SANnet® II Family FRU
Installation Guide

March 2005
83-00002708, Revision F
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Preface

This manual provides instructions for removing and installing field-replaceable units (FRUs) in:

- SANnet II 200 SCSI arrays
- SANnet II 220 SCSI arrays
- SANnet II 200 FC arrays
- SANnet II 200 SATA arrays
- SANnet II 200 SATA Special Edition (SE) arrays
- SANnet II 100 Blade SCSI arrays
- SANnet II 110 Blade SCSI arrays

Instructions are also included for FRUs which are common to all seven arrays. These FRU components can be replaced by customers or by Dot Hill-trained personnel.

**Note** – FRU installation procedures for SANnet II 200 FC, SANnet II 200 SATA, and SANnet II 200 SATA SE arrays are identical except where differences are identified in this manual.

Removal and installation instructions are provided for the following FRUs:

- Disk drives and air management sleds
- Power and fan modules
- Controller, expansion unit, and JBOD modules
- Special use FRUs, such as small form-factor pluggable transceivers (SFPs), filler panels, and battery modules
- EMU modules
- Terminator modules

**Caution** – Before beginning any procedure in this manual, read the *SANnet II Family Safety, Regulatory, and Compliance Manual.*
How This Book Is Organized

This book contains the following topics:

Chapter 1 lists the available FRUs for all the SANnet II arrays and provides precautions and procedures for maintaining and replacing FRUs.

Chapter 2 provides instructions for removing and installing disk drive and air management sled FRUs.

Chapter 3 provides instructions for removing and installing power and fan module FRUs.

Chapter 4 provides instructions for removing and installing batteries and battery modules.

Chapter 5 provides instructions for replacing the LED and reset switch module.

Chapter 6 provides instructions for removing and installing field-replaceable units (FRUs) in SANnet II 200 FC, SATA, and SATA SE arrays.

Chapter 7 provides instructions for removing and installing field replaceable units (FRUs) in SANnet II 200 SCSI, SANnet II 220 SCSI, SANnet II 100 Blade SCSI, and in SANnet II 110 Blade SCSI JBOD arrays.

Typographic Conventions

<table>
<thead>
<tr>
<th>Typeface</th>
<th>Meaning</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>AaBbCc123</td>
<td>The names of commands, files, and directories; on-screen computer output</td>
<td>Edit your .login file. Use ls -a to list all files. % You have mail.</td>
</tr>
<tr>
<td>text</td>
<td>Computer menu</td>
<td>Click Start.</td>
</tr>
<tr>
<td>AaBbCc123</td>
<td>Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.</td>
<td>Read Chapter 6 in the User’s Guide. These are called class options. You must be a superuser to do this. To delete a file, type rm filename.</td>
</tr>
</tbody>
</table>

1. The settings on your browser might differ from these settings.
Technical Support

For late-breaking Release Notes and all manuals for this product, go to the SANnet II 200 SCSI, SANnet II 220 SCSI, SANnet II 200 FC, SANnet II 200 SATA, SANnet II 200 SATA SE, or the SANnet II 110 Blade array section depending on which array you have, at:

http://www.dothill.com/manuals

The following information may be required when contacting Technical Support: Dot Hill serial number and part number of hardware; version of Dot Hill supplied software; host computer platform and operating system version; description of the problem and any related error messages.

Also supply the following information to facilitate our tracking system and improve our response time: customer name, company name; state and country; telephone number with area code; Internet mail address; maintenance contract number, if applicable.

Placing a Support Call

After obtaining the above information, a support call may be placed by Internet mail, fax, or telephone.

Phone: 1-877-DOT7X24 (877-368-7924)
URL: http://www.dothill.com/support/index.htm

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United States (California) Corporate Headquarters
Tel: 1-760-931-5500 or 1-800-872-2783
Fax: 1-760-931-5527
E-mail: support@dothill.com

Netherlands: European Headquarters
Dot Hill Systems Corp., B.V. (Netherlands)
Tel: 31 (0) 53 428 4980; Fax: 31 (0) 53 428 0562
E-mail: bv@dothill.com

Japan: Japanese Headquarters
Nihon Dot Hill Systems Corp., Ltd.
Tel: 81-3-3251-1690; Fax: 81-3-3251-1691
E-mail: nihon@dothill.com

For additional sales offices in the U.K., China, Sweden, Germany, France, Israel, and Singapore, refer to:

http://www.dothill.com/company/offices.htm
Dot Hill Welcomes Your Comments

Dot Hill is interested in improving its documentation and welcomes your comments and suggestions. You can email your comments to:

support@dothill.com

Include the part number (83-00002708) of your document in the subject line of your email.
CHAPTER 1

SANnet II Family FRUs

This chapter lists the available FRUs for all the SANnet II arrays and provides precautions and procedures for maintaining and replacing FRUs. This chapter includes the following topics:

- “Available FRUs” on page 1-1
- “Static Electricity Precautions” on page 1-9
- “Powering Off the Array” on page 1-9
- “Powering On the Array” on page 1-10

1.1 Available FRUs

Most FRUs are hot-swappable except a few modules which are hot-serviceable. Hot-swappable means that a live upgrade can be performed—the FRU can be removed and replaced while the RAID array is powered on and operational. Hot-serviceable means that the module can be replaced while the RAID product and hosts are powered on, but the connected hosts must be inactive.

Caution – Follow the FRU procedures carefully to ensure successful FRU replacement.

The following tables list the FRUs that are currently available. For additional FRUs, consult your sales representative or the Release Notes for your array.
Table 1-1 List of Available FRUs for the SANnet II 200 SCSI Array

<table>
<thead>
<tr>
<th>FRU Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMU001-02</td>
<td>Event monitoring unit</td>
</tr>
<tr>
<td>FIOM002-04</td>
<td>I/O module, LVD, expansion unit or JBOD</td>
</tr>
<tr>
<td>FIOM001-04</td>
<td>I/O module, LVD, RAID</td>
</tr>
<tr>
<td>FCTL001-04</td>
<td>Controller module, 512 memory, battery, 1U / 2U LVD, Firmware 3.25</td>
</tr>
<tr>
<td>FCTL001-05</td>
<td>Controller module, 512 memory, battery, 1U / 2U LVD, Firmware 4.11</td>
</tr>
<tr>
<td>FTRM001-01</td>
<td>Terminator module</td>
</tr>
<tr>
<td>FDRV018-01</td>
<td>Drive module, 73 GB LVD, 10K RPM</td>
</tr>
<tr>
<td>FDRV020-01</td>
<td>Drive module, 146 GB LVD, 10K RPM</td>
</tr>
<tr>
<td>FDRV022-01</td>
<td>Drive module, 300 GB LVD, 10K RPM</td>
</tr>
<tr>
<td>FDRV005-01</td>
<td>Drive module, 36 GB LVD, 15K RPM</td>
</tr>
<tr>
<td>FDRV006-01</td>
<td>Drive module, 73 GB LVD, 15K RPM</td>
</tr>
<tr>
<td>FPSA003-01</td>
<td>AC power and fan module, 2U</td>
</tr>
<tr>
<td>FPSD003-01</td>
<td>DC power and fan module, 2U</td>
</tr>
<tr>
<td>FDRV001-01</td>
<td>Air management sled</td>
</tr>
<tr>
<td>FBAT001-01</td>
<td>Battery, LVD</td>
</tr>
<tr>
<td>CBL-U3-VHD-VHD-01</td>
<td>Cable, LVD, 1-foot, jumper</td>
</tr>
<tr>
<td>FCBL002-01</td>
<td>Cable, LVD, 1.5-foot, expansion</td>
</tr>
<tr>
<td>FENC002-001</td>
<td>Box, 2U, JBOD, LVD</td>
</tr>
<tr>
<td>FENC001-001</td>
<td>Box, 2U, RAID, LVD</td>
</tr>
<tr>
<td>FHDW001-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 22- to 28-in. deep</td>
</tr>
<tr>
<td>FHDW002-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 28- to 36-in. deep</td>
</tr>
<tr>
<td>FHDW004-01*</td>
<td>Kit, rackmount center mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FHDW003-01*</td>
<td>Kit, rackmount flush mount, 2U, 19-in. wide</td>
</tr>
</tbody>
</table>

* Refer to the SANnet II 200 Family Rack Installation Guide for 2U Arrays for rack kit instructions.

**Caution** – You can mix capacity in the same chassis, but not spindle speed (RPM) on the same SCSI bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 15K RPM drives. Violating this configuration guideline leads to poor performance.
Refer to the SANnet II 200 Family Rack Installation Guide for 2U Arrays for rack kit instructions.

Caution – You can mix capacity in the same chassis, but not spindle speed (RPM) on the same SCSI bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 15K RPM drives. Violating this configuration guideline leads to poor performance.

