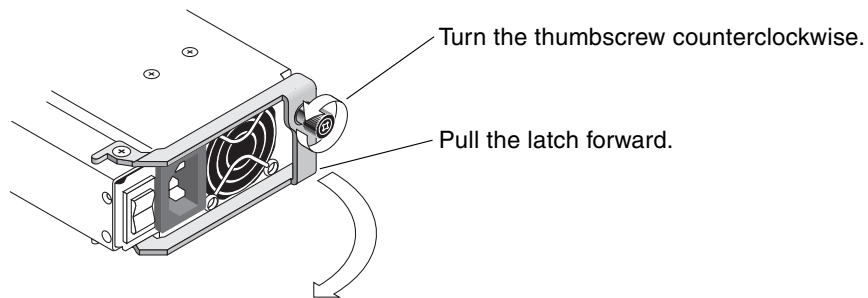
FIGURE 3-3 The Power Supply Partially Pulled out of the Chassis

4. **Pull the latch forward about 90 degrees to disconnect the power supply/fan module from the midplane.**

5. **Pull the power supply/fan module out of the chassis.**

3.2.2.2 Installing an DC Power Supply/Fan Module

1. **Slide the new module into the fan and power supply slot.**

2. **Push the latch back so that the power supply is fully inserted into the chassis.**

3. **Turn the thumbscrew at the top of the power supply latch clockwise until it is finger-tight, to secure the module.**

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

---

4. **Connect the DC power cable to the DC source.**

Note – Use only DC power cables provided with the array.

Check the DC cable part number and wire labels carefully before connecting the cable to the source (see the table below). GND = Chassis Ground.

TABLE 3-4   DC Cable Wiring

Cable 35-00000148			Cable 35-00000156		
Pin #	Voltage	Color	Pin #	Voltage	Color
A3	Return	Red	A3	L+	White
A2	GND	Green/yellow	A2	GND	Green/yellow
A1	-48V	Black	A1	L-	White

5. **To extend the length of the DC power cable as needed: Strip the last 1/4-inch of the cable, insert it into a provided Panduit tube, and crimp the tube.**

6. **Attach the power cable to the array.**

7. **Turn the power on.**

Battery FRUs

This chapter provides instructions for removing and installing batteries and battery modules. The FC arrays have an independent battery module located above each I/O module. The SCSI arrays contain a battery on each controller module.

The battery dating information is the same for all batteries.

Topics covered in this chapter are:

- "Battery Operation" on page 4-2
- "Battery Status on the Initial Firmware Screen" on page 4-2
- "Battery Dating on the Battery Labels" on page 4-3
- "Replacing a Battery" on page 4-5
    - "Replacing a SCSI Battery" on page 4-5
    - "Replacing an FC Battery" on page 4-8
- "FC Battery Status and In-Service Date Procedures" on page 4-10

4.1 Battery Operation

Your lithium ion battery should be changed every two years if the unit is continuously operated at 25 degrees C. If the unit is continuously operated at 35 degrees C or higher, it should be changed every year. The shelf life of your battery is three years.

In the event of a power failure, the battery maintains power to the cache for 72 hours. When power is restored, the data in cache is dumped to disk.

Note – The RAID controller has a temperature sensor which shuts off battery charging above 54 degrees C. When this happens, the battery status may be reported as BAD, but no alarm is written to the event log since no actual battery failure has occurred. This behavior is normal. As soon as the temperature returns to the normal range, battery charging resumes and the battery status is reported correctly. It is not necessary to replace or otherwise interfere with the battery in this situation.

The battery LED (on the far right side of the controller module) is an amber LED if the battery is bad or missing. The LED blinks green if the battery is charging and is solid green when the battery is fully charged.

4.2 Battery Status on the Initial Firmware Screen

The initial firmware screen displays the battery status at the top of the initial screen where BAT: status displays somewhere in the range from BAD to ----- (charging), or +++++ (fully charged).

For maximum life, lithium ion batteries are not recharged until the charge level is very low, indicated by a status of -----. Automatic recharging at this point takes very little time.

A battery module whose status shows one or more + signs can support cache memory for 72 hours. As long as one or more + signs are displayed, your battery is performing correctly.

TABLE 4-1   Battery Status Indicators

Battery Display	Description
-----	Discharged; the battery is automatically recharged when it reaches this state.
+----	Adequately charged to maintain cache memory for 72 hours or more in case of power loss. Automatic recharging occurs when the battery status drops below this level.
++---	Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.
+++--	Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.
++++-	Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.
+++++	Fully charged; adequate to maintain cache memory for 72 hours or more in case of power loss.

4.3   Battery Dating on the Battery Labels

The battery modules display a serial number/part number label, whose placement on the battery is shown in FIGURE 4-1 and FIGURE 4-2.

Below the top bar code is a seven-digit code that indicates the place of manufacture, followed by a dash (–), followed by a four-digit code that indicates the date of manufacture, followed by a six-digit supplier-assigned serial number.

In FIGURE 4-1, the example date of battery manufacture is indicated by "0240," where "02" is the year of manufacture and "40" is the week of manufacture. If a battery does not have a serial number/part number label, the manufacture date for the battery is August 2002.

Date code of manufacture (yyww=year+week)

Serial number —— **0000044-0240 3000001**

Part number —— **3705555-04**
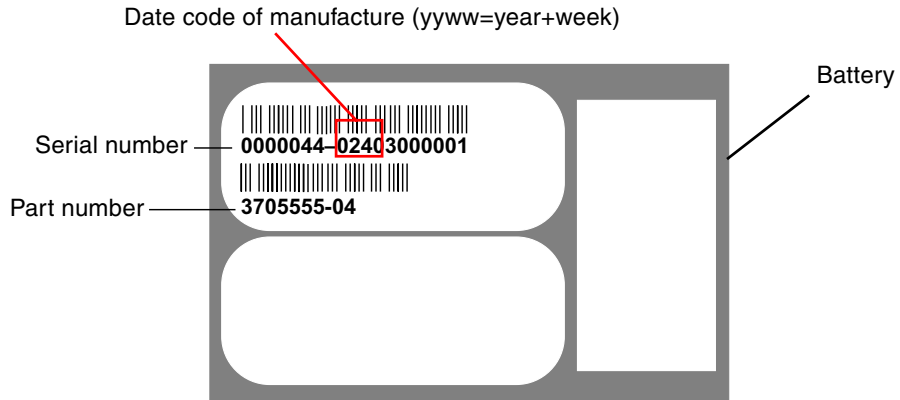
Battery

FIGURE 4-1   Battery Label Example for the Sun StorEdge 3310 SCSI Array

Date code of manufacture (yyww=year+week)

Battery

Part number —— **66-00000057/50**

Serial number —— **0000043-0303 000274**

FIGURE 4-2   Battery Label Example for the Sun StorEdge 3510 FC Array

In FIGURE 4-1, the number below the bottom bar code is the part number (for example, 3705555–04).

4.4 Replacing a Battery

This section explains how to remove an existing battery and install a new battery. The following procedures are guidelines for replacing batteries in SCSI and FC arrays.

4.4.1 Replacing a SCSI Battery

To replace a SCSI array battery, perform the following steps (refer to FIGURE 4-3 through FIGURE 4-7).

1. **Turn the thumbscrews on the left and right sides of the controller module that contains the battery counterclockwise until the thumbscrews are disengaged from the chassis.**

2. **Hold the thumbscrews and pull out the battery module to check the battery date.**

3. **To replace the battery, pull out the controller module completely.**

4. **Disconnect the battery connector from the controller module.**

5. **With a screwdriver, remove the battery screws to release the battery from the battery module.**

6. **Lift out the battery.**

7. **Insert the new battery, and attach the battery connector to the controller module.**

8. **With a screwdriver, attach the battery to the controller with the screws that you removed in Step 5.**

9. **Reinsert the controller module into the array, and tighten the thumbscrews firmly to secure the module.**

⚠

Caution – If you plan to replace the batteries in both controllers, you must complete all the preceding steps for the first controller and battery before performing the steps for the second controller; otherwise, the array disconnects and goes offline.
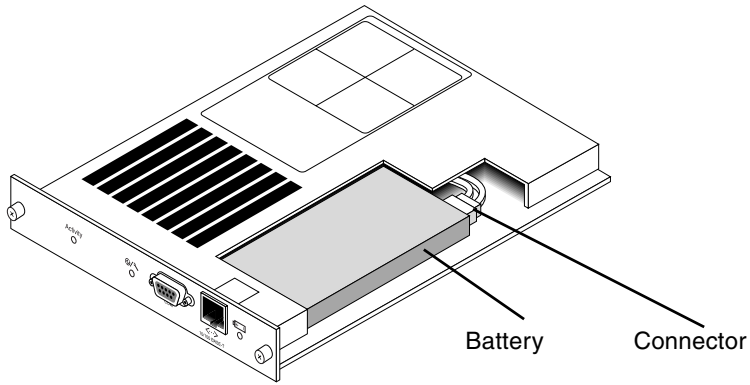
FIGURE 4-3   The Battery and Connector in a SCSI Array
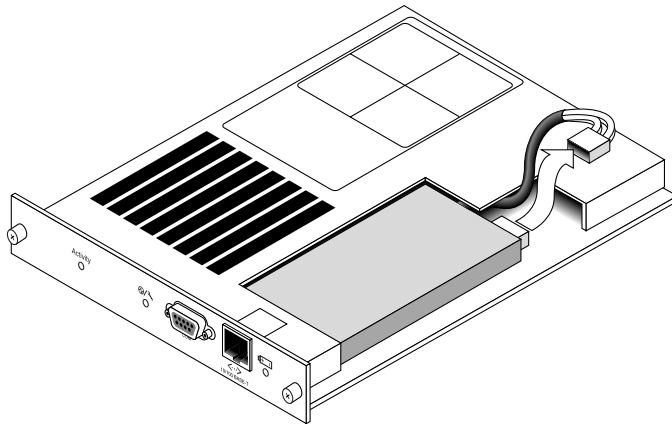
FIGURE 4-4   The Battery Connector Unplugged in a SCSI Array
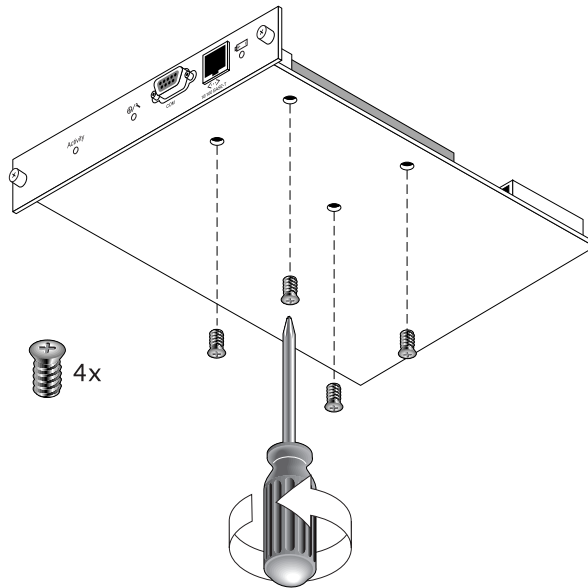
FIGURE 4-5   The Underside of the Battery Module With Screws Being Removed
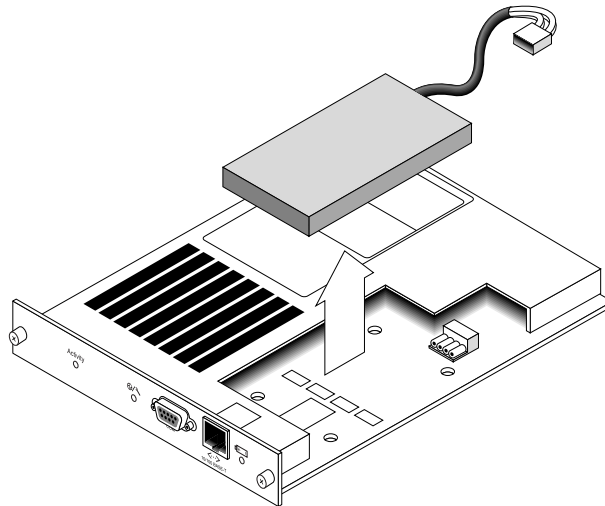
FIGURE 4-6   The Top Side of the Controller Module With the Battery Being Lifted Out and the Connector Unplugged
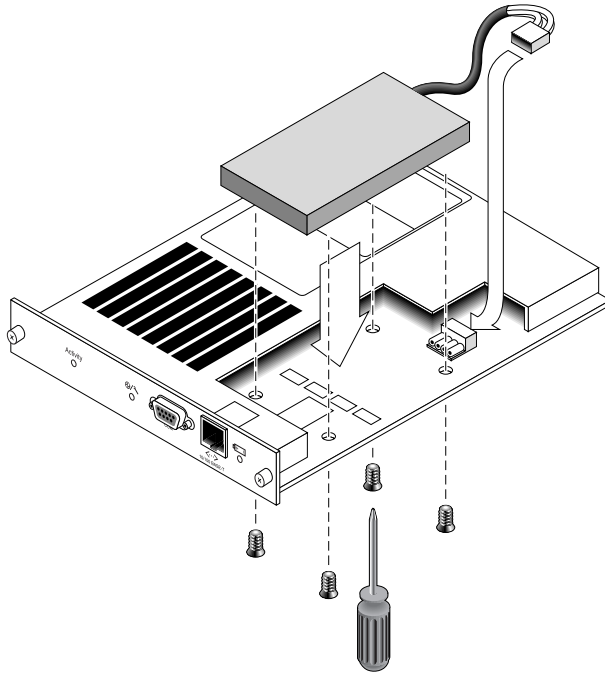
FIGURE 4-7 The Top and Side View of the Controller Module With the Battery Being Inserted

4.4.2   Replacing an FC Battery

To replace a FC array battery, perform the following steps.

1. **Turn the thumbscrews on the left and right sides of a battery module for the FC array counterclockwise until the thumbscrews are disengaged from the chassis.**

2. **Hold the thumbscrews and pull out the battery module to check the battery date.**

3. **To replace the battery, pull out the battery module completely and disconnect the battery connector from the battery module.**
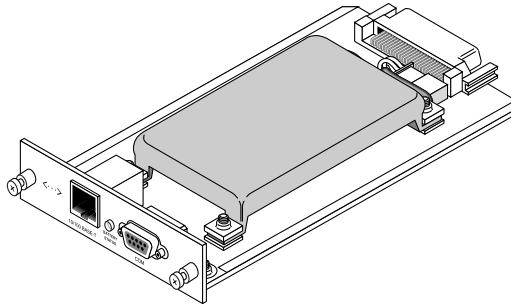
FIGURE 4-8   Battery Module Removed From the Chassis
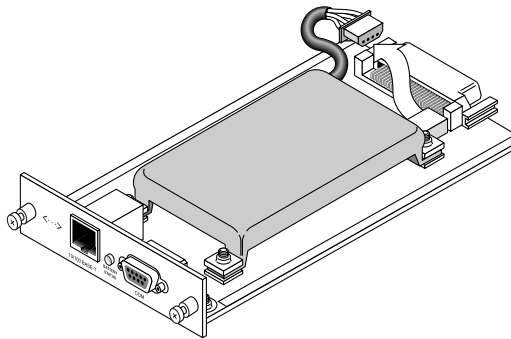
FIGURE 4-9   Battery Connector Disconnected From the Battery Module

4. **Remove the battery screws on the underside of the module to release the battery from the battery module, similar to the screw removal shown in** FIGURE 4-5**.**

5. **Lift out the battery.**

6. **Insert the new battery and attach the battery connector to the battery module.**

7. **With a screwdriver, attach the battery to the controller with the screws that you removed in** Step 4**.**

8. **Reinsert the battery module into the array, and tighten the module thumbscrews firmly to secure the module.**

9. **Set the in-service dates for the new FC battery replacement with the CLI or SSCS program. For details, refer to** "FC Battery Status and In-Service Date Procedures" on page 4-10**.**

4.5 FC Battery Status and In-Service Date Procedures

The CLI and SSCS programs offer the following features for FC battery modules:

- Setting the In-Service Date
- Monitoring the FC battery status

4.5.1 Viewing Status and Setting the In-Service Date with the CLI

This command sets the in-service date for battery FRU replacements and displays the status of the battery modules.

- For battery FRU replacements, the battery in-service-date must be set manually with the `show battery-status` command after the battery FRU module is installed. The `show battery-status` command will prompt you to set the in-service date to the system clock date. Run this command immediately to ensure the battery status is accurate when you run the `show battery-status` command in the future.

- For redundant controllers, status for both batteries is shown. Status values include: Expired, Warning, or Good. A status of Warning indicates that the battery will expire within 21 days.

Note – If the battery type is an early board module, then battery expiration monitoring is not supported. In this case, a message displays that says, "battery board type is not supported."

The following example shows one good battery one and one battery that is set to expire within the next week:

```
sccli> show battery-status
 Upper Battery Type: 1
 Upper Battery Manufacturing Date: Sat Jan 04 00:00:00 2003
 Upper Battery Placed In Service:  Thu Jan 22 10:59:58 2004
 Upper Battery Expiration Date:    Tue Jan 03 06:00:00 2006
 Upper Battery Status: good

 Lower Battery Type: 1
 Lower Battery Manufacturing Date: Tue Jan 02 00:00:00 2001
 Lower Battery Placed In Service: Sat Dec 29 00:00:00 2001
 Lower Battery Expiration Date: Mon Dec 29 00:00:00 2003
 Lower Battery Status: warning
```

4.5.2 Viewing Status and Setting the In-Service Date with SSCS

Sun StorEdge Configuration Service monitors the usable life of the FC battery and displays its status in the Battery Information window. The program calculates the battery expiration date using the battery type, manufacture date, and in-service date, which have been programmed at the factory.

Note – For an FC battery FRU, you need to verify the in-service date so that Sun StorEdge Configuration Service can set it as explained in "Verifying the In-Service Date When Replacing a Battery in SSCS" on page 4-13.

The enclosure icon on the main window displays a degraded (yellow) status 21 days before the battery is going to expire. The enclosure icon also displays a warning (yellow) status if the in-service date has not been set for a battery FRU. A critical (red) status is displayed when a battery has expired.

To view the battery status, choose View → View Enclosure or double-click the enclosure. The View Enclosure window is displayed, showing the battery status in the Summary box.
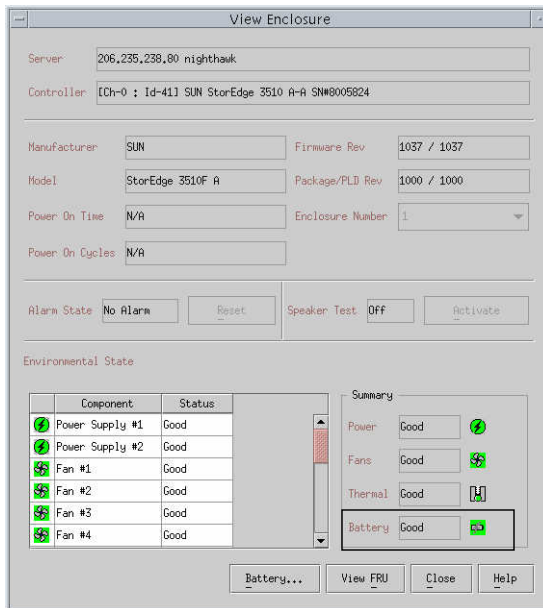
To view battery information, including type, status, manufacture date, in-service date, and expiration date, click Battery. The Battery Information window is displayed.
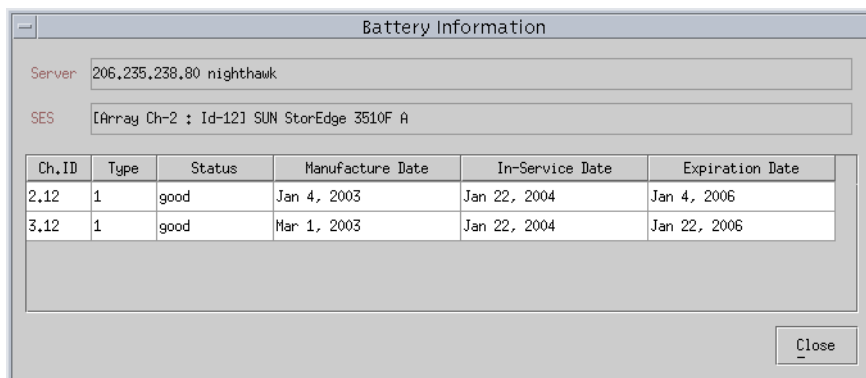
4.5.3 Verifying the In-Service Date When Replacing a Battery in SSCS

When Sun StorEdge Configuration Service detects a battery FRU, the enclosure icon displays a degraded (yellow) status symbol as shown in the following example.
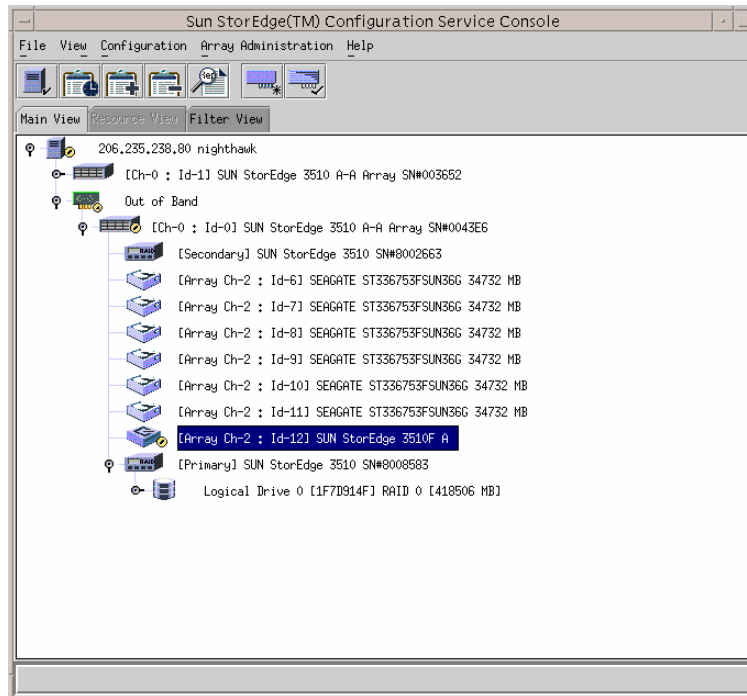
1. **Double-click the enclosure icon.**