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<td>Event monitoring unit</td>
</tr>
<tr>
<td>FIOM004-01</td>
<td>I/O module, LVD, expansion unit or JBOD</td>
</tr>
<tr>
<td>FIOM003-01</td>
<td>I/O module, LVD, RAID</td>
</tr>
<tr>
<td>FCTL008-01</td>
<td>Controller module, 512 memory, battery, 2U LVD, Firmware 4.11</td>
</tr>
<tr>
<td>FTRM001-01</td>
<td>Terminator module</td>
</tr>
<tr>
<td>FDRV018-01</td>
<td>Drive module, 73 GB LVD, 10K RPM</td>
</tr>
<tr>
<td>FDRV020-01</td>
<td>Drive module, 146 GB LVD, 10K RPM</td>
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<td>Drive module, 73 GB LVD, 15K RPM</td>
</tr>
<tr>
<td>FPSA003-01</td>
<td>AC power and fan module, 2U</td>
</tr>
<tr>
<td>FPSD003-01</td>
<td>DC power and fan module, 2U</td>
</tr>
<tr>
<td>FDRV001-01</td>
<td>Air management sled</td>
</tr>
<tr>
<td>FBAT001-01</td>
<td>Battery, LVD</td>
</tr>
<tr>
<td>CBL-U3-VHD-VHD-01</td>
<td>Cable, LVD, 1-foot, jumper</td>
</tr>
<tr>
<td>FCBL002-01</td>
<td>Cable, LVD, 1.5-foot, expansion</td>
</tr>
<tr>
<td>FENC002-001</td>
<td>Box, 2U, JBOD, LVD</td>
</tr>
<tr>
<td>FENC001-001</td>
<td>Box, 2U, RAID, LVD</td>
</tr>
<tr>
<td>FHDW001-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 22- to 28-in. deep</td>
</tr>
<tr>
<td>FHDW002-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 28- to 36-in. deep</td>
</tr>
<tr>
<td>FHDW004-01*</td>
<td>Kit, rackmount center mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FHDW003-01*</td>
<td>Kit, rackmount flush mount, 2U, 19-in. wide</td>
</tr>
</tbody>
</table>

* Refer to the SANnet II 200 Family Rack Installation Guide for 2U Arrays for rack kit instructions.
Table 1-3 List of Available FRUs for the SANnet II 200 FC Array

<table>
<thead>
<tr>
<th>FRU Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FENC003-02</td>
<td>Box, 2U, FC, Chassis + Backplane (RAID/JBOD)</td>
</tr>
<tr>
<td>FBAT002-02</td>
<td>Battery, FC, 2U</td>
</tr>
<tr>
<td>FCBL003-02</td>
<td>Cable, FC, 1.5-foot, expansion</td>
</tr>
<tr>
<td>FCTL002-05</td>
<td>I/O w/SES, RAID FC, 2U, Firmware 3.27</td>
</tr>
<tr>
<td>FCTL002-06</td>
<td>I/O w/SES, RAID FC, 2U, Firmware 4.11</td>
</tr>
<tr>
<td>FCTL003-05</td>
<td>I/O w/SES, JBOD FC, 2U</td>
</tr>
<tr>
<td>FPSA003-01</td>
<td>AC power and fan module, 2U</td>
</tr>
<tr>
<td>FPSD003-01</td>
<td>DC power and fan module, 2U</td>
</tr>
<tr>
<td>FDRV008-01</td>
<td>Drive module, 73 GB FC, 10K RPM</td>
</tr>
<tr>
<td>FDRV009-01</td>
<td>Drive module, 146 GB FC, 10K RPM</td>
</tr>
<tr>
<td>FDRV010-01</td>
<td>Drive module, 36 GB FC, 15K RPM</td>
</tr>
<tr>
<td>FDRV011-01</td>
<td>Drive module, 73 GB FC, 15K RPM</td>
</tr>
<tr>
<td>FDRV023-01</td>
<td>Drive module, 300 GB FC, 15K RPM</td>
</tr>
<tr>
<td>FDRV001-01</td>
<td>Air management sled</td>
</tr>
<tr>
<td>FHDW001-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 22- to 28-in. deep</td>
</tr>
<tr>
<td>FHDW002-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 28- to 36-in. deep</td>
</tr>
<tr>
<td>FHDW004-01*</td>
<td>Kit, rackmount center mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FHDW003-01*</td>
<td>Kit, rackmount flush mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FSFP001-01</td>
<td>SFP, 2G, SW 850NM, FC, TRANS</td>
</tr>
</tbody>
</table>

* Refer to the SANnet II 200 Family Rack Installation Guide for 2U Arrays for rack kit instructions.
Table 1-4 List of Available FRUs for the SANnet II 200 SATA Array

<table>
<thead>
<tr>
<th>FRU Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FENC006-01</td>
<td>Box, 2U, SATA, Chassis + Backplane (RAID/JBOD)</td>
</tr>
<tr>
<td>FBAT002-02</td>
<td>Battery, FC, 2U</td>
</tr>
<tr>
<td>FCBL003-02</td>
<td>Cable, FC, 1.5-foot, expansion</td>
</tr>
<tr>
<td>FCTL005-02</td>
<td>I/O, RAID CONT SATA, 1 GB Memory, Battery, 2U, Firmware 3.27</td>
</tr>
<tr>
<td>FCTL005-03</td>
<td>I/O, RAID CONT SATA, 1 GB Memory, Battery, 2U, Firmware 4.11</td>
</tr>
<tr>
<td>FCTL006-02</td>
<td>I/O, JBOD SATA, 2U</td>
</tr>
<tr>
<td>FPSA003-01</td>
<td>AC power and fan module, 2U</td>
</tr>
<tr>
<td>FPSD003-01</td>
<td>DC power and fan module, 2U</td>
</tr>
<tr>
<td>FDRV015-01</td>
<td>Drive module, 250 GB SATA, 7K RPM</td>
</tr>
<tr>
<td>FDRV016-01</td>
<td>Drive module, 400 GB SATA, 7K RPM</td>
</tr>
<tr>
<td>FDRV001-01</td>
<td>Air management sled</td>
</tr>
<tr>
<td>FHDW001-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 22- to 28-in. deep</td>
</tr>
<tr>
<td>FHDW002-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 28- to 36-in. deep</td>
</tr>
<tr>
<td>FHDW004-01*</td>
<td>Kit, rackmount center mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FHDW003-01*</td>
<td>Kit, rackmount flush mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FSFP001-01</td>
<td>SFP, 2G, SW 850NM, FC, TRANS</td>
</tr>
</tbody>
</table>

* Refer to the SANnet II 200 Family Rack Installation Guide for 2U Arrays for rack kit instructions.
### Table 1-5 List of Available FRUs for the SANnet II 200 SATA SE Array

<table>
<thead>
<tr>
<th>FRU Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FENC006-01</td>
<td>Box, 2U, SATA, Chassis + Backplane (RAID/JBOD)</td>
</tr>
<tr>
<td>FBAT002-02</td>
<td>Battery, FC, 2U</td>
</tr>
<tr>
<td>FCBL003-02</td>
<td>Cable, FC, 1.5-foot, expansion</td>
</tr>
<tr>
<td>FCTL007-03</td>
<td>I/O, RAID CONT SATA, 256 MB Memory, 2U, Firmware 3.27</td>
</tr>
<tr>
<td>FCTL007-04</td>
<td>I/O, RAID CONT SATA, 256 MB Memory, 2U, Firmware 4.11</td>
</tr>
<tr>
<td>FPSA003-01</td>
<td>AC power and fan module, 2U</td>
</tr>
<tr>
<td>FDRV015-01</td>
<td>Drive module, 250 GB SATA, 7K RPM</td>
</tr>
<tr>
<td>FDRV016-01</td>
<td>Drive module, 400 GB SATA, 7K RPM</td>
</tr>
<tr>
<td>FDRV001-01</td>
<td>Air management sled</td>
</tr>
<tr>
<td>FHDW001-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 22- to 28-in. deep</td>
</tr>
<tr>
<td>FHDW002-01*</td>
<td>Kit, rackmount, 2U, 19-in. wide, 28- to 36-in. deep</td>
</tr>
<tr>
<td>FHDW004-01*</td>
<td>Kit, rackmount center mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FHDW003-01*</td>
<td>Kit, rackmount flush mount, 2U, 19-in. wide</td>
</tr>
<tr>
<td>FSFP001-01</td>
<td>SFP, 2G, SW 850NM, FC, TRANS</td>
</tr>
</tbody>
</table>

* Refer to the SANnet II 200 Family Rack Installation Guide for 2U Arrays for rack kit instructions.
* Refer to the SANnet II 100 Family Rack Installation Guide for 1U Arrays for rack kit instructions.

**Caution** – You can mix capacity in the same chassis, but not spindle speed (RPM) on the same SCSI bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 15K RPM drives. Violating this configuration guideline leads to poor performance.
Table 1-7 List of Available FRUs for the SANnet II 110 Blade JBOD Array

<table>
<thead>
<tr>
<th>FRU Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FENC007-03</td>
<td>1U JBOD, LVD, Chassis + I/O board with SAF-TE</td>
</tr>
<tr>
<td>FPSA002-01</td>
<td>AC power supply and fan module, 1U</td>
</tr>
<tr>
<td>FPSD002-01</td>
<td>DC power supply and fan module, 1U</td>
</tr>
<tr>
<td>FCBL001-01</td>
<td>Cable, LVD, 1-foot, jumper</td>
</tr>
<tr>
<td>FCBL002-01</td>
<td>Cable, LVD, 1.5-foot, expansion</td>
</tr>
<tr>
<td>FDRV005-02</td>
<td>Drive module, 36 GB LVD, 15K RPM</td>
</tr>
<tr>
<td>FDRV018-01</td>
<td>Drive module, 73 GB LVD, 10K RPM</td>
</tr>
<tr>
<td>FDRV020-01</td>
<td>Drive module, 73 GB LVD, 15K RPM</td>
</tr>
<tr>
<td>FDRV004-02</td>
<td>Drive module, 146 GB LVD, 10K RPM</td>
</tr>
<tr>
<td>FHDW006-01</td>
<td>Kit, rackmount, 1U, 19-in. wide, 22- to 28-in. deep</td>
</tr>
<tr>
<td>FHDW007-01</td>
<td>Kit, rackmount, 1U, 19-in. wide, 28- to 36-in. deep</td>
</tr>
<tr>
<td>FHDW008-01</td>
<td>Kit, Telco rackmount flush mount, 1U, 19-in. wide</td>
</tr>
<tr>
<td>FHDW009-01</td>
<td>Kit, Telco rackmount center mount, 1U, 19-in. wide</td>
</tr>
<tr>
<td>FDRV001-01</td>
<td>Air management blank sled</td>
</tr>
</tbody>
</table>

* Refer to the SANnet II 100 Family Rack Installation Guide for 1U Arrays for rack kit instructions.