   Sun StorEdge Configuration Service calculates the battery expiration date using the in-service date (date that the battery is put into service), which is based on the host clock. The program prompts you to verify the date by displaying the following message:

```
  Warning
┌──────────────────────────────────────────────────────────────┐
│ ┌─┐                                                            │
│ │2│  Sun StorEdge(TM) Configuration Service has detected a new │
│ └─┘  battery. To calculate the battery expiration date, the in-service │
│      date, which is based on the clock of host " xxxxxxxx ", needs to │
│      be verified. Today's date is Jan 22, 2004. Is this the correct │
│      date?                                                     │
│                                                                │
│                      ┌─────┐  ┌─────┐                          │
│                      │ Yes │  │ No  │                          │
│                      └─────┘  └─────┘                          │
└──────────────────────────────────────────────────────────────┘
```
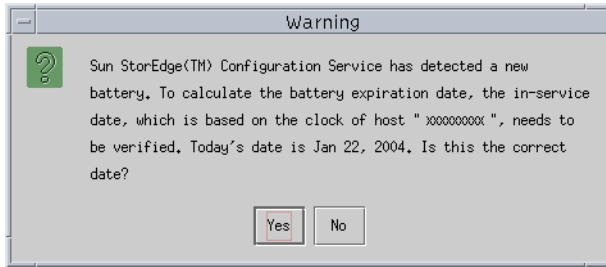
2. If the host clock is correct, click Yes.

The following confirmation message is displayed. Click OK.


```
        Battery
┌──────────────────────────────────┐
│ ┌─┐                               │
│ │i│  The in-service date is Jan 22, 2004 │
│ └─┘                               │
│              ┌─────┐              │
│              │ OK  │              │
│              └─────┘              │
└──────────────────────────────────┘
```

Sun StorEdge Configuration Service sets the in-service date and displays the date in the In-Service Date field in the Battery Information window.

3. If the host clock is incorrect, click No and reset the clock so that Sun StorEdge Configuration Service can prompt you to verify it again and set the in-service date.

⚠ **Caution –** If you do not reset and verify the in-service date, Sun StorEdge Configuration Service cannot accurately calculate the battery expiration date.

2U FC Module FRUs

This chapter provides instructions for removing and installing field-replaceable units (FRUs) in Sun StorEdge 3510 FC arrays.

Topics covered in this chapter are:

- "Replacing an I/O Controller Module" on page 5-2
  - "Saving the Configuration Settings to NVRAM" on page 5-2
  - "Removing an I/O Controller Module" on page 5-3
  - "Installing an I/O Controller Module" on page 5-5
  - "Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU" on page 5-6
  - "SES Firmware Update Sometimes Required with I/O Controller Module Replacements" on page 5-7
  - "Converting a Dual-Controller Array to a Single Controller Array" on page 5-9
  - "I/O Controller Replacement for a Single-Controller or Powered-Off Array" on page 5-9
- "Replacing I/O Expansion Modules" on page 5-10
  - "Removing the I/O Expansion Module" on page 5-10
  - "Installing the I/O Expansion Module" on page 5-10
- "Installing Small Form-Factor Pluggable Transceivers" on page 5-11
- "Installing a RAID/Expansion Chassis FRU" on page 5-12
- "Converting an FC JBOD to an FC RAID Array" on page 5-15

5.1 Replacing an I/O Controller Module

Be sure to follow the "Static Electricity Precautions" on page 1-4. The I/O controller modules are hot-serviceable. Hot-serviceable means that the module can be replaced while the array and hosts are powered on but the connected hosts must be inactive.

⚠ **Caution –** Connected hosts must be inactive during this replacement procedure.

5.1.1 Saving the Configuration Settings to NVRAM

Before replacing a controller module, save the configuration settings to NVRAM. If power is removed before you replace an I/O controller module, the settings can be restored from NVRAM.

⚠ **Caution –** If you power off the array and replace a controller module, the replacement controller could become the primary controller and overwrite any configuration settings previously set.

Note – It is also important to save the configuration settings to NVRAM after replacing a failed drive.

1. **From the firmware application Main Menu, choose "system Functions." Use the arrow keys to scroll down, and choose "controller maintenance."**

2. **Choose "save NVRAM to disks" and press Return. Select Yes to confirm. A message informs you that NVRAM information has been successfully saved.**

5.1.2 Removing an I/O Controller Module

1. **Keep the array powered on, and make sure that the connected hosts are inactive.**

Note – Most users who have multiple host connections between the two controllers, use multi-pathing software to manage them. If multi-pathing software and connectivity are not possible, one alternative is to power off the array and discontinue all host I/O until the replacement is completed and the array is powered on.

---

2. **Write down the cabling configuration for the controller-to-host connection and expansion unit connections so that you can reconnect the cables correctly with the new I/O controller module. See FIGURE 5-1.**

3. **Remove all cables from the I/O controller module.**

4. **Turn the thumbscrews on the left and right sides of the I/O controller module counterclockwise until the thumbscrews are disengaged from the chassis.**

5. **Hold the thumbscrews, and pull out the I/O controller module.**
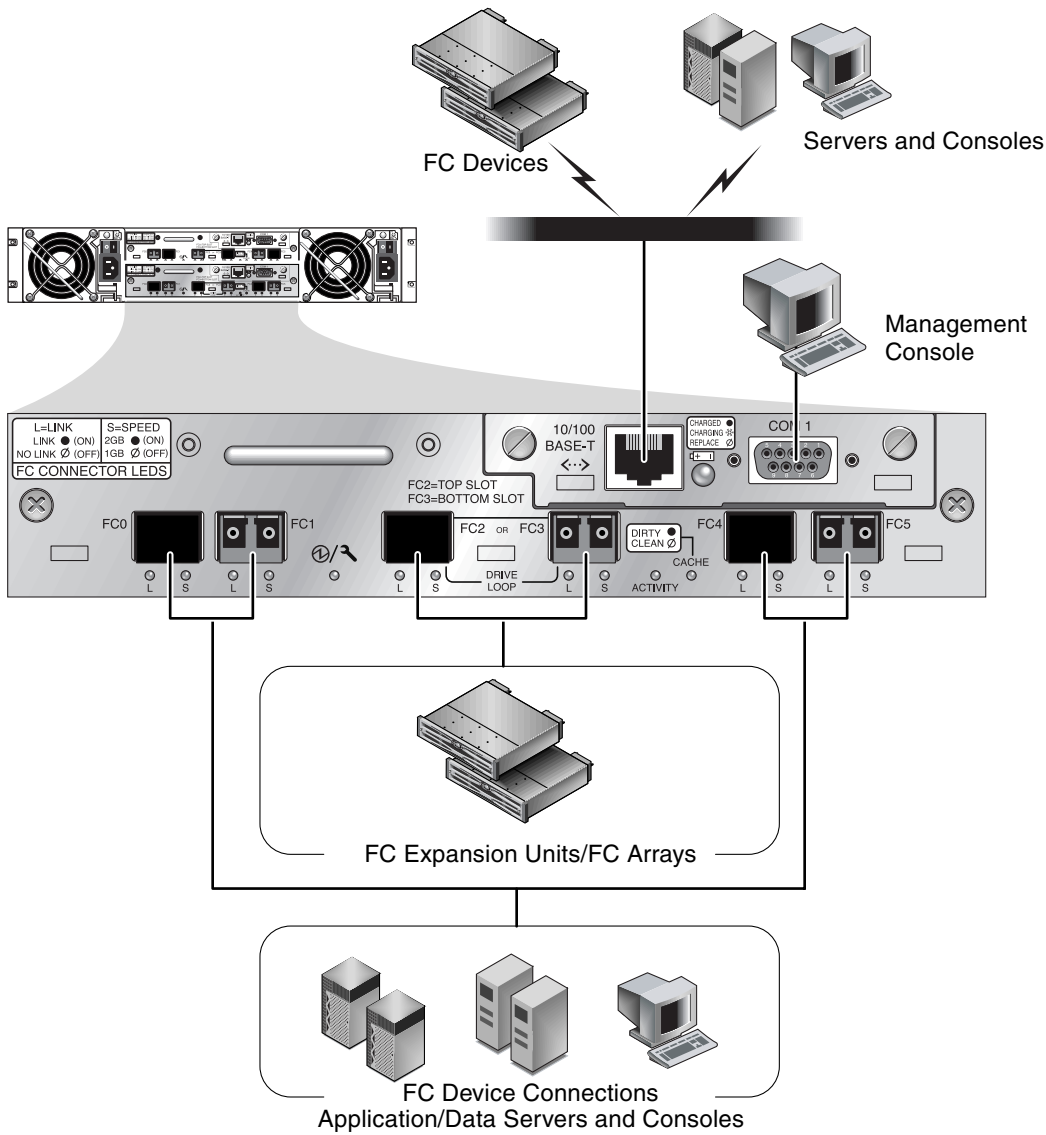
FIGURE 5-1 Hardware Connections on the Back of a Dual-Controller FC Array

Management is in-band through fibre host connections and out-of-band through the serial port and Ethernet port on the back of each controller.

5.1.3 Installing an I/O Controller Module

1. **Keep the array powered on. Gently slide the I/O controller module into the unit until it clicks and is seated in the backplane.**

   Caution – Be sure that the module is properly inserted into the guide rails of the array and that you keep the power on. If you power off and then replace the module, you will have to continue with additional steps. Refer to "I/O Controller Replacement for a Single-Controller or Powered-Off Array" on page 5-9.

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

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

   The new controller automatically becomes the secondary controller.

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

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

   The redundant controller process automatically synchronizes the firmware version of the newly installed FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 3.27N and the new controller has 3.27Q, the new controller will be synchronized to have the 3.27N firmware of the running controller. To monitor this process, refer to "Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU" on page 5-6.

3. **If you hear an audible alarm and see a blinking amber Event light on the front of your array, the SES firmware or its associated PLD code in the new controller has version that is different from the code in the other I/O controller in your array.**

   To solve this mismatch, refer to "SES Firmware Update Sometimes Required with I/O Controller Module Replacements" on page 5-7.