**Caution** – You can mix capacity in the same chassis, but not spindle speed (RPM) on the same SCSI bus. For instance, you can use 36 Gbyte and 73 Gbyte drives with no performance problems if both are 15K RPM drives. Violating this configuration guideline leads to poor performance.
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 array, 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.

**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.

1.3 Powering Off the Array

Almost all FRU procedures are either hot-serviceable or hot-swappable except for the chassis replacement procedure. However, you might need to power off the array (both power supplies) if you relocate the array or perform certain maintenance procedures with its associated servers.

**Caution** – If controllers are not shut down from the firmware application or the CLI before an array is powered off, data that is written to cache and data that has not been completely written to the disks will be lost.

Before you power off both power supplies, you must perform the following steps which require shutting down the controller(s).

1. Stop all I/O activity to the array.
2. Shut down the controller with one of the following commands:
   - Firmware application **Shutdown Controller** command (system Functions → Shutdown controller)
SANscape Command-Line Interface (CLI) *shutdown controller* command

These commands first halt all I/O activity, and then write the contents of cache to the drives.

3. Power off both power supply/fan modules.

See “Powering On the Array” on page 1-10 for information about turning the array on again.

### 1.4 Powering On the Array

Power on the equipment in the following order so the host computer discovers all connected arrays:

1. Expansion units
2. RAID array
3. Host computers

When the array is powered on and is connected to a Solaris operating system, the **Tip**
connection window displays a series of messages, as shown in the following example.

```
SANnet II Disk Array is installed with 1024MBytes SDRAM
Total SCSI channels: 6
SCSI channel: 0 is a host channel, id: 40
SCSI channel: 1 is a host channel, id: 41
SCSI channel: 2 is a drive channel, id: 14, 15
SCSI channel: 3 is a drive channel, id: 14, 15
SCSI channel: 4 is a host channel, id: 70
SCSI channel: 5 is a host channel, id: 71
Scanning SCSI channels. Please wait a few moments!
Preparing to restore saved persistent reservations. Type 'skip' to skip:
```

Do not use the ‘skip’ option shown at the end of the example. This option is reserved
for support personnel performing testing.
CHAPTER 2

Disk Drive and Air Management Sled FRUs

This chapter provides instructions for removing and installing disk drives and air management sleds and covers the following topics:

Topics covered in this chapter include:
- “Replacing the Front Bezel and Ear Caps” on page 2-1
- “Removing the Front Bezel and Ear Caps” on page 2-1
- “Placing the Bezel and Ear Caps Back Onto the Chassis” on page 2-2
- “Replacing a Disk Drive” on page 2-3
- “Identifying the Defective Disk Drive in a RAID Array” on page 2-4
- “Identifying the Defective Disk Drive in a JBOD Array” on page 2-5
- “Removing a Defective Disk Drive” on page 2-7
- “Installing a New Disk Drive” on page 2-8
- “Scanning the New Drive and Related Procedures for RAID Arrays” on page 2-9
- “Installing an Air Management Sled” on page 2-13

2.1 Replacing the Front Bezel and Ear Caps

Some procedures require that you remove the front bezel and the small vertical plastic caps on either side of the bezel that cover the rackmount tabs. These rackmount tabs are referred to as “ears.”

2.1.1 Removing the Front Bezel and Ear Caps

1. Use the provided key to unlock both bezel locks.

2. Grasp the front bezel cover on both sides and pull it forward and then down.
Note – For many operations, including replacing disk drives, it is not necessary to further detach the bezel, because dropping it down moves it sufficiently out of the way.

3. Press the right bezel arm (hinge) toward the left side to release it from the chassis hole. The left hinge also disengages.

4. Note the location of the chassis bezel holes on each ear.

5. Remove the plastic caps from the front left and right ears of the array.

6. Both plastic caps are removed in the same way.
   a. Squeeze both sides of the cap at the top and the bottom.
   b. Turn the cap toward the center of the array until it disengages and pull it free.

2.1.2 Placing the Bezel and Ear Caps Back Onto the Chassis

Each plastic cap is replaced in the same way, but be sure to place the cap with LED labels on the right ear.

1. Align the inside round notches of the cap with the round cylindrical posts (ball studs) on the ear.

2. Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array first.

3. Continue pushing the top and bottom of the ear cap onto the ear, pressing on the side toward the outside of the array.
   Do not use force when placing a cap on an ear.

Caution – Be careful to avoid compressing the reset button under the plastic cap when you replace the plastic cap on the chassis.

4. Insert the bezel arms into the chassis holes.

5. Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.

6. Use the key to lock both bezel locks.
2.2 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.

![Diagram of disk drive module with labels: Chassis notch, Thumbscrew, Handle pin, Drive handle.]

**Figure 2-1** Front View of a SANnet II 200 Drive Module Pulled Out of the Chassis

**Figure 2-2** Front View of a SANnet II 100 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 (RPM) 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.
2.2.1 Identifying the Defective Disk Drive in a RAID Array

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 data prior to removing the disk drives.

**Note** – To receive automatic email notification of a disk drive failure, set up SANscape or SANscape Alert. For details, refer to the SANscape User's Guide or the SANscape Alert User's Guide.

1. Examine the back of the RAID array 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 → Drive-side Parameters.
   b. Set the Periodic Drive Check Time option to 5 seconds.

3. Find the Channel number and target ID combination (for instance, Chl 0 ID 4) of the disk drive to be replaced:
   a. From the Main Menu, choose view and edit Drives.
   b. Locate the disk drive that has a status of BAD or FAILED in the Status column:
      - Write down the Channel number and 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.

**Figure 2-3** Front Panel of a RAID Array

**Caution** – Failure to identify the correct disk drive might 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 a disk drive.
5. If you are uncertain about the location of a 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 Drives** and press Return.

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

c. Choose **Identify scsi drive →flash all But selected drive** to flash the activity LEDs of all the drives in the drive channel except the selected drive, and press Return.

d. Type a time interval and press Return.

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

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

### 2.2.2 Identifying the Defective Disk Drive in a JBOD Array

A JBOD (Just a Bunch of Disks) is an array that consists of drives with no controllers. Before replacing a disk drive in a JBOD, perform the following steps to ensure that you have identified the correct defective disk for removal from the array.

**Note** – If you are using disk management software or volume management software to manage your disk storage, you might need to perform software operations to take a disk offline before you remove it and after you have replaced a drive to bring it back online. Refer to the documentation that accompanies your disk management software or volume management software for more information.
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 data prior to removing the disk drives.

**Note** – To receive automatic email notification of a disk drive failure, set up SANscape or SANscape Alert. For details, refer to the **SANscape Alert User’s Guide** or the **SANscape User’s Guide**.

1. Examine the back of the array, and record the cable connections.

2. Physically locate the defective disk drive.

   An amber LED next to a drive on the front panel of the JBOD indicates a failed disk drive. For details, refer to the **Installation, Operation, and Service Manual** for your array.

   **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. It is strongly recommended that you back up the data prior to removing disks.

3. Record the Chl and ID number for the defective disk drive (for example, Chl 0 ID 4).

   For descriptions of ID settings, refer to the **Installation, Operation, and Service Manual** for your array.

4. **(Optional.)** In SANscape, a red icon 🔄 in the main window indicates a JBOD drive failure. Review the error log to confirm the disk drive ID for the failed drive.

   For details on the SANscape main window, refer to the **SANscape User’s Guide**.

5. **(Optional.)** In SANscape CLI, run the `show enclosure-status` command. If the drive status is “Absent” the drive may have failed, or has been removed from the chassis.

   For details on the `show enclosure-status` command, refer to the **SANscape CLI User’s Guide**.

### 2.2.3 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. An amber drive LED indicates a drive failure. For details, refer to the **Installation, Operation, and Service Manual** for your array.
Caution – To prevent any possibility of data loss, back up data prior to removing the 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 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.
2.2.4 Installing a New Disk Drive

Caution – When you replace a disk drive, the replacement disk drive must have the same capacity or more than the disk drive which is being replaced. You can mix capacity in the same chassis, but not spindle speed (RPM) 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.

Caution – Be sure to install a disk drive that is appropriate for your array. SANnet II 200 FC array disk drives cannot be used in a SANnet II 200 SATA or SATA SE array. Similarly, a SANnet II 200 SATA or SATA SE disk drive cannot be used in a SANnet II 200 FC array.

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

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.

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

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.
   A green drive LED indicates a functional drive.

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.
   For specific operating system instructions, refer to the SANnet II Installation, Operation, and Service Manual for your array.

7. (Optional.) If you are using SANscape, you can discover the new drives using the software.
   For instructions, refer to the SANscape User’s Guide.

2.2.5 Scanning the New Drive and Related Procedures for RAID Arrays

When a SCSI array is powered on, the controller scans all physical drives that are connected through drive channels. Unlike FC and SATA arrays, if a SCSI array has completed initialization and then a physical drive is connected, the controller does not recognize the new drive until the next controller reset. This difference in behavior is due to differences between Fibre Channel and SCSI architectures and protocols.

SANscape CLI does not have a command that can force the scanning of a SCSI drive. Use the Scan scsi drive firmware application menu option, or reset the controller, to scan a newly added SCSI drive that has been added to a SCSI array.

Neither the Periodic Auto-Detect Failure Drive Swap Check Time firmware application menu option nor the Periodic Drive Check Time menu option force the scanning of a SCSI drive.

2.2.5.1 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 Drives.
   b. Check the 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 Drives. Select any disk drive in the list, 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

<table>
<thead>
<tr>
<th>If this drive status occurs</th>
<th>Perform this task</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the <strong>target logical drive</strong> 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.</td>
<td>Go to “Assigning a Disk Drive as a Spare” on page 2-11</td>
</tr>
<tr>
<td>If the <strong>target logical drive</strong> status is FATAL FAIL, two or more disk drives have failed</td>
<td>All data in the logical drive is lost. Rebuild the logical drive and restore backup data.</td>
</tr>
<tr>
<td>The logical drive status of DRV ABSENT or INCOMPLETE only occurs at chassis power up. DRV ABSENT indicates that one drive is bad. INCOMPLETE indicates that two or more drives are bad.</td>
<td>Go to “Checking and Performing the Correct Power On Sequence” on page 2-10.</td>
</tr>
<tr>
<td>If the <strong>target logical drive</strong> status is DRV FAILED</td>
<td>If this occurs after a new drive has replaced the defective drive, it indicates a bad midplane. Replace the chassis.</td>
</tr>
<tr>
<td>If the <strong>target logical drive</strong> status is REBUILDING</td>
<td>Go to “If the Logical Drive Status is REBUILDING” on page 2-11.</td>
</tr>
</tbody>
</table>

4. After replacing a failed drive, save the configuration settings to NVRAM as described in “Saving the Configuration Settings to NVRAM” on page 7-2. The NVRAM procedure applies to all drives.

When you save the non-volatile RAM (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.

#### 2.2.5.2 Checking and Performing the Correct Power On Sequence

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

1. Power up the arrays and associated server as follows:
   - Expansion units 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 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 2-11.

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` → `Drive-side Parameters` → `Disk Access Delay Time`.

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

c. Select **Yes** to confirm the setting.

d. Reboot the system.

e. 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 quickly as possible.

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

2.2.5.3 Assigning a Disk Drive as a Spare

1. From the Main Menu, choose `view and edit 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**. Select the target logical drive, then select **Yes** to confirm when prompted.

4. Disable Periodic Drive Check Time:
   
   From the Main Menu, choose `view and edit Configuration parameters` → `Drive-side Parameters`.

   Set the option **Periodic Drive Check Time** to **Disable**, then confirm **Yes**.

2.2.5.4 If the Logical Drive Status is REBUILDING

The rebuilding process refers to the rebuilding of the logical drive in which the data from the defective disk drive is moved onto the 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 another logical drive on the array.

**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.

### 2.2.5.5 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 require system resources and can impact performance.

**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 replacement of the bad drive.

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 replacement 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.

To enable Periodic Auto-Detect Failure Drive Swap Check Time:

1. Choose **view and edit Configuration parameters → Drive-side 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. Select **Yes** to confirm the setting.

When you choose 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 as a global spare the unused drive with the lowest drive ID. This enables the array to rebuild automatically without user intervention if a drive is replaced.

To enable Auto-Assign Global Spare Drive:

1. Choose **view and edit Configuration parameters → Drive-side 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.

### 2.3 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 have removed a disk drive and do not replace it, you can insert an air management sled to maintain the optimum airflow inside the chassis. The air management sled is installed with the same procedure as “Installing a New Disk Drive” on page 2-8.
CHAPTER 3

Power and Fan Module FRUs

Topics covered in this chapter are:

- “Replacing Power Supply/Fan Modules for 2U Arrays” on page 3-2
- “Replacing an AC Power Supply/Fan Module” on page 3-2
- “Replacing a DC Power Supply/Fan Module” on page 3-3
- “Replacing Power Supply/Fan Modules for 1U Arrays” on page 3-4
- “Replacing an AC Power Supply/Fan Module” on page 3-4
- “Replacing a DC Power Supply/Fan Module” on page 3-5

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

Table 3-1 Power Specifications

<table>
<thead>
<tr>
<th>Power Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC power:</strong></td>
<td>Voltage and frequency 90 to 264 VAC, 47 to 63 Hz</td>
</tr>
<tr>
<td><strong>Input current:</strong></td>
<td>1U: 4A max</td>
</tr>
<tr>
<td></td>
<td>2U: 5A max</td>
</tr>
<tr>
<td><strong>Power-supply output voltages:</strong></td>
<td>+5 VDC and +12 VDC</td>
</tr>
<tr>
<td><strong>DC power:</strong></td>
<td>−48V DC (−36 VDC to −72 VDC)</td>
</tr>
</tbody>
</table>
3.1 Replacing Power Supply/Fan Modules for 2U Arrays

3.1.1 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.

3.1.1.1 Removing an AC Power Supply/Fan Module

Be sure to follow “Static Electricity Precautions” on page 1-9.

1. Turn off the power, 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.

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.

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

3.1.1.2 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.

### 3.1.2 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.

#### 3.1.2.1 Removing a DC Power Supply/Fan Module

Be sure to follow “Static Electricity Precautions” on page 1-9.

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.

#### 3.1.2.2 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 following table.) GND = Chassis Ground.

<table>
<thead>
<tr>
<th>Cable 35-00000148</th>
<th>Pin #</th>
<th>Voltage</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>Return</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>GND</td>
<td>Green/yellow</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>-48V</td>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable 35-00000156</th>
<th>Pin #</th>
<th>Voltage</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>L+</td>
<td>White</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>GND</td>
<td>Green/yellow</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>L-</td>
<td>White</td>
<td></td>
</tr>
</tbody>
</table>

5. 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/Fan Modules for 1U Arrays

#### 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 1-9.

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.
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 1-9.
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.

![Image: 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 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 following table.) GND = Chassis Ground.
5. 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.

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Voltage</th>
<th>Color</th>
<th>Pin #</th>
<th>Voltage</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>Return</td>
<td>Red</td>
<td>A3</td>
<td>L+</td>
<td>White</td>
</tr>
<tr>
<td>A2</td>
<td>GND</td>
<td>Green/yellow</td>
<td>A2</td>
<td>GND</td>
<td>Green/yellow</td>
</tr>
<tr>
<td>A1</td>
<td>-48V</td>
<td>Black</td>
<td>A1</td>
<td>L-</td>
<td>White</td>
</tr>
</tbody>
</table>
CHAPTER 4

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 SANnet II 200 and 220 SCSI arrays and the SANnet II 100 Blade SCSI array use the same battery module.

The SANnet II 200 FC, SATA, and SATA Special Edition (SE) arrays use the same battery module.

The battery dating information is the same for all batteries.

**Note** – The SANnet II 110 Blade SCSI JBOD does not have a battery.

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 Label” on page 4-3
- “Replacing a Battery” on page 4-4
  - “Replacing a SCSI Battery” on page 4-4
  - “Replacing a FC or SATA Battery” on page 4-7
- “FC Battery Status and In-Service Date Procedures” on page 4-9
  - “Viewing Status and Setting the In-Service Date with the CLI” on page 4-9
  - “Viewing Status and Setting the In-Service Date with SANscape” on page 4-11
  - “Verifying the In-Service Date When Replacing a Battery in SANscape” on page 4-12
4.1 Battery Operation

Your lithium ion battery should be changed every two years if the unit is continuously operated at 77°F (25°C). If the unit is continuously operated at 95°F (35°C) or higher, it should be changed every year. The shelf life of the 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 129°F (54°C). When this happens, the battery status might 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 amber 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.
4.3 Battery Dating on the Battery Label

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

The serial number 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 supplier-assigned serial number.

The date of battery manufacture is indicated by the 0240 number where the 02=year of manufacture and the 40=week of manufacture. If a battery does not have a serial number/part number label, the manufacture date for the battery is August 2002.

<table>
<thead>
<tr>
<th>Battery Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-----</td>
<td>Discharged; the battery is automatically recharged when it reaches this state.</td>
</tr>
<tr>
<td>+----</td>
<td>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.</td>
</tr>
<tr>
<td>++---</td>
<td>Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.</td>
</tr>
<tr>
<td>+++--</td>
<td>Over 92% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.</td>
</tr>
<tr>
<td>+++++</td>
<td>Over 95% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.</td>
</tr>
<tr>
<td>++++++</td>
<td>Over 97% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.</td>
</tr>
</tbody>
</table>

Figure 4-1 Battery Label
4.4 Replacing a Battery

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

4.4.1 Replacing a SCSI Battery

Caution – Before beginning this procedure, contact your Dot Hill sales representative. It is strongly recommended that Dot Hill-trained personnel perform this procedure.

Caution – If you plan to replace the batteries in both controllers, you must complete all the following steps for the first controller and battery before performing the steps for the second controller; otherwise, the array disconnects and goes offline.

Caution – Use extreme care while removing the controller module. The controller module has many electrostatic discharge (ESD) sensitive components and should be handled using ESD protection. Follow “Static Electricity Precautions” on page 1-9 for all procedures.

To replace a SCSI array battery, perform the following steps (refer to Figure 4-2 through Figure 4-6).

1. Locate the controller module with the defective or expired battery.

2. If you have a single-controller array, power off the array.

3. Turn the thumbscrews on the left and right sides of the controller module that contains the defective or expired battery counterclockwise until the thumbscrews are disengaged from the chassis.

4. Use the thumbscrews to pull the controller module completely out of the chassis.

5. Disconnect the battery connector from the controller module.

6. With a Phillips screwdriver, remove the four battery screws on the underside of the controller module to release the battery from the module.

7. Lift out the battery.

8. Insert the new battery and attach the battery connector to the controller module.
9. With a Phillips screwdriver, attach the battery to the controller with the four screws that you removed in Step 6.

10. Reinsert the controller module into the array and turn the thumbscrews on the controller module clockwise until they are finger-tight.

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

---

**Figure 4-2**  The Battery and Connector in a SCSI Array

**Figure 4-3**  The Battery Connector Unplugged in a SCSI Array
Figure 4-4  The Underside of the Battery Module With Screws Being Removed

Figure 4-5  The Top Side of the Controller Module With the Battery Being Lifted Out and the Connector Unplugged
4.4.2 Replacing a FC or SATA Battery

Note – Be sure to follow “Static Electricity Precautions” on page 1-9 for all procedures.

To replace a FC, SATA, or SATA Special Edition (SE) array battery, perform the following steps.

1. Locate the battery module with the defective or expired battery.

2. Turn the thumbscrews on the left and right sides of the battery module that contains the defective or expired battery counterclockwise until the thumbscrews are disengaged from the chassis.