4. **If you wish to have the most current version of firmware on your controllers, download the latest firmware patch as described the Release Notes for the array.**

Caution – Follow the upgrade instructions in the patch README file with great care, to download and install firmware correctly. If the wrong firmware is installed, or the firmware is installed on the wrong device, your controller may be rendered inoperable.

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

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

5.1.4 Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU

To monitor the status of the automatic firmware update, use the CLI **show redundancy** command. The CLI will display the progression of "Failed," "Scanning," "Detected" and "Enabled" states.

Note – If you have not installed the CLI software, you need to install it from the CD that was packaged with your array.

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

```
sccli> show redundancy
sccli: selected se3000://210.7.180.17:58632 [SUN StorEdge 3510
SN#0043E6]
 Primary controller serial number: 8008583
 Redundancy mode: Active-Active
 Redundancy status: Failed
 Secondary controller serial number: 8002663
```

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

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

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

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

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

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

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

Periodically, firmware upgrades are made available as patches that you can download from SunSolve™ Online, located at:

http://sunsolve.sun.com

The Sun StorEdge 3510 FC array patch contains the most current version of the controller, SES, and PLD firmware.

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

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

- Locating the patch on SunSolve that contains the firmware upgrade you want.
- Downloading the patch to a location on your network.
- Using your array software (SSCS or sscli(1M) or array firmware, in some cases, to "flash" the firmware to the device it updates.

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

When you power on the expansion unit or array, if you hear an audible alarm and see a blinking amber Event light on the front of the array/unit, the new I/O expansion module or controller module has a different version of SES firmware or PLD firmware from that of the other I/O module in the unit/array. To resolve this issue you need to download new SES firmware. This can be done using Sun StorEdge Configuration Service software or the command line interface (CLI) for your array.

If you have not installed this software, you need to install it from the CD that was packaged with your array.

Use the CLI commands show ses and show events to see what error condition is causing the alarms. If the error message indicates a PLD firmware mismatch, it may be because your SES firmware has not yet been upgraded. Upgrading your SES firmware usually resolves any apparent PLD mismatch.

Refer to the *Sun StorEdge 3000 Family Configuration Service User's Guide* for your array to see instructions for "flashing" the upgraded firmware to the appropriate device, or refer to the sccli(1M) man page for instructions on performing the same operation using the CLI.

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

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

If you convert a dual-controller unit into a single-controller unit, the SSCS software does not automatically recognize the change and reports that the SES and battery board from the removed controller are failed or not present.

If you are running SSCS software and want to avoid this message, follow the steps in the chapter titled "Maintaining the Array," in the *Sun StorEdge 3000 Family Configuration Service User's Guide* for the Sun StorEdge 3510 FC array. The section containing the instructions is entitled, "Converting a Dual Controller Array to a Single Controller Array."

5.1.7 I/O Controller Replacement for a Single-Controller or Powered-Off Array

If the array was powered off during the controller replacement or if you replaced a controller in a single-controller configuration, perform the following important steps.

1. **Restore configuration settings from NVRAM if the new controller replaced an old controller:**

   a. **From the Main Menu, choose "system Functions," choose "Controller maintenance," and press Return.**

   b. **Choose "Restore NVRAM from disks" and press Return. Select Yes to confirm.**

2. **Set the parameter called the "Controller Unique Identifier" to the correct value:**

   a. **From the firmware Main Menu, choose "view and edit Configuration parameters," then choose "Controller Parameters" and press Return.**

   b. **From the Controller Parameters menu, choose "Controller Unique Identifier <hex>" and press Return. Type the value 0 (to automatically read the chassis serial number from the midplane) or type the hex value for the original serial number of the chassis (used when the midplane has been replaced).**

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

3. **To implement the revised configuration settings from step 1 or step 2, choose "system Functions" from the Main Menu, choose "Reset controller" and press Return.**

5.2 Replacing I/O Expansion Modules

Be sure to follow "Static Electricity Precautions" on page 1-4.

All I/O expansion modules are hot-serviceable. Hot-serviceable means that the module can be replaced while the array and hosts are powered on but the connected hosts must be inactive.

Caution – When you replace an I/O expansion module, the connected hosts must be inactive during the replacement procedure.

5.2.1 Removing the I/O Expansion Module

1. **Keep the array powered on, and be sure that the connected hosts are inactive during this procedure.**

2. **Turn the thumbscrews on the left and right sides of an I/O expansion module counterclockwise until the thumbscrews are disengaged from the chassis.**

3. **Hold the thumbscrews and pull out the I/O expansion module.**

5.2.2 Installing the I/O Expansion Module

1. **Keep the array powered on, and be sure that the connected hosts are inactive during this procedure.**

2. **Slide the I/O expansion module into the chassis until the module is firmly seated in the backplane, and the module's front panel is flush with the chassis.**

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

3. **Turn the thumbscrews on the left and right sides of the I/O expansion module clockwise until the thumbscrews are finger-tight to secure the module.**

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

When you power on your array, if you hear an audible alarm and see a blinking amber Event light on the front of your array, the SES firmware or its associated PLD code in the new controller has version that is different from the code in the other I/O controller in your array. To solve this mismatch, refer to "SES Firmware Update Sometimes Required with I/O Controller Module Replacements" on page 5-7.

Note – The beep code that identifies an SES or PLD firmware mismatch is the repeating Morse code letter "R," dot dash dot.

5.3 Installing Small Form-Factor Pluggable Transceivers

Fibre Channel arrays use small form-factor (SFP) transceivers to attach the array to hosts and expansion units.

Each Fibre Channel I/O controller module has six SFP ports, as shown in the lower row of ports in FIGURE 5-2. These ports are labeled FC0 through FC5.
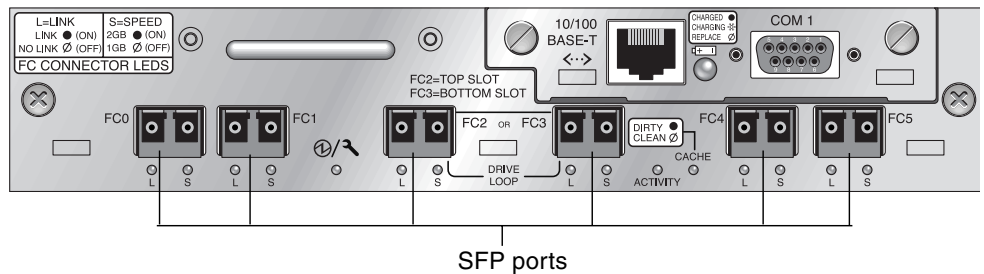
SFP ports

FIGURE 5-2   Six SFP Ports on an I/O Controller Module

Each Fibre Channel I/O expansion module has two SFP ports. These ports are labeled Loop A or Loop B.

1. **Slide the SFP into the SFP port so that the gold pins connect firmly with the chassis.**
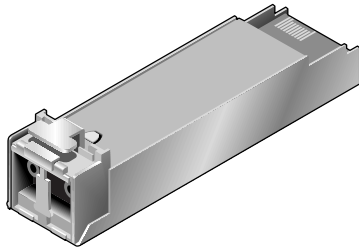
FIGURE 5-3   Typical SFP Used to Connect Cables to SFP Ports

2. Plug one end of a Fibre Channel cable into the duplex jack at the end of the SFP, as shown in FIGURE 5-4**.**

3. Plug the other end into a server or into an FC expansion unit.
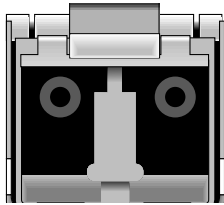
FIGURE 5-4   Duplex Jack at the End of an SFP

Note – To remove an SFP, make sure that no cable is connected to it and then slide it out from the port.

5.4 Installing a RAID/Expansion Chassis FRU

The chassis (box) FRU for the Sun StorEdge 3510 FC array includes a chassis, its drive midplane, and its backplane. This product is ordered to replace a box that has been damaged or whose midplane or backplane has been damaged.

To make a fully functional array, you need to add the following parts from the replaced array:

- Drive modules
- Two power supply/fan modules

- One or two JBOD I/O modules (for an expansion unit or JBOD)
- One or two I/O controller modules (for a RAID array)

To install the individual modules, use the replacement instructions provided in this guide.

To configure the array, refer to the installation manual for your array, located on your Sun StorEdge 3000 Family Documentation CD or on the product websites.

To replace the chassis frame of an existing RAID array or expansion unit, perform the following steps.

1. **Connect to the firmware application via the serial interface (tip for Solaris/Linux) or via telnet.**

Caution – Connected hosts must be inactive during this replacement procedure.

---

2. **If the defective array is a RAID array:**

   a. **From the Main Menu, choose "view and edit Configuration parameters," then choose "Controller Parameters."**

   b. **Write down the Controller Unique Identifier (hex) - value.**

3. **Power off both power supply modules on the defective array.**

4. **Ensure all FC cables attached to the I/O controller module are labeled clearly.**

5. **Write down the defective array's cabling configuration.**

6. **Remove all FC cables attached to the I/O controller module.**

7. **If the defective array is a RAID array, remove all serial and Ethernet cables connected to the I/O controller modules.**

8. **Label each disk drive with its disk slot position in the array.**

9. **Remove the I/O controller module(s), power supply modules, and disk drives from the defective array.**

10. **Remove the defective chassis.**

11. **Obtain the replacement chassis.**

12. **Reinstall all previously removed FRUs in their original positions into the replacement chassis.**

13. **Reinstall all FC, serial, Ethernet, and power cables in their original positions.**

14. **Power on both power supply modules on the replacement chassis.**

15. **If the replacement chassis is an expansion unit or JBOD, refer to your installation manual to configure it.**

16. **If the replacement chassis is a RAID array, proceed with the following steps:**

    a. **Connect to the array console menu interface via the serial interface (tip for Solaris/Linux) or via telnet.**

    b. **From the Main Menu, choose "view and edit Configuration parameters," then "Controller Parameters."**

    c. **Select "Controller Unique Identifier (hex)."**

17. **If this array is being used by clustered hosts, or for any other reason its attached hosts require that their Device IDs remaining consistent, perform these steps:**

    a. **Set Controller Unique Identifier (hex) to the value you wrote down in step 2.**

    b. **Reset the RAID Controllers: From the Main Menu, choose "system Functions," then "Reset controller." Confirm Yes when prompted.**

    c. **This procedure is now complete. Proceed with step 19.**

18. **If this array is NOT being used by clustered hosts, perform these steps:**

    a. **On the firmware main menu, choose "view and edit Configuration parameters," then choose "Controller Parameters," and press Return.**

```
┌──────────── < Main Menu > ────────────┐
│ Quick installation                     │
│ view and edit Logical drives           │
│ view and edit logical Volumes          │
│ view and edit Host luns                │
│ view and edit scsi Drives              │
│ view and edit Scsi channels            │
│ view and edit  onfiguration parameters │
├──┬─────────────────────────────────────┘
│ v│
│ s│  Communication Parameters           │
│ v│  Caching Parameters                 │
│ v│  Host-side SCSI Parameters          │
└──┤  Drive-side SCSI Parameters         │
   │  Disk Array Parameters              │
   │  Redundant Controller Parameters    │
   │  Controller Parameters              │
   │  DMEP Parameters                    │
   └─────────────────────────────────────┘
```

    b. **From the Controller Parameters menu, choose "Controller Unique Identifier <hex>" and press Return.**

c. **Type in the value 0 (to automatically read the chassis serial number from the midplane).**