3. Use the thumbscrews to pull the battery module completely out of the chassis.

4. Disconnect the battery connector from the battery module.
5. With a Phillips screwdriver, remove the four battery screws on the underside of the module to release the battery from the battery module, similar to the screw removal shown in Figure 4-4.

6. Lift out the battery.

7. Insert the new battery and attach the battery connector to the battery module.

8. With a Phillips screwdriver, attach the battery to the battery module with the four screws that you removed in Step 5.

9. Reinsert the battery module into the array and turn the thumbscrews on the battery module clockwise until they are finger-tight.

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

10. Set the in-service date for the new FC battery replacement with the CLI or SANscape program.
Note – To successfully execute scripts using the CLI, the battery in-service date must be set. For details, see “FC Battery Status and In-Service Date Procedures” on page 4-9.

4.5 FC Battery Status and In-Service Date Procedures

SANscape CLI and SANscape programs offer the following features for FC, SATA, and SATA Special Edition (SE) battery modules:

- Setting the in-service date
- Monitoring the battery status

Note – If the battery in-service date is not set, SANscape and SANscape CLI cannot accurately calculate the battery expiration date.

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

The `show battery-status` command displays the status of the battery modules, which preserve the contents of the write cache in each RAID controller. For redundant controllers, status for both batteries is shown. Status values include: Warning, Not present, Bad, N/A, Expired, and OK. A status of Warning indicates that the battery will expire within 21 days.

If you run the `show battery-status` command and the battery in-service date is not set, run the `show battery-status -u` command. Early model battery boards were not programmed with an in-service date. The `show battery-status -u` command sets the in-service date to the battery board manufacturing date and prompts the user to verify the date.

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 and one expired battery.

```
sccli> show battery-status
  Battery Type: 1
  Battery Manufacturing Date: Fri Oct 17 15:59:08 2003
  Battery Placed In Service: Fri Oct 17 15:59:08 2003
  Battery Expiration Date: Sun Oct 16 15:59:08 2005
  Battery Status: OK

  Battery Type: 1
  Battery Manufacturing Date: Fri Oct 17 19:29:20 2003
  Battery Placed In Service: Fri Oct 17 19:29:20 2003
  Battery Expiration Date: Sun Oct 6 19:29:20 2004
  Battery Status: Expired
```

The following example uses the `-u` option, which prompts the user to verify the battery date if the battery in-service date has not been set previously.

```
sccli> show battery-status -u
  Battery Type: 1
  Battery Manufacturing Date: Mon Feb 2 08:00:00 2004
  Battery Placed In Service: Wed Aug 11 20:18:02 2004
  Battery Expiration Date: Fri Aug 11 20:18:02 2006
  Battery Status: good

  Battery Type: 1
  Battery Manufacturing Date: Tue Mar 30 14:32:26 2004
  Battery Placed In Service: Wed Sep 29 21:04:39 2004
  Battery Expiration Date: Fri Sep 29 21:04:39 2006
  Battery Status: good
```

**Note** – To successfully execute scripts using SANscape CLI, the battery in-service date must be set. Newer battery boards are programmed with the in-service date. If you are not sure that the in-service date is correct, consult your sales representative.
4.5.2 Viewing Status and Setting the In-Service Date with SANscape

SANscape 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 a battery FRU, you must verify the in-service date so SANscape can set it as explained in “Verifying the In-Service Date When Replacing a Battery in SANscape” on page 4-12.

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 SANscape

When SANscape detects a battery FRU, the enclosure icon displays a degraded (yellow) status symbol as shown in the following example.

**Note** – If you do not reset and verify the in-service date, SANscape cannot accurately calculate the battery expiration date.

To verify the in-service date, perform the following steps.

1. Double-click the enclosure icon.

SANscape 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 in-service date.
2. If the date is correct, select **Yes**.
   When a confirmation message is displayed, click **OK**.
   SANscape 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 SANscape can prompt you to verify it again and set the in-service date.
CHAPTER 5

LED Module FRUs

This chapter provides instructions for replacing the LED and reset switch module. For convenience, this module will be called the LED module.

Topics covered in this chapter are:

- “Replacing the LED Module for 2U Arrays” on page 5-2
- “Reviewing the Parts and Tools” on page 5-2
- “Removing the Front Bezel and Right Ear Cap” on page 5-3
- “Replacing the LED Module” on page 5-3
- “Installing a New LED Module” on page 5-5
- “Replacing the Ear Cap and Front Bezel” on page 5-6
- “Replacing the LED Module for 1U Arrays” on page 5-6
- “Reviewing the Parts and Tools” on page 5-6
- “Removing the Front Bezel and Right Ear Cap” on page 5-7
- “Removing the LED Module” on page 5-7
- “Installing a New LED Module” on page 5-10
- “Replacing the Ear Cap and Front Bezel” on page 5-11
5.1 Replacing the LED Module for 2U Arrays

5.1.1 Reviewing the Parts and Tools

The following parts are included in the LED module replacement kit:

- one LED/reset switch board, 2U
- two #4-40 x 1/4-inch flathead, magnetic SS, Phillips, 100 degree screws

The following tools are required to complete this procedure:

- Phillips No. 1 screwdriver

5.1.2 Removing the Front Bezel and Right Ear Cap

1. Power off both power supply modules on the array.
2. If attached, unlock the front bezel cover with the provided key.
3. Grasp the front bezel cover on both sides and pull it forward and then down.
4. Press the right bezel arm (hinge) toward the left side to release it from the chassis hole.
   The left bezel arm also disengages.
5. Note the location of the chassis bezel holes on each ear.
6. Remove the plastic cap from the right ear of the array.
   a. Squeeze both sides of the cap at the top and the bottom.
   b. Turn the cap toward the center of the array until it disengages and pull it free.
5.1.3 Removing the LED Module

Be sure to follow “Static Electricity Precautions” on page 1-9

1. Remove the two panhead screws (B in Figure 5-2) holding the LED module to the bracket.
Figure 5-2 Detaching the LED Module From the Chassis

**Note** – If the bracket screws (A in Figure 5-2) obstruct the LED module screws (B in Figure 5-2), the chassis will have to be removed from the rack (if it is a rackmounted array) or the case (if it is a tabletop array) to gain access to the bracket screws and remove them. Two #4-40 x 1/4-inch flathead screws are provided to replace the bracket screws, should they become damaged when removed.

Figure 5-3 Removing the LED Module
2. Carefully detach the LED module from the ribbon cable by pulling out the tiny cable lock drawer and sliding the LED module free.

![Figure 5-4 Disengaging the Ribbon Cable From the Cable Lock Drawer](image)

**Caution** – Do not pull the ribbon cable too far out from the chassis. If you pull it too far, you might have difficulty sliding it back inside the box or even detach the connection at the other end. If this happens, you will have to remove the top of the chassis and reattach the cable inside.

### 5.1.4 Installing a New LED Module

Be sure to follow “Static Electricity Precautions” on page 1-9.

1. Pull out the cable lock drawer on the new LED module.

2. Place the new LED module against the bracket and carefully slide the ribbon cable into the cable lock drawer.

3. Close the cable lock drawer to reconnect the cable to the LED module.

![Figure 5-5 Inserting the Ribbon Cable Into the Cable Lock Drawer](image)

**Note** – The blue side of the ribbon cable must face towards the LED module and the ribbon contact area must be completely inserted into the LED module before the lock drawer is closed.

4. Insert the panhead screws through the LED module and attach the LED module to the chassis.
5. If the flathead screws (A in Figure 5-2) were removed, reattach these screws through the chassis flange into the bracket. Replacement screws are provided in the ship kit in case the original screws were damaged during removal.

6. If it was removed in Step 1 in Section 5.1.3, restore the chassis to its case or rack.

5.1.5 Replacing the Ear Cap and Front Bezel

1. Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array until the ear cap snaps into place.

2. Insert the bezel arms into the chassis holes.

3. Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.

4. Lock the bezel in the closed position with the keys.

5. Remove the keys if they were not initially inserted into the chassis.

6. Power on both power supply modules.

5.2 Replacing the LED Module for 1U Arrays

5.2.1 Reviewing the Parts and Tools

The following parts are included in the LED module replacement kit:

- one LED/reset switch board, 1U
- two #4-40 x 1/4-inch flathead, magnetic SS, Phillips, 100 degree screws
The following tools are required to complete this procedure:

- Phillips No. 1 screwdriver
- 3/16-inch wrench

5.2.2 Removing the Front Bezel and Right Ear Cap

1. Power off both power supply modules on the array.
2. If attached, unlock the front bezel cover with the provided key.
3. Grasp the front bezel cover on both sides and pull it forward and then down.
4. Press the right bezel arm (hinge) toward the left side to release it from the chassis hole.
   The left bezel arm also disengages.
5. Note the location of the chassis bezel holes on each ear.
6. Remove the plastic cap from the right ear of the array.
   a. Squeeze both sides of the cap at the top and the bottom.
   b. Turn the cap toward the center of the array until it disengages and pull it free.

Figure 5-7 Removing the Right Ear Cap

5.2.3 Removing the LED Module

Be sure to follow “Static Electricity Precautions” on page 1-9.
1. Remove the ball studs holding the LED module to the chassis.
Figure 5-8  Removing the ball studs

Note – Older models of the 1U array have two flathead screws driven through from the back side of the bracket. Two #4-40 x 1/4-inch flathead screws are provided to replace the screws, should they become damaged when removed. On newer models, the studs are embedded in the chassis ear and no screws are required. You will need a 3/16-inch wrench to remove the ball studs.

Note – If you cannot access the ball studs to remove them, the chassis will have to be removed from the rack.