The value 0 is immediately replaced with the hex value of the chassis serial number.

```
┌──────────────< Main Menu >──────────────┐
│  Quick installation                      │
│  view and edit Logical drives            │
│  view and edit logical Volumes           │
│  view and edit Host luns                 │
│  view and edit scsi Drives               │
│  view and edit Scsi channels             │
│ │view│                                   │
│  v ┌─── Controller Name − Not Set        │
│  s │ C  LCD Title Display − Controller Logo
│  v │ C  Password Validation Timeout − Always Check
│  v │ H │Controller Unique Identifier(Hex) − 2F18│
│    │ D │ S                               │
│    │ D │ S                               │
│    │ R └─────────────────────────────────
│  │Cont│   Controller Unique Identifier(Hex): 2F18
│  DMEP                                     
```

d. **To implement the revised parameter value, choose "system Functions" on the Main Menu, choose "Reset Controller" and press Return.**

19. **Connect the array to hosts according to the configuration identified in steps 4 and 5. The chassis replacement is now complete.**

5.5 Converting an FC JBOD to an FC RAID Array

You can convert an FC JBOD (or expansion unit) to a single- or dual-controller FC RAID array by performing the following procedure.

Components required for this conversion are:

- An FC JBOD
- An FC I/O controller module (two modules for a dual-controller array)
- Additional SFPs as needed
- A serial null modem cable for initial configuration of the RAID array
- Ethernet cable(s) for network access (one for each I/O controller module)
- *Sun StorEdge Operation, Installation, and Service Manual* for the array
- *Sun StorEdge Configuration Service User's Guide* (if Configuration Service is used to manage and monitor Sun StorEdge 3000 Family products)

Note – If you do not have the required cables, consult your sales representative to obtain them.

1. **If you have data on the JBOD drives, be sure to back up the data onto the network or onto another array prior to the conversion of the JBOD to a RAID array.**

Caution – The data on the drives of a JBOD will not be accessible after the JBOD is converted to a RAID array. Therefore, it is essential that you back up the JBOD data onto another storage device prior to converting the JBOD to a RAID array.

Note – You must use a tool within Solaris, or an external software package to perform the data backup function. The firmware, software and CLI provided with the Sun StorEdge 3510 FC array do not have backup functions for data.

2. **If you use Sun StorEdge Configuration Service (SSCS) to monitor your arrays and JBODs, stop the sscs daemon and close the console.**

Note – When you disconnect the JBOD from the host, the JBOD drives will appear as failed drives in SSCS. To remove the failed drive entries, you need to stop the daemon, remove the JBOD, and restart the daemon.

3. **To convert the JBOD to a RAID array, power off the JBOD.**

4. **Remove all cables connected to the JBOD I/O expansion module(s) which will be replaced by I/O controller module(s).**

5. **Remove the top I/O expansion module with the following steps.**

   a. **Turn the thumbscrews on the left and right sides of an I/O expansion module counterclockwise until the thumbscrews are disengaged from the chassis.**

   b. **Hold the thumbscrews and pull out the I/O expansion module.**

   c. **To remove an SFP, make sure no cable is connected to it and then slide it out from the port.**

   Each I/O expansion module has one SFP which can be re-used and inserted into the new I/O controller module.

6. **Insert the SFP from step 5c into the new I/O controller module.**

Slide the single-end of the SFP into an empty port so that it connects firmly with the chassis.

See FIGURE 5-5 and FIGURE 5-6 for recommended SFP locations in I/O controller modules.

Note – I/O controller module FRUs do not have any SFPs; the SFPs must be ordered separately. The I/O controller module X-Option includes two SFPs, an Ethernet cable, and a serial cable.

In a dual-controller array, the recommended configuration is SFPs plugged into the following ports, namely into one port out of two ports in each pair of host and drive ports:

■ The upper I/O controller module with SFPs in the FC0, FC2, and FC4 ports.

■ The lower I/O controller module with SFPs in the FC1, FC3, and FC5 ports.

This configuration provides connections to all four host channels as well as to both drive channels, and prevents a single point-of-failure.
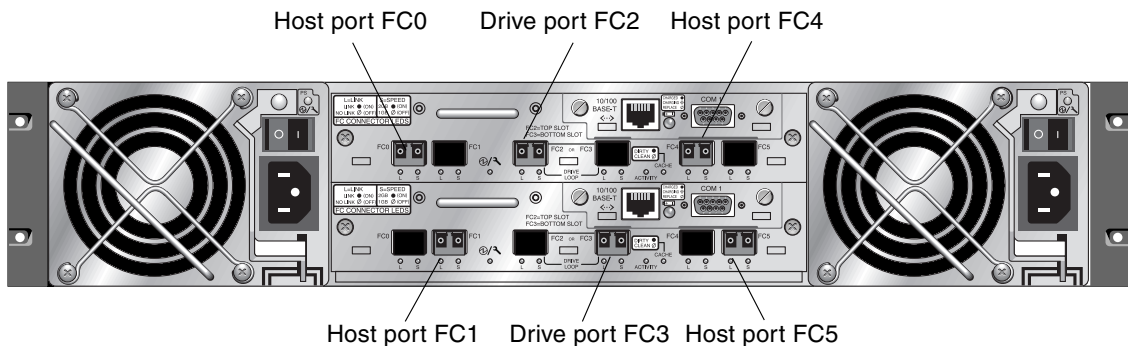
FIGURE 5-5 Recommended Dual-Controller SFP Placement

In a single-controller array, SFPs are usually plugged into FC0, FC1, FC4, and FC5. No SFPs are plugged into the drive channels. This configuration is appropriate for connecting to up to four hosts or fibre switches, with no connection to expansion units.

Host port FC0   Host port FC1   Host port FC4   Host port FC5
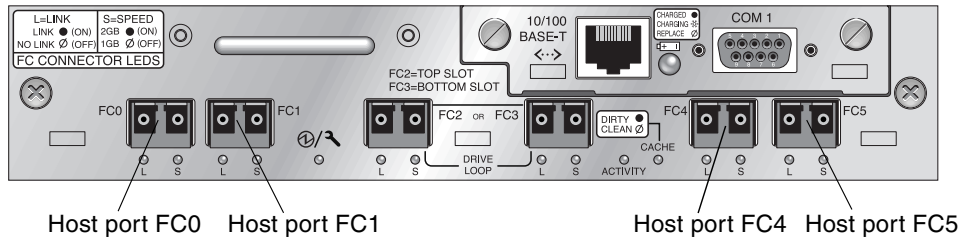
FIGURE 5-6   Single-Controller SFP Placement

7. Insert additional SFPs into the new I/O controller module as needed.

8. Install an I/O controller module into the top slot with the following steps.

    a. Gently slide the I/O controller module into the unit until it clicks and is seated in the backplane.

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

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

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

9. Repeat steps 4 and 5 to remove the I/O module in the lower slot and repeat step 6 to install a second I/O controller module if you want to create a dual-controller RAID array.

10. Power on the array.

11. Print or locate chapters 4 and 5 of the *Sun StorEdge Installation, Operation and Service Manual* **for the array, to use for the remainder of this procedure.**

12. Connect the new RAID array to a terminal emulation program or workstation through its serial port.

For information on how to connect to the serial port, refer to section 4.7, Configuring a COM Port to Connect to a RAID Array, in the installation manual.

On a Solaris system, use the `tip` command to access the array locally.

```
# tip -38400 /dev/ttyn
```

where *n* is the COM port identifier. For instance, if you have connected the array to the COM port identified as `ttyb`, use this command:

```
# tip -38400 /dev/ttyb
```

Refresh your screen by holding down the Control key on your keyboard and pressing the letter L key on your keyboard.

13. **Set up an IP address for the chassis.**

    Refer to section 4.8, *Setting an IP Address*, in the installation manual.

    Note – You can access the firmware application program directly through the serial port, or over Ethernet after you have set up the IP address.

    ---

14. **To telnet to the chassis and access the firmware application, refer to section 4.9, Setting Up Out-of-Band Management Over Ethernet, in the installation manual.**

15. **The Controller Unique Identifier for each I/O controller module must be set to 0 so that it adopts the chassis serial number with the Reset controller command.**

    The Controller Unique Identifier is used to create Ethernet addresses and worldwide names.

    Perform the following steps to ensure that the Controller Unique Identifier is set to zero.

    a. **On the firmware main menu, choose "view and edit Configuration parameters," then choose "Controller Parameters," and press Return.**

```
 ─────────── < Main Menu > ───────────
 Quick installation
 view and edit Logical drives
 view and edit logical Volumes
 view and edit Host luns
 view and edit scsi Drives
 view and edit Scsi channels
 view and edit  onfiguration parameters
 ┌─v──────────────────────────────────────┐
 │ s │ Communication Parameters            │
 │ v │ Caching Parameters                  │
 │ v │ Host-side SCSI Parameters           │
 │   │ Drive-side SCSI Parameters          │
 │   │ Disk Array Parameters               │
 │   │ Redundant Controller Parameters     │
 │   │ Controller Parameters               │
 │   │ DMEP Parameters                     │
 └────────────────────────────────────────┘
```

b. From the Controller Parameters menu, choose "Controller Unique Identifier <hex>" and press Return.

c. Type in the value 0 (to automatically read the chassis serial number from the midplane).

The value 0 is immediately replaced with the hex value of the chassis serial number.

```
                ─ < Main Menu > ─
   Quick installation
   view and edit Logical drives
   view and edit logical Volumes
   view and edit Host luns
   view and edit scsi Drives
   view and edit Scsi channels
   view
   v  ┌─── Controller Name - Not Set
   s  │ C  LCD Title Display - Controller Logo
   v  │ C  Password Validation Timeout - Always Check
   v  │ H  Controller Unique Identifier(Hex) - 2F18
      │ D  S
      │ D  S
      │ R ─────────────────────────────────────────
   Cont    Controller Unique Identifier(Hex): 2F18
   DMEP └─────────────────────────────────────────
```

d. To implement the revised parameter value, choose "system Functions" on the Main Menu, choose "Reset Controller" and press Return.

16. On the firmware main menu, choose "view system Information," and record the serial number of the array. You will use this number later.

```
                ─ < Main Menu > ─
   Quick installation
   view and edit Logical drives
   view and edit logical Volumes
   view and edit Host luns
   view and edit scsi Drives
   v
   v  ┌──────────────────────┬────────────────────┐
   v  │ CPU Type             │ PPC750             │
   v  │ Total Cache Size     │ 1024MB SDRAM(ECC)  │
   s  │ Firmware Version     │ 3.27M              │
   v  │ Bootrecord Version   │ 1.31H              │
   v  │ FW Upgradability     │ Rev. C             │
      │ Serial Number        │ 8008127            │────── Serial Number
      │ Battery Backup Unit  │ Present            │
      │ Base Board Rev. ID   │ 0                  │
      │ Base Board ID        │ 53                 │
      │ ID of NVRAM Defaults │ 327K 3510 v2.39    │
      │ Controller Position  │ Slot A             │
      └──────────────────────┴────────────────────┘
```

17. If you plan to use SSCS to manage and monitor the RAID array, perform the following additional steps.

a. Restart the SSCS agent and the console.

b. **From the SSCS main window in the console, click View → Agent Options Management, and uncheck the box labeled Enable JBOD support.**

You need to disable the JBOD support temporarily in order to remove the old JBOD drive assignments.

c. **Click View → View Server.**

d. **Double-click on the server which had the JBOD connected to it. Click the Probe button.**

The JBOD connections are removed now.

e. **Click Array Administration → Controller Assignment.**

The Assign Server to Manage a RAID Controller window is displayed.

f. **Check that the RAID array serial number recorded in step 16 is displayed.**

If the serial number is not displayed, check the operating system information in the *Sun StorEdge Operation, Installation, and Service Manual* and your operating system documentation to complete the configuration. You will need to stop and restart the SSCS agent and console to see the revised configuration.

g. **Select a server from the "Server to manage this controller" list and click Apply.**

This enables the selected server to manage an array controller. It also disables all other servers listed from managing the same array.

h. **To provide monitoring of other JBODs, click View → Agent Options Management, and check the box labeled Enable JBOD support.**

Your initial configuration of the RAID array is now complete. Refer to the *Sun StorEdge Configuration Service User's Guide* for additional information.

18. **If you are creating a dual-controller RAID array, perform the following steps with the firmware application, to ensure compatibility.**

a. **To check the controller firmware version of each module, perform these steps:**

Remove one I/O controller module so that only one I/O controller module remains in the array.

Maintain a serial port connection to a terminal or workstation as described in step 10.

In the firmware application, choose "view system Information" and record the Firmware Version.

Insert the second I/O controller module, remove the first module, and choose "view system Information" to record the Firmware Version of the second module.

```
                ─── < Main Menu > ───
 Quick installation
 view and edit Logical drives
 view and edit logical Volumes
 view and edit Host luns
 view and edit scsi Drives
 v
 v │ CPU Type              │PPC750
 v │ Total Cache Size      │1024MB SDRAM(ECC)
 s │ Firmware Version      │3.27M            ─── Firmware version
 U │ Bootrecord Version    │1.31H
 v │ FW Upgradability      │Rev. C
   │ Serial Number         │8008127
   │ Battery Backup Unit   │Present
   │ Base Board Rev. ID    │0
   │ Base Board ID         │53
   │ ID of NURAM Defaults  │327K 3510 v2.39
   │ Controller Position   │Slot A
```

To check that you have the latest firmware, go to:

http://sunsolve.sun.com

and select Patch Portal, and then browse in the Sun Alert Patch Report, or check the Sun StorEdge 3510 FC Release Notes for firmware patch information.

b. **Check the number on each I/O controller module faceplate where there is a four-digit number such as** 03/50 **or** 04/50**.**

Both I/O controller modules must have the same first two digits which represent a SES/PLD firmware level in the module. If the two modules have two different numbers, for example 03 and 04, you must upgrade one I/O controller module to the higher level or both modules to the latest SES/PLD level. For more information, refer to "SES Firmware Update Sometimes Required with I/O Controller Module Replacements" on page 5-7.

c. **If the firmware versions of the two I/O controller modules do not match, download the latest firmware to each I/O controller module to ensure that they have the latest firmware and the same firmware.**

To download new versions of controller firmware, disk drive firmware, or SES/PLD firmware, use one of the following tools and check the Sun StorEdge 3510 Release Notes or Sun Solve for the latest firmware patch:

- Sun StorEdge 3000 Family CLI (with an in-band connection, for Linux and Windows hosts, and for servers running the Solaris operating environment)

- Sun StorEdge 3000 Family Configuration Service program (with an in-band connection, for Solaris and Windows hosts)

- Firmware application (only for downloading controller firmware from a Windows host with an out-of-band serial port connection)

19. **The new RAID array requires new cabling and first-time configuration.**

For cabling and configuration instructions, refer to Chapters 4 and 5 in the installation manual.

Note – Each operating system has additional procedures or requirements for seeing a new device. For instructions related to each operating system, refer to the appropriate appendix in the *Sun StorEdge Installation, Operation, and Service Manual* for your array.

Note – In some operating systems, you will also have obsolete files or paths associated with the removed JBOD unit; for example in Solaris operating systems, `ses` files are created for each JBOD drive under `/dev/es`. Consult your operating system documentation for information on how to remove or modify appropriate files and paths.

20. **After you create RAID logical drives on the new RAID array, restore the data onto the drives.**

Note – You must use a tool within Solaris, or an external software package to perform the data restore function. The firmware, software and CLI provided with the Sun StorEdge 3510 FC array do not have restore functions for data.

CHAPTER **6**

2U SCSI Module FRUs

This chapter provides instructions for removing and installing field-replaceable units (FRUs) in Sun StorEdge 3310 SCSI arrays.

Topics covered in this chapter are:

Note – Be sure to follow "Static Electricity Precautions" on page 1-4 for all procedures.

6.1 Replacing a SCSI Controller Module

Be sure to follow the "Static Electricity Precautions" on page 1-4.

The controller modules are hot-swappable.

6.1.1 Saving the Configuration Settings to NVRAM

Before replacing a controller module, save the configuration settings to NVRAM. If power is removed before you replace a controller module, the settings can be restored from NVRAM.

Caution – If you power off the array and replace a controller module, the replacement controller could become the primary controller and overwrite any configuration settings previously set.

Note – It is also important to save the configuration settings to NVRAM after replacing a failed drive.

1. **From the firmware application Main Menu, choose "system Functions."**

2. **Use the arrow keys to scroll down, choose "controller maintenance," and then choose "save NVRAM to disks" and press Return.**

3. **Select Yes to confirm. A message informs you that NVRAM information has been successfully saved.**

6.1.2 Removing a SCSI Controller Module

1. **Keep the array powered on.**

2. **Turn the thumbscrews on the left and right sides of the controller module counterclockwise until the thumbscrews are disengaged from the chassis.**

3. **Hold the thumbscrews, and pull out the controller module.**

6.1.3　Installing a SCSI Controller Module

1. **Keep the array powered on. Gently slide the controller module into the unit until it clicks and is seated in the backplane.**

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

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

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

   The new controller automatically becomes the secondary controller.

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

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

   The redundant controller process automatically synchronizes the firmware version of the newly installed controller FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 3.25P and the new controller has 3.25S, the new controller will be synchronized to have the 3.25P firmware of the running controller.

   To monitor this process, refer to "Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU" on page 6-4.

3. **If you wish to have the most current version of firmware on your controllers, download the latest firmware patch to the controllers as described the Release Notes for the array.**

Caution – Follow the upgrade instructions in the patch README file with great care, to download and install firmware correctly. If the wrong firmware is installed, or the firmware is installed on the wrong device, your controller may be rendered inoperable.

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

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

6.1.4   Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU

To monitor the status of the automatic firmware update, use the CLI **show redundancy** command. The CLI will display the progression of "Failed," "Scanning," "Detected" and "Enabled" states.

Note – If you have not installed the CLI software, you need to install it from the CD that was packaged with your array.

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

```
sccli> show redundancy
sccli: selected se3000://210.7.180.17:58632 [SUN StorEdge 3510
SN#0043E6]
 Primary controller serial number: 8008583
 Redundancy mode: Active-Active
 Redundancy status: Failed
 Secondary controller serial number: 8002663
```

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

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

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

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

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

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

6.1.5 Replacing a Single-Controller Array or Powered Off Array

If the array was powered off during the controller replacement, or if you replaced a controller in a single-controller configuration, perform the following important steps.

1. **Restore configuration settings from NVRAM if the new controller replaced an old controller:**

   a. **From the firmware Main Menu, choose "system Functions," choose "Controller maintenance," and press Return.**

   b. **Choose "Restore NVRAM from disks" and press Return. Select Yes to confirm.**

2. **Set the parameter called the "Controller Unique Identifier" to the correct value:**

   a. **From the firmware Main Menu, select "view and edit Configuration parameters," select "Controller Parameters," and press Return.**

   b. **From the Controller Parameters menu, choose "Controller Unique Identifier <hex>" and press Return. Type the value 0 (to automatically read the chassis serial number from the midplane) or type the hex value for the original serial number of the chassis (used when the midplane has been replaced).**

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

3. **To implement the revised configuration settings from step 1 and step 2, choose "system Functions" from the Main Menu, choose "Reset controller" and press Return.**

6.2 Replacing SCSI I/O Modules

Be sure to follow "Static Electricity Precautions" on page 1-4.

Caution – The SCSI I/O modules are hot-serviceable only if you disable the Periodic Drive Check Time parameter through the firmware application; this is not the preferred procedure. *Hot-serviceable* means that the module can be replaced while the array and hosts are powered on, but the connected hosts must be inactive.

6.2.1 Installing Gaskets If Needed

Prior to installing the I/O module, check to see if there is a 1/4-inch thin gasket on the top inside edge of the I/O module slot on the chassis.

If the gasket is on that edge, do not use the gasket provided with the I/O module FRU.

If there is no gasket on the top inside edge of the I/O module slot, install the enclosed gasket as follows:

1. **Remove the plastic white backing on the back of the gasket.**

2. **Attach the adhesive side of the gasket to the top inside edge of the I/O module faceplate. This will look identical to the gasket already on the bottom inside edge of the I/O module faceplate.**

6.2.2   Removing the SCSI I/O Module

Caution – Connected hosts must be inactive during this replacement procedure.

1. **Power off both power supply modules on the array.**

2. **Write down the bus configuration (dual-bus or single-bus configuration).**

3. **Ensure that all SCSI cables attached to the I/O module are labeled clearly. Then remove all SCSI cables attached to the I/O module.**

Caution – The I/O module offers resistance when you remove it from the chassis backplane. When unseating the module from the chassis, check that you do not bend backwards the ERROR LED mounted on the module.

4. **Turn the thumbscrews on the left and right sides of an I/O module counterclockwise until the thumbscrews are disengaged from the chassis.**

5. **Hold the thumbscrews, and using a slight downward pressure, pull evenly on the screws to disengage the I/O module.**

6.2.3   Installing a SCSI I/O Module

1. **With the power still off, slide the I/O module into the chassis far enough to engage the thumbscrews.**

Caution – Be sure that the I/O module is properly inserted into the guide rails.