2. Unfold the ribbon cable and detach it from the LED module by pulling out the tiny cable lock drawer and sliding the LED module free.
3. Remove the two panhead screws holding the LED module to the bracket.
5.2.4 Installing a New LED Module

1. Attach the new LED module to the bracket using the two screws from Step 3 in Section 5.2.3.
2. Pull out the cable lock drawer on the new LED module.
3. Insert the ribbon cable into the new LED module and close the cable lock drawer to reconnect the cable to the LED module.
Note – The blue side of the ribbon cable must face towards the LED module and the ribbon contact area must be completely inserted into the LED module before the lock drawer is closed.

4. Fold the ribbon to lay flat against the back of the LED module and attach the LED module to the chassis with the ball studs from Step 1 in “Removing the LED Module” on page 5-7.

5. If the ball studs were attached to flathead screws, reattach these screws through the bracket to the ball studs.
   Replacement screws are provided in the ship kit in case the original screws were damaged during removal.

6. If it was removed in Step 1 in Section 5.2.3, restore the chassis to its rack.

5.2.5 Replacing the Ear Cap and Front Bezel

1. Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array until the ear cap snaps into place.

2. Insert the bezel arms into the chassis holes.

3. Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.

4. Lock the bezel in the closed position with the keys.

5. Remove the keys if they were not initially inserted into the chassis.

6. Power on both power supply modules.
CHAPTER 6

FC, SATA, and SATA SE Module FRUs

This chapter provides instructions for removing and installing field-replaceable units (FRUs) in SANnet II 200 FC, SATA, and SATA Special Edition (SE) arrays.

Topics covered in this chapter are:
- “Replacing an I/O Controller Module” on page 6-2
- “Saving the NVRAM Configuration Settings” on page 6-2
- “I/O Controller Replacement for a Dual-Controller Array” on page 6-3
- “Restoring the Configuration Settings of a Powered-Off Array” on page 6-10
- “Converting a Dual-Controller Array to a Single-Controller Array” on page 6-11
- “I/O Controller Replacement for a Single-Controller Array” on page 6-11
- “Replacing I/O Expansion Modules” on page 6-13
- “Removing the I/O Expansion Module” on page 6-14
- “Installing the I/O Expansion Module” on page 6-14
- “Installing Small Form-Factor Pluggable Transceivers” on page 6-15
- “Installing a RAID/Expansion Chassis FRU” on page 6-17
- “Converting a FC JBOD Into a FC RAID Array” on page 6-19
- “Managing an FC RAID Array Using SANscape” on page 6-24
- “Creating a Dual-Controller RAID Array” on page 6-25
- “Replacing the ID Switch Module” on page 6-26
- “Reviewing the Parts and Tools” on page 6-26
- “Removing the Front Bezel and Left Ear Cap” on page 6-27
- “Removing the ID Switch Module” on page 6-28
- “Installing a New ID Switch Module” on page 6-30
- “Replacing the Ear Cap and Front Bezel” on page 6-31
6.1 Replacing an I/O Controller Module

Be sure to follow the “Static Electricity Precautions” on page 1-9. 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 all I/O to the array must be stopped during the replacement procedure.

⚠️ Caution – All activity between the connected host and the array must stop during this procedure.

When a controller is replaced in a dual-controller configuration, the controller firmware of the remaining functional controller automatically overwrites the firmware of the new replacement controller to maintain compatibility. This is referred to as cross-loading. Cross-loading uses the NVRAM configuration settings to synchronize the firmware version of the newly installed controller to match the firmware version of the running controller.

In a single-controller configuration, you cannot restore the NVRAM configuration settings from disk if you replace a version 3.27 controller with a version 4.11 controller. See “I/O Controller Replacement for a Single-Controller Array” on page 6-11 for single-controller replacement instructions.

⚠️ Note – When a controller is installed and initialized or when configuration settings are changed, you are strongly advised to make a record of the new configuration settings and firmware version. This is particularly important in a single-controller configuration for re-establishing your configuration settings when a controller is replaced. You can record this information in the “Record of Settings” appendix in the SANnet II Family RAID Firmware User’s Guide.

6.1.1 Saving the NVRAM Configuration Settings

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

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

⚠️ Caution – If controllers are not shut down from the firmware application or the SANscape CLI before an array is powered off, data that is written to cache and that has not been completely written to the disks will be lost.
1. From the firmware application Main Menu, choose system Functions → Controller maintenance → Save nvram to disks.

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

6.1.2 I/O Controller Replacement for a Dual-Controller Array

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

6.1.2.1 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 multipathing software to manage them. If multipathing 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. See “Powering Off the Array” on page 1-9 for important instructions about powering off an array.

2. Write down the cabling configuration for the controller-to-host connections and expansion unit connections so that you can reconnect the cables correctly with the new I/O controller module (see Figure 6-1 and Figure 6-2).

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

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

5. Grasp the handle and carefully pull out the I/O controller module.
**Figure 6-1** Hardware Connections on the Back of a Dual-Controller SANnet II 200 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.
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.

6.1.2.2 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 in the guide rails of the array and that you keep the power on. If you power off and then replace the module, you will have to continue with additional steps. See “Restoring the Configuration Settings of a Powered-Off Array” on page 6-10.

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 cross-load to be completed. If the newly installed controller is removed for any reason during the period when the status LED is amber (for 10 minutes or more), the controller can be rendered inoperable and must be returned for repair.

In a redundant-controller configuration where a new controller FRU is installed, the controller status LED will remain amber until the controllers complete the redundant controller process, which can take more than 10 minutes. The same firmware versions must be installed on both controllers for proper redundant-controller operation.

The redundant-controller process automatically cross-loads the firmware version of the newly installed FRU to match the firmware version of the other running controller. For example, if the running controller has firmware 3.27N and the new controller has 3.27Q, the new controller will be cross-loaded with the 3.27N firmware of the running controller. To monitor this process, see “Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU” on page 6-8.

If after the firmware cross-load you hear an audible alarm and see a blinking amber Event light on the front of your array, the SCSI Enclosure Services (SES) firmware or its associated Programmable Logic Device (PLD) code in the new controller has a version that is different from the code in the other I/O controller in your array. To solve this mismatch, see to “SES Firmware Update Sometimes Required with I/O Controller Module Replacements” on page 6-9.

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

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

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.
6.1.2.3 Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU

To monitor the status of the automatic firmware update, use the SANscape CLI `show redundancy-mode` command. SANscape CLI will display the progression of “Failed,” “Scanning,” “Detected,” and “Enabled” states.

**Note** – If you have not installed the SANscape CLI software, you must install it. For details, see the *Release Notes* for your array.

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

```
sccli> show redundancy-mode
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 updates the firmware on the newly installed controller if it is not identical to the running firmware version. The controllers can remain in this state for up to 10 minutes depending upon system activity.

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

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