2. **Turn the thumbscrews on the left and right sides of the I/O module clockwise as tight as possible without using a screwdriver. Then push firmly with a single firm, two-handed push which should move the module about 1 cm.**

3. **Tighten the thumbscrews again. Then push firmly with a single firm, two-handed push. Tighten the thumbscrews again until finger-tight.**

> **Note –** An improperly seated I/O module commonly causes SCSI channel errors.

4. **Reinstall all SCSI cables in their original positions.**

5. **Power on both power supply modules.**

6.3 Replacing the SCSI Terminator Module

Be sure to follow "Static Electricity Precautions" on page 1-4.

6.3.1 Removing the SCSI Terminator Module

1. **Power off both power supply modules on the array.**

   Although the terminator module is technically hot-swappable, most users power off the array because the procedure requires that you will be removing and reinserting three modules during the procedure.

> **Caution –** Connected hosts must be inactive during this replacement procedure.

2. **Remove all serial and Ethernet cables connected to the controller modules.**

3. **Remove both controller modules:**

   a. **Turn the thumbscrews on the left and right sides of each controller module counterclockwise until the thumbscrews are disengaged from the chassis.**

   b. **Hold the thumbscrews and pull out the controller module.**

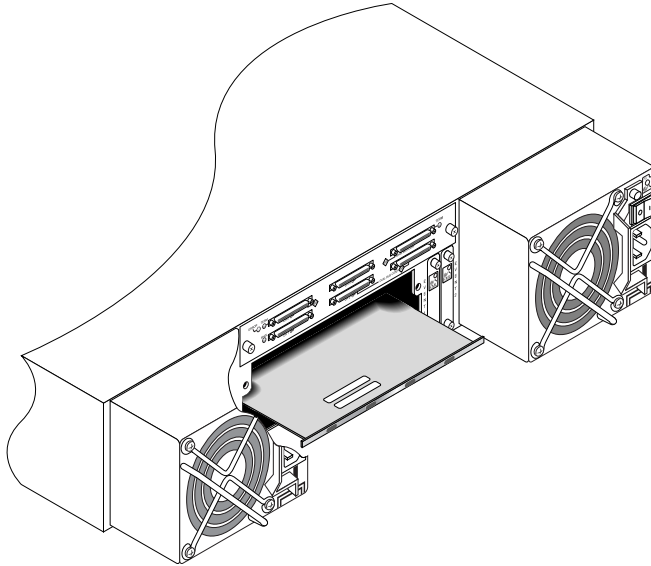4. **Hold the terminator module by the front edges, and pull it out of the chassis.**

FIGURE 6-1 The Terminator Module Partially Pulled Out of the Chassis

6.3.2 Installing a Terminator Module

1. **Keep the array powered off.**

2. **Slide the terminator module into the chassis until it is seated in the backplane.**

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

---

3. **Reinstall both controller modules:**

   a. **Gently slide each controller module into the unit until the module is seated in the backplane.**

   b. **Turn the thumbscrews on the left and right side of the controller module clockwise until they are finger-tight, to secure the module.**

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

---

4. **Reinstall the serial and Ethernet cables in their original positions.**

5. **Power on both power supply modules of the array.**

6.4 Replacing the EMU Module

Be sure to follow "Static Electricity Precautions" on page 1-4. The EMU module is hot-swappable and can be replaced with the array powered on.
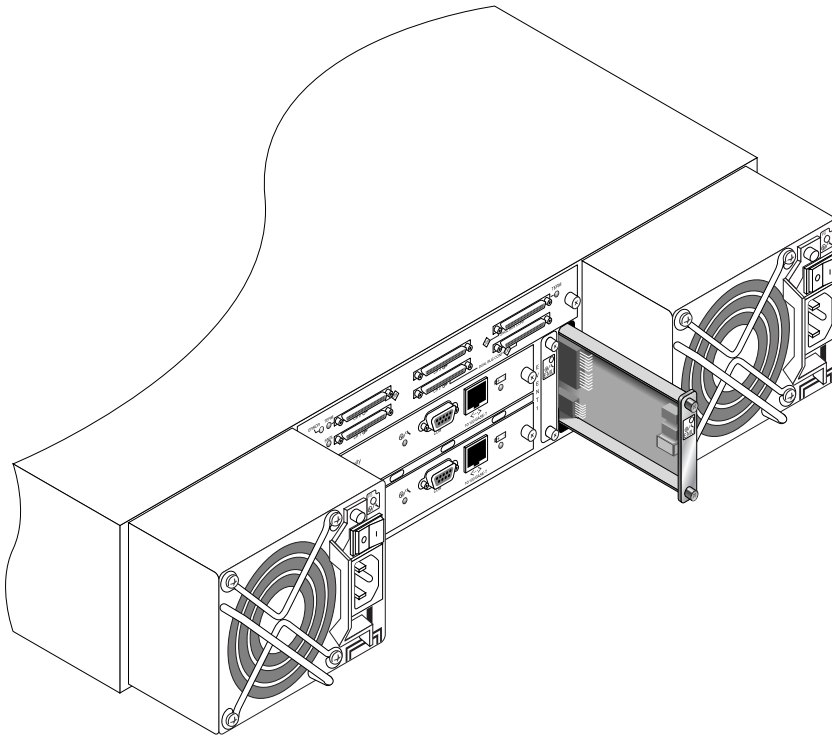
FIGURE 6-2   The EMU Module Partially Pulled out of the Chassis

6.4.1 Removing an EMU Module

1. **With the power on, and turn the thumbscrews on the top and bottom of an EMU module counterclockwise until the thumbscrews are disengaged from the chassis.**

2. **Hold the thumbscrews, and pull out the EMU module.**

6.4.2   Installing an EMU Module

1. **With the power on, slide the new EMU module into the chassis until it is firmly seated in the backplane and the module's front panel is flush with the chassis.**

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

---

2. **Turn the thumbscrews on the top and bottom of the EMU module clockwise until they are finger-tight, to secure the module.**

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

6.5   Installing a RAID/Expansion Chassis FRU

The Sun StorEdge 3310 SCSI array box FRU includes a chassis, its drive midplane, and its backplane. This product is ordered to replace a box that has been damaged or whose midplane or backplane has been damaged.

To make a fully functional array, you need to add the following parts from the replaced array:

- Drive modules
- Two power supply/fan modules
- Two EMU modules
- One or two JBOD I/O modules (for an expansion unit or JBOD)
- One or two RAID I/O modules (for a RAID array)
- One or two RAID controllers (for a RAID array)
- One terminator module

To install the individual modules, use the replacement instructions provided in this guide.

To configure the array, refer to the installation manual for your array, located on your Sun StorEdge 3000 Family Documentation CD.

To replace the chassis frame of an existing RAID array or expansion unit, perform the following steps.

1. **Connect to the firmware application via the serial interface (tip for Solaris/Linux) or via telnet.**

Caution – Connected hosts must be inactive during this replacement procedure.

2. **If the defective array is a RAID array:**

   From the Main Menu, choose "view and edit Configuration parameters," then choose "Controller Parameters."

   Write down the Controller Unique Identifier (hex) - value.

3. **Power off both power supply modules on the defective array.**

4. **Ensure all SCSI cables attached to the I/O module are labeled clearly.**

5. **Write down the defective array's cabling configuration.**

6. **Remove all SCSI cables attached to the I/O module.**

7. **If the defective array is a RAID array, remove all serial and Ethernet cables connected to the RAID controllers.**

8. **Label each disk drive with its disk slot position in the array.**

9. **Remove the RAID controllers (if applicable), terminator board (if applicable), I/O module(s), EMUs, power supply modules, and disk drives from the defective array.**

10. **Remove the defective chassis.**

11. **Obtain the replacement chassis.**

12. **Re-install all previously removed modules in their original positions in the replacement array.**

13. **Reinstall all SCSI, serial, Ethernet, and power cables in their original positions.**

14. **Power on both power supply modules on the replacement array.**

15. **If the replacement array is an expansion unit or JBOD, refer to your installation manual to configure it.**

16. **If the replacement chassis is a RAID array, proceed with the following steps:**

a. Connect to the array console menu interface via the serial interface (tip for Solaris/Linux) or via telnet.

b. From the Main Menu, choose "view and edit Configuration parameters," then "Controller Parameters."

c. Select "Controller Unique Identifier (hex)."

17. If this array is being used by clustered hosts, or for any other reason its attached hosts require that their Device IDs remaining consistent, perform these steps:

a. Set Controller Unique Identifier (hex) to the value you wrote down in step 2.

b. Reset the RAID Controllers: From the Main Menu, choose "system Functions," then "Reset controller." Confirm Yes when prompted.

c. Proceed with step 19.

18. If this array is NOT being used by clustered hosts, perform these steps:

a. On the firmware main menu, choose "view and edit Configuration parameters," then choose "Controller Parameters," and press Return.

```
 ─────────── < Main Menu > ───────────
   Quick installation
   view and edit Logical drives
   view and edit logical Uolumes
   view and edit Host luns
   view and edit scsi Drives
   view and edit Scsi channels
   view and edit  onfiguration parameters
   u ┌──────────────────────────────────────┐
   s │ Communication Parameters             │
   u │ Caching Parameters                   │
   u │ Host-side SCSI Parameters            │
     │ Drive-side SCSI Parameters           │
   ──│ Disk Array Parameters                │──
     │ Redundant Controller Parameters      │
     │ Controller Parameters                │
     │ DMEP Parameters                      │
     └──────────────────────────────────────┘
```

b. From the Controller Parameters menu, choose "Controller Unique Identifier <hex>" and press Return.

c. Type in the value 0 (to automatically read the chassis serial number from the midplane).

The value 0 is immediately replaced with the hex value of the chassis serial number.

```
──────── < Main Menu > ────────
 Quick installation
 view and edit Logical drives
 view and edit logical Volumes
 view and edit Host luns
 view and edit scsi Drives
 view and edit Scsi channels
 view
  v ┌─── Controller Name - Not Set
  s │ C  LCD Title Display - Controller Logo
  v │ C  Password Validation Timeout - Always Check
  v │ H  Controller Unique Identifier(Hex) - 2F18
    │ D  S
    │ D  S ┌────────────────────────────────────┐
    │ R  └ │  Controller Unique Identifier(Hex): 2F18 │
  Cont     └────────────────────────────────────┘
  DMEP
```

   d. **To implement the revised parameter value, choose "system Functions" on the Main Menu, choose "Reset Controller" and press Return.**

19. **Connect the array to hosts according to the configuration identified in Step 4 and Step 5. The chassis replacement is now complete.**

6.6   Special JBOD Usage With External Terminators

The external terminator is necessary only during certain maintenance tasks performed with a Sun StorEdge 3310 SCSI JBOD dual bus configuration, which is connected directly to multiple servers in a clustering environment (most often, the Sun Cluster environment). With many maintenance tasks, you remove a failed or outdated part and replace it immediately; this is standard procedure.

However, if you have an unusual situation and need to remove a host connection from the JBOD for a prolonged period, you might need to preserve the other host connections and activity on the JBOD.

The Sun SCSI LVD/MSE external terminator is part number XTA-3310-SC-TERM (595-6750-01).

6.6.1   External Terminators for Special Dual-Bus JBOD Maintenance

If you have JBOD I/O modules, part number 370-5396-02/50 or higher, use this information.

Note – This new I/O module supports both single-initiator and multi-initiator dual-bus configurations. The older I/O module supports only single-initiator dual-bus configurations.

If you have earlier I/O modules and do not have JBOD I/O modules, part number 370-5396-02/50 or higher, see "Older JBOD Dual-Bus Configurations" on page 6-16.

To preserve all original SCSI IDs and correct termination on a dual-bus JBOD in a cluster environment, insert an external terminator in all cases where a SCSI port becomes empty that was not empty in the original configuration. This maintains the SCSI drive IDs for the active host connections. For an example of two removed cables and two inserted terminators, see FIGURE 6-3.

In a dual-bus configuration, the SCSI IDs change according to the termination on the SCSI ports. If your original configuration has both SCSI ports connected on a bus connected to host(s), the SCSI IDs are 0 to 5. If only the bottom port is connected to a host, the SCSI drive IDs are 8 to 13.
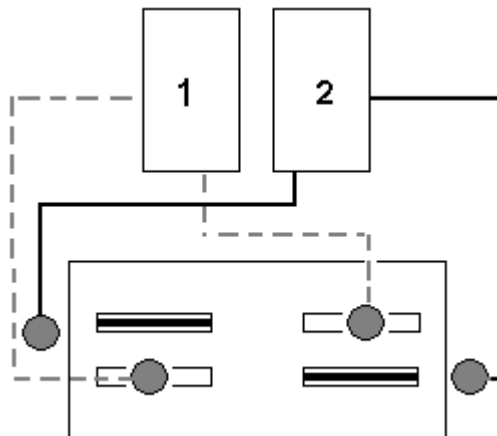

FIGURE 6-3   Two Terminators for Two Cables That Have Been Removed in a Dual-Bus Configuration

Caution – SCSI IDs are based on the cabling of the array when the array is powered up. If you are removing host connections from a dual-host dual-bus multi-initiator configuration, use terminators to preserve the existing SCSI ID assignments (as well as the termination on the bottom SCSI ports).

To keep other host connections operational while one host connection is temporarily removed, perform the following steps.

1. **Stop all host I/O activity on the host bus where the removal of a cable will occur.**

2. **Disconnect the array from the host SCSI cable of the server that requires the maintenance work from the array.**

3. **Insert the external terminator into the empty SCSI port on the array.**

   The external terminator preserves the original SCSI IDs.

4. **Resume host I/O activity on the remaining host(s).**

6.6.2 Older JBOD Dual-Bus Configurations

If you have earlier I/O modules and do not have JBOD I/O modules part number 370-5396-02/50 or higher, use the information in this section.

Note – The older I/O modules only supported single-initiator dual-bus configurations.

In a dual-bus configuration, the SCSI IDs change according to the termination on the SCSI ports. If your original configuration has both SCSI ports connected on a bus connected to host(s), the SCSI IDs are 0 to 5. If only the bottom port is connected to a host, the SCSI IDs are 8 to 15. To preserve all original SCSI IDs and correct termination on a dual bus JBOD in a cluster environment, insert an external terminator in all cases where a top SCSI port is empty but was not empty in the original configuration.

Note – As a general rule, external terminators are necessary in JBOD configurations (for JBOD configuration information, refer to the *Sun StorEdge 3310 SCSI Installation, Operation, and Service Manual*). The two bottom SCSI ports on the JBOD are typically terminated with an HBA host connection or a SCSI jumper cable. The upper I/O SCSI connectors are autoterminated. Single-bus JBOD cabling does not require an external terminator at any time; only the dual-bus JBOD cabling in the cluster environment has the one condition where external terminators are required.

Caution – In a cluster configuration, adding a separate host connection that was not originally planned for the array will cause a change in SCSI IDs and therefore loses access to data stored under the original SCSI IDs.

To keep other host connections operational while one host connection is temporarily removed, perform the following steps.

1. **Stop all host I/O activity on the host bus where the removal of a cable will occur.**

2. **Disconnect the array from the host SCSI cable of the server that requires the maintenance work from the array.**

3. **In a dual bus configuration, if two hosts are connected to one bus, and the host cable to the bottom port of the array is disconnected, move the cable of the top port to the bottom port.**

   The moved cable provides termination to the bottom port.

4. **Insert the external terminator into the empty top SCSI port on the array.**

   The external terminator preserves the original SCSI IDs, which are 0 to 5 on each bus that has two host connections established.

5. **Resume host I/O activity on the remaining host(s).**

You can have situations in which one or two SCSI cables are temporarily removed from a standard SCSI array configuration.
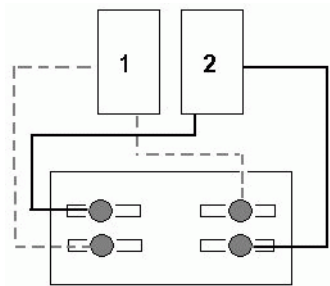

**FIGURE 6-4**   Example of a SCSI Array Configuration

In each of the four scenarios in FIGURE 6-5 and FIGURE 6-6, a single cable was removed from the original configuration shown in FIGURE 6-4. In each of these scenarios one external terminator was required.

Note – The bottom input ports support only host SCSI connections and do not support external terminators.

Scenario #1

Disconnect 1 cable from A-IN port:

1. Disconnect Host 1 cable from port A-IN.
2. Unplug cable from port A-OUT and move it to port A-IN.
3. Install a terminator in port A-OUT.
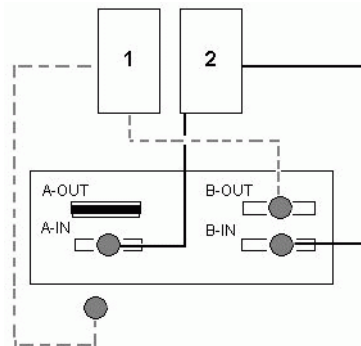
Scenario #2

Disconnect 1 cable from B-IN port:

1. Disconnect Host 1 cable from port B-IN.
2. Unplug cable from port B-OUT and move it to port B-IN.
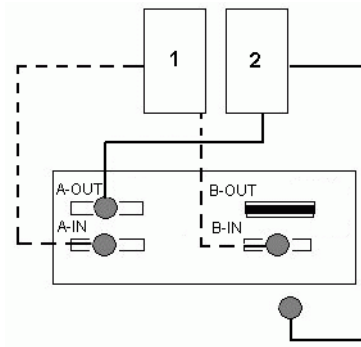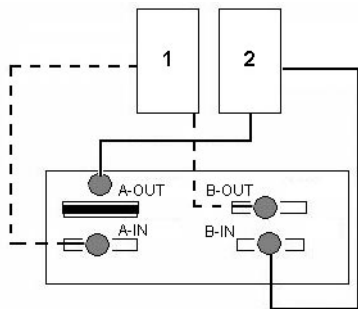3. Install a terminator in port B-OUT.

FIGURE 6-5   Removing a Single Cable From an IN Port in a Two-Host Configuration

Scenario #3

Disconnect 1 cable from A-OUT port:

1. Disconnect Host 1 cable from port A-OUT.
2. Install a terminator in port A-OUT.

Scenario #4

Disconnect 1 cable from B-OUT port:

1. Disconnect Host 1 cable from port B-OUT.
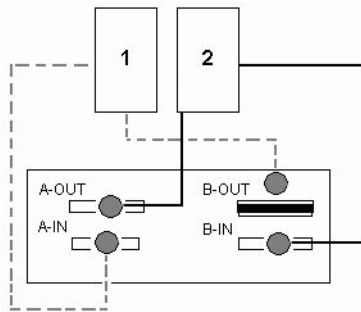2. Install a terminator in port B-OUT.

FIGURE 6-6   Removing a Single Cable From an OUT Port in a Two-Host Configuration

6.7 Installing a Filler Panel on a SCSI Array

The filler panel FRU is a single metal panel used to cover an empty controller module slot on the rear of a Sun StorEdge 3310 SCSI array. Most often, this occurs when you wish to remove a controller module and change a dual-controller array to a single-controller array. The filler panel protects the interior of the array.

To install a filler panel, perform the following steps.

1. **Remove the controller module according to "Removing a SCSI Controller Module" on page 6-2.**

2. **Position the filler panel so that it covers the empty slot and the thumbscrews overlay the thumbscrew holes.**

3. **Turn the thumbscrews on the left and right sides of the filler panel clockwise until the thumbscrews are finger-tight, to secure the panel on the array.**

1U SCSI Module FRUs

This chapter provides instructions for removing and installing field-replaceable units (FRUs) which are specific to the Sun StorEdge 3120 SCSI array. FRU components can be replaced by customers or by Sun service representatives.

Note – Be sure to follow "Static Electricity Precautions" on page 1-4for all procedures.

7.1 Installing an Expansion Chassis FRU

The Sun StorEdge 3120 SCSI array box FRU includes a chassis, its drive midplane, and its backplane. This product is ordered to replace a box that has been damaged or whose midplane, backplane, or terminator module has been damaged.

To make a fully functional array, you need to add the following parts from the replaced array:

- Drive modules
- Two power supply/fan modules

To install the individual modules, use the replacement instructions provided in this guide.

To configure the array, refer to the installation manual for your array, located on your Sun StorEdge 3000 Family Documentation CD.

To replace the chassis frame of an existing JBOD, perform the following steps.

Caution – Connected hosts must be inactive during this replacement procedure.

> **Note –** Be sure to follow "Static Electricity Precautions" on page 1-4 for all procedures.

1. **Power off both power supply modules on the defective array.**

2. **Ensure all SCSI cables attached to the I/O module are labeled clearly.**

3. **Write down the defective array's cabling configuration.**

4. **Write down the SCSI ID switch setting, right or left.**

   The IDs assigned for disks 1 through 4 depend on the switch settings on the array. The right switch setting uses IDs 8, 9, 10, and 11. The left switch setting uses IDs 12, 13, 14, and 15.

5. **Remove all SCSI cables attached to the I/O module.**

6. **Label each disk drive with its disk slot position in the array.**

7. **Remove the power supply modules and disk drives from the defective array.**

8. **Remove the defective chassis.**

9. **Obtain the replacement chassis.**

10. **Re-install all previously removed modules in their original positions into the replacement array.**

11. **Re-install all SCSI and power cables in their original positions.**

12. **Set the SCSI ID switch to right or left depending on your previous configuration.**

> **Note –** SCSI IDs are set based on the switch setting on the array when it is powered on. If you change the switch setting, the SCSI IDs will change after you power off, and then power on.

13. **Power on both power supply modules on the replacement array.**

14. **Refer to your installation manual to configure the JBOD.**