```
... Redundancy status: Detected
Secondary controller serial number: 0
```
6.1.2.4 SES Firmware Update Sometimes Required with I/O Controller Module Replacements

Periodically, firmware upgrades are made available as patches. The SANnet II 200 FC, SATA, and SATA SE array patches contains the most current version of the controller, SES, and PLD firmware.

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

- Downloading the patch to a location on your network.
- Using your array software (SANscape or SANscape CLI) 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.

If after replacing a controller module you hear an audible alarm and see a blinking amber Event light on the front of the array/unit, the new I/O expansion module or controller module has a different version of SES firmware or PLD firmware than that of the other I/O module in the array/unit. To resolve this mismatch you must download new SES firmware. This can be done using SANscape software or the SANscape Command-Line Interface (CLI) for your array.

If you have not installed SANscape or SANscape CLI, you must install it. For details, see the Release Notes for your array.

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

Refer to the SANscape User's Guide to see instructions for “flashing” the upgraded firmware to the appropriate device. Refer to the SANscape CLI User’s Guide or the `sccli(1M)` man pages for instructions on performing the same operation using the SANscape CLI.
**Caution** – Follow the upgrade instructions in the *Release Notes* with great care to download and install firmware correctly. If the wrong firmware is installed, or the firmware is installed on the wrong device, your controller might be rendered inoperable. Always be sure to upgrade your SES firmware first before trying to determine if you need a PLD upgrade.

### 6.1.3 Restoring the Configuration Settings of a Powered-Off Array

If the array was powered off during the controller replacement procedure, perform the following important steps.

1. Power on the array.

2. If the new controller replaced an old controller, restore the NVRAM configuration settings from disk:
   
   a. From the Main Menu, choose **system Functions → Controller maintenance → Restore nram from disks**.
   
   b. Select **Yes** to confirm.

3. Set the parameter called the **Controller Unique Identifier** to the correct value:
   
   a. From the firmware Main Menu, choose **view and edit Configuration parameters → Controller Parameters → Controller Unique Identifier <hex>**.
   
   b. Type the value 0 (to automatically read the chassis serial number from the midplane) or type the hex value for the original serial number of the chassis (used when the midplane has been replaced).

   The Controller Unique Identifier is used to create Ethernet 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 cluster environment to maintain the same disk device names in a cluster.

4. To implement the revised configuration settings, choose **system Functions → Reset controller** from the Main Menu, then select **Yes** to confirm.
6.1.4 Converting a Dual-Controller Array to a Single-Controller Array

If you convert a dual-controller array into a single-controller array, the SANscape 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 SANscape software and want to avoid this message, follow the steps in the chapter titled “Maintaining the Array,” in the SANscape User’s Guide. The section containing the instructions is titled, “Converting a Dual-Controller Array to a Single-Controller Array.”

6.1.5 I/O Controller Replacement for a Single-Controller Array

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

1. If possible, make a record of the firmware version and configuration settings before replacing the controller.
   - Use the CLI `show configuration` command to output the configuration settings to a file. Refer to the SANscape CLI User’s Guide for more information.

2. Save NVRAM configuration settings to disk.
   - From the firmware Main Menu, choose `system Functions → Controller maintenance → Save nvram to disks`, and select `Yes` to save the contents of NVRAM to disk.

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

4. Insert the replacement controller.
   a. Keep the array powered on.
   b. 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 in the guide rails of the array and that you keep the power on.

c. 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.

5. Download the desired firmware into the replacement controller.

Note – All FC and SATA controller replacement FRUs have firmware 4.11G. If you are using 3.27R or earlier controller firmware and do not want to upgrade to version 4.11G, you can download the most recent 3.27R firmware patch. For details, refer to the Release Notes for your array.

Note – Firmware version 4.11 supports a maximum of 32 partitions per logical drive. Firmware version 3.27 supports as many as 128 partitions per logical drive on FC and SATA arrays. You cannot upgrade to version 4.11 from version 3.27 if you have more than 32 partitions.

Refer to the Release Notes for your array for specific instructions on loading firmware into your new controller.

6. Restore the NVRAM settings.

Note – When the old controller and the new controller have different firmware version numbers (such as 3.27 and 4.11), you cannot restore the NVRAM configuration settings from disk. You must edit the configuration settings manually.

a. If the old controller and the new controller have the same firmware version number, from the firmware Main Menu, choose system Functions →Controller maintenance →Restore nvram from disks, and select Yes to confirm.

b. If the old controller and the new controller have different firmware version numbers, edit the configuration settings manually.

Refer to the SANnet II Family RAID Firmware User's Guide for instructions on setting configuration parameters.

7. 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.

8. Set the Controller Unique Identifier parameter to the correct value:

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

b. Type the value 0 (to automatically read the chassis serial number from the midplane) or type the hex value for the original serial number of the chassis (used when the midplane has been replaced).

The Controller Unique Identifier is used to create Ethernet 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 cluster environment to maintain the same disk device names in a cluster.

9. To implement the revised configuration settings, choose system Functions →Reset controller from the Main Menu, then select Yes to confirm.

6.1.5.1 SES Firmware Update

Periodically, firmware upgrades are made available as patches. The SANnet II 200 FC, SATA, and SATA SE array firmware upgrades contain the most current version of the controller, SES, and PLD firmware.

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

- Downloading the upgrade to a location on your network.
- Using SANscape CLI 2.0 to “flash” the firmware to the device it updates.

Refer to the Release Notes for your array for the latest general firmware upgrade information available for your array at the time of release.

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

6.2 Replacing I/O Expansion Modules

Be sure to follow “Static Electricity Precautions” on page 1-9.
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](warning_icon) **Caution** – When you replace an I/O expansion module, the connected hosts must be inactive during the replacement procedure.

### 6.2.1 Removing the I/O Expansion Module

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

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

2. Grasp the handle and pull out the I/O expansion module.

### 6.2.2 Installing the I/O Expansion Module

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

1. 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](warning_icon) **Caution** – Be sure that the I/O expansion module is properly inserted in the guide rails of the array.

2. 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 a version that is different from the code in the other I/O controller in your array. To solve this mismatch, see “SES Firmware Update Sometimes Required with I/O Controller Module Replacements” on page 6-9.

**Note** – The beep code that identifies an SES or PLD firmware mismatch is the repeating Morse code letter “R” (dot dash dot).
6.3 Installing Small Form-Factor Pluggable Transceivers

Arrays use small form-factor pluggable (SFP) transceivers to attach the array to hosts and expansion units.

SANnet II 200 FC I/O controller modules have six SFP ports, as shown in the lower row of connectors in Figure 6-4. These ports are labeled FC0 through FC5.

SANnet II 200 SATA I/O controller modules have eight SFP ports, as shown in Figure 6-5. SFP ports on the SANnet II 200 SATA array are also labeled FC0 through FC5.

SANnet II 200 SATA SE I/O controller modules have six SFP ports, as shown in Figure 6-6. SFP ports on the SANnet II 200 SATA SE array are labeled FC0, FC1, FC4, and FC5.

---

**Figure 6-4** Six SFP Ports on a SANnet II 200 FC I/O Controller Module

**Figure 6-5** Eight SFP Ports on a SANnet II 200 SATA I/O Controller Module
Each SANnet II 200 FC I/O expansion module has two SFP ports. SANnet II 200 SATA I/O expansion modules have four SFP ports. On both SANnet II 200 FC and SANnet II 200 SATA I/O expansion modules, these ports are labeled Loop A or Loop B. SANnet II 200 SATA SE arrays do not support expansion modules.

To install an SFP, perform the following steps.

1. Slide the SFP connector into the port so that the gold pins connect firmly with the chassis.

2. Plug one end of a Fibre Channel cable into the duplex jack at the end of the SFP connector, as shown in Figure 6-8.

3. Plug the other end into a server or into an FC expansion unit.

**Figure 6-6** Six SFP Ports on a SANnet II 200 SATA SE I/O Controller Module

**Figure 6-7** Typical SFP Connector Used to Connect Cables to SFP Ports

**Figure 6-8** Duplex Jack at the End of an SFP Connector

**Note** – To remove an SFP connector, make sure no cable is connected to it and then slide it out from the port.
6.4 Installing a RAID/Expansion Chassis FRU

The chassis (box) FRU for the SANnet II FC, SATA, or SATA SE arrays 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 must 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 SANnet II Documentation CD or on the Dot Hill web site.

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

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

Note – Be sure to follow “Static Electricity Precautions” on page 1-9 for all procedures.

1. Connect to the firmware application via the serial interface (tip for Solaris/Linux) or via telnet.
2. If the defective array is a RAID array:
   a. From the Main Menu, choose view and edit Configuration parameters → Controller Parameters.
   b. Write down the Controller Unique Identifier (hex) value.
3. If the defective array is a RAID array, stop all I/O activity and shut down the RAID controller:
   a. From the Main Menu, choose system Functions → Shutdown Controller. Then select Yes to confirm.
4. Power off both power supply modules on the defective array.
5. Clearly label all FC cables attached to the I/O controller module.
6. Write down the defective array’s cabling configuration.
7. Remove all FC cables attached to the I/O controller module.
8. If the defective array is a RAID array, remove all serial, Ethernet, and power cables connected to the I/O controller modules.

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

10. Remove the I/O controller modules, power supply modules, and disk drives from the defective array.
    Make sure you place the component on a flat surface that is not susceptible to electrostatic discharge.

11. Remove the defective chassis.

12. Obtain the replacement chassis.

13. Reinstall all previously removed FRUs in their original positions in the replacement chassis.

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

15. Power on both power supply modules.

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

17. 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 → Controller Parameters → Controller Unique Identifier (hex).

18. If this array is being used by clustered hosts, or for any other reason its attached hosts require that their Device IDs remain 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 → Reset controller. Confirm Yes when prompted.

19. 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 → Controller Parameters → Controller Unique Identifier <hex>.
    b. Type in the value 0 and press Return (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.
    c. To implement the revised parameter value, on the firmware Main Menu, choose system Functions → Reset controller.
        Confirm Yes when prompted.
6.5 Converting a FC JBOD Into a FC RAID Array

You can convert a SANnet II 200 FC JBOD (or expansion unit) into a single-controller or dual-controller SANnet II 200 FC RAID array by performing the following procedure.

**Note** – It is not possible to convert a SANnet II 200 SCSI JBOD or expansion unit to a SANnet II 200 SCSI RAID array.

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 cables for network access (one for each I/O controller module)
- *SANnet II Family Installation, Operation, and Service Manual* for your array
- *SANscape User’s Guide* (if SANscape is used to manage and monitor SANnet II 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 to the network or to 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 to 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 SANscape CLI provided with the FC and SATA arrays do not have backup functions for data.

2. If you use SANscape to monitor your arrays and JBODs, stop the SANscape daemon and close the console.

   **Note** – When you disconnect the JBOD from the host, the JBOD drives will appear as failed drives in SANscape. To remove the failed drive entries, 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 modules which will be replaced by I/O controller modules.

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. Grasp the handle 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 inserted into the new I/O controller module and reused.

6. Insert the SFP from Step c above 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.

**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 SANnet II 200 FC array (Figure 6-9), 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 6-9 Recommended SANnet II 200 FC Array Dual-Controller SFP Placement](image)

In a dual-controller SANnet II 200 SATA array (Figure 6-10), the recommended configuration is SFPs plugged into the following ports:
■ The upper I/O controller module with SFPs in the left-most FC0 port, the FC2, and FC4 ports.
■ The lower I/O controller module with SFPs in the left-most FC1 port, the 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 6-10 Recommended SANnet II 200 SATA Array Dual-Controller SFP Placement](image)

In a single-controller SANnet II 200 FC 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.

![Figure 6-11 SANnet II 200 FC Array Single-Controller SFP Placement](image)

In a single-controller SANnet II 200 SATA array, SFPs are usually plugged into the left-most port of FC0, the left-most port of FC1, ports 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.
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 in 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 Step 4 and Step 5 to remove the I/O module in the lower slot and repeat Step 6 through Step 8 to install a second I/O controller module if you want to create a dual-controller RAID array.


11. Print or locate the *SANnet II Family Installation, Operation, and Service Manual* for your 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 the installation manual for your array.
   On a Solaris system, use the `tip` command to access the array locally.

```
# tip -38400 /dev/tty$n
```

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:
13. Set up an IP address for the chassis. Refer to the installation manual for your array for more details.

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

To connect by telnet to the chassis and access the firmware application, refer to the installation manual for your array.

14. Set the **Controller Unique Identifier** for each I/O controller module 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. From the firmware Main Menu, choose **view and edit Configuration parameters \rightarrow Controller Parameters \rightarrow Controller Unique Identifier <hex>**.

b. Type in the value 0 (to automatically read the chassis serial number from the midplane) and press Return.

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

c. To implement the revised parameter value, on the Main Menu, choose **system Functions \rightarrow Reset Controller**. Confirm **Yes** when prompted.

15. On the firmware Main Menu, choose **view system Information**, and record the serial number of the array. You will use this number later.

```
# 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.

To connect by telnet to the chassis and access the firmware application, refer to the installation manual for your array.
16. For cabling and configuration instructions, refer to the *SANnet II Family Installation, Operation, and Service Manual* for your array.

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

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 *SANnet II Family 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.

17. 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 SANscape CLI do not have restore functions for data.

### 6.5.1 Managing an FC RAID Array Using SANscape

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

**Note** — For first time configuration of a new RAID array, refer to the *SANnet II Family RAID Firmware User’s Guide*.

1. Restart the SANscape agent and the console.

2. From the SANscape main window in the console, choose **View → Agent Options Management**, and uncheck the box labeled **Enable JBOD support**.

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

3. Choose **View → View Server**.

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

   The JBOD connections are removed now.
5. Choose **Array Administration →Controller Assignment**.
   The **Assign Server to Manage a RAID Controller** window is displayed.

6. Check that the RAID array serial number recorded in Step 15 is displayed.
   If the serial number is not displayed, check the operating system information in the **SANnet II Family Installation, Operation, and Service Manual** for your array and your operating system documentation to complete the configuration. You will need to stop and restart the SANscape agent and console to see the revised configuration.

7. 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.

8. To provide monitoring of other JBODs, choose **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 **SANscape User’s Guide** for additional information.

### 6.5.2 Creating a Dual-Controller RAID Array

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

**Note** – For first time configuration of a new RAID array, refer to the **SANnet II Family RAID Firmware User’s Guide**.

1. To check the controller firmware version of each module:
   a. Remove one I/O controller module so that only one I/O controller module remains in the array.
   b. Maintain a serial port connection to a terminal or workstation as described in Step 12.
   c. In the firmware application, choose **view system Information** and record the **Firmware Version**.
   d. 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.
2. 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, see “SES Firmware Update Sometimes Required with I/O Controller Module Replacements” on page 6-9.

3. 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 Release Notes for your array:

- SANscape CLI (with an in-band connection, for Linux and Windows hosts, and for servers running the Solaris operating system)
- SANscape 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)

6.6 Replacing the ID Switch Module

This procedure replaces an obsolete FC switch module with a new FC switch module.

**Note** – If the label on the front lip reads P001-20138 or P200-20126, the upgrade has already been completed.

6.6.1 Reviewing the Parts and Tools

The following parts are included in the ID switch module replacement kit:
The following tool is required to complete this procedure:

- Phillips No. 1 screwdriver

### 6.6.2 Removing the Front Bezel and Left Ear Cap

1. Power off both power supply modules on the array.
2. If attached, unlock the front bezel cover with the provided key.
3. Grasp the front bezel cover on both sides and pull it forward and then down.
4. Press the right bezel arm (hinge) toward the left side to release it from the chassis hole. The left bezel arm also disengages.
5. Note the location of the chassis bezel holes on each ear.
6. Remove the plastic cap from the left ear of the array.
   a. Squeeze both sides of the cap at the top and the bottom.
   b. Turn the cap toward the center of the array until it disengages and pull it free.

![Figure 6-13 Removing the Left Ear Cap](image)
6.6.3 Removing the ID Switch Module

Be sure to follow “Static Electricity Precautions” on page 1-9.

1. Record the ID switch setting on the switch module currently attached to the chassis. You must set the same switch setting on the new switch module before you install it.

2. Remove the one panhead screw (B in Figure 6-14) attaching the switch module to the chassis.

**Figure 6-14** Detaching the ID Switch Module From the Chassis

*Note* – If the lower bracket screw obstructs the ID switch module screw (B in Figure 6-14), the chassis will have to be removed from the rack (if it is a rackmounted array) or the case (if it is a tabletop array) to gain access to the bracket screws (A in Figure 6-14) and remove them. Two #4-40 x 1/4-inch flathead screws are provided to replace the bracket screws, should they become damaged when removed.
3. Carefully pull the switch module out a short distance from the chassis.

![Figure 6-15 Removing the ID Switch Module](image)

4. Detach the switch module from the ribbon cable by pulling out the tiny cable lock drawer and sliding the switch module free.

![Figure 6-16 Disengaging the Ribbon Cable From the Cable Lock Drawer](image)
6.6.4 Installing a New ID Switch Module

1. Before installing the new switch module, set the ID switch on the new module to the same switch setting recorded in Step 1 in “Removing the ID Switch Module” on page 6-28.

   **Caution** – Be sure that the ID switch has the correct setting. If it does not have the correct setting, the configuration might be invalid.

2. Pull out the cable lock drawer on the new switch module.

3. Insert the ribbon cable into the cable lock drawer and close the cable lock drawer to reconnect the cable to the switch module.

   ![Figure 6-17 Inserting the Ribbon Cable Into the Cable Lock Drawer](image)

   **Note** – The blue side of the ribbon cable must face towards the switch module and the ribbon contact area must be completely inserted into the switch module before the lock drawer is closed.

4. Insert the panhead screw through the switch module and reattach the module to the chassis.

   ![Figure 6-18 Installing the New ID Switch Module](image)
5. If the flathead screws (A in Figure 6-14) were removed, reattach these screws through the chassis flange into the bracket.
   Replacement screws are provided in the ship kit in case the original screws were damaged during removal.

6. If it was removed in Step 2 in Section 6.6.3, restore the chassis to its case or rack.

7. Confirm that the switch setting is still the same value as that recorded in Step 1 in “Removing the ID Switch Module” on page 6-28.

6.6.5 Replacing the Ear Cap and Front Bezel

1. Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array until the ear cap snaps into place.

2. Insert the bezel arms into the chassis holes.

3. Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.

4. Lock the bezel in the closed position with the keys.

5. Remove the keys if they were not initially inserted into the chassis.

6. Power on both power supply modules.
CHAPTER 7

SCSI Module FRUs

This section provides instructions for removing and installing field replaceable units (FRUs) in SANnet II 200 SCSI, SANnet II 220 SCSI, SANnet II 100 Blade SCSI, and in SANnet II 110 Blade SCSI JBOD arrays.

Topics covered in this chapter include:

■ “Replacing a SCSI Controller Module” on page 7-2
  ■ “Saving the Configuration Settings to NVRAM” on page 7-2
  ■ “SCSI Controller Replacement for a Dual-Controller Array” on page 7-3
  ■ “Restoring the Configuration Settings of a Powered Off Array” on page 7-6
  ■ “SCSI Controller Replacement for a Single-Controller Array and the SANnet II 100 Blade” on page 7-7
■ “Replacing SCSI I/O Modules” on page 7-9
  ■ “Installing Gaskets If Needed” on page 7-9
  ■ “Removing the SCSI I/O Module” on page 7-9
  ■ “Installing a SCSI I/O Module” on page 7-10
■ “Replacing the SCSI Terminator Module” on page 7-11
  ■ “Removing the SCSI Terminator Module” on page 7-11
  ■ “Installing a Terminator Module” on page 7-12
■ “Replacing the EMU Module (SANnet II 200 and 220 Only)” on page 7-12
  ■ “Removing an EMU Module (SANnet II 200 Only)” on page 7-13
  ■ “Installing an EMU Module (SANnet II 200 Only)” on page 7-14
■ “Installing a RAID Expansion Chassis FRU” on page 7-14
■ “Installing a JBOD Chassis FRU for the SANnet II 110 SCSI JBOD” on page 7-16
■ “Installing a Filler Panel on a SCSI Array” on page 7-17

Note – Be sure to follow “Static Electricity Precautions” on page 1-9 for all procedures.
7.1 Replacing a SCSI Controller Module

Be sure to follow the “Static Electricity Precautions” on page 1-9.

The controller modules are hot-swappable.

When a controller is replaced in a dual-controller configuration, the controller firmware of the remaining functional controller automatically overwrites the firmware of the new replacement controller to maintain compatibility. This is referred to as cross-loading. Cross-loading uses the NVRAM configuration settings to synchronize the firmware version of the newly installed controller to match the firmware version of the running controller.

In a single-controller configuration, you cannot restore the NVRAM configuration settings from disk if you replace a version 3.25 controller with a version 4.11 controller. See Section 7.1.4, “SCSI Controller Replacement for a Single-Controller Array and the SANnet II 100 Blade” on page 7-7 for single-controller replacement instructions.

**Note** – The SANnet II 220 SCSI array is only available with firmware version 4.11.

**Note** – When a controller is installed and initialized or when configuration settings are changed, you are strongly advised to make a record of the new configuration settings and firmware version. This is particularly important in a single-controller configuration for re-establishing your configuration settings when a controller is replaced. You can record this information in the “Record of Settings” appendix in the *SANnet II Family RAID Firmware User’s Guide*.

7.1.1 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 I/O controller module, the settings can be restored from NVRAM.

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

**Caution** – If controllers are not shut down from the firmware application or the SANscape CLI before an array is powered off, data that is written to cache and that has not been completely written to the disks will be lost.
Note – It is important to save the configuration settings to NVRAM after replacing a failed drive.

1. From the firmware application Main Menu, choose system Functions →Controller maintenance →Save nvram to disks.
2. Select Yes to confirm. A prompt informs you that NVRAM information has been successfully saved.

7.1.2 SCSI Controller Replacement for a Dual-Controller Array

To replace a SCSI controller module in a dual-controller configuration, perform the following steps.

7.1.2.1 Removing a SCSI Controller Module

This procedure differs based on which SANnet II module you have. Since the SANnet II 100 Blade SCSI array is a single-controller array, the array must be powered off before you begin.

1. For the SANnet II 200 or 220 SCSI array, keep the array powered on.
   For the SANnet II 100 Blade SCSI array (which has a single controller), the array must be powered off before you begin.
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.

7.1.2.2 Installing a SANnet II 200 or 220 SCSI Controller Module

This procedure differs based on which SANnet II module you have. Since the SANnet II 100 Blade SCSI array is a single-controller array, the array must be powered off before you begin. For details on the SANnet II 100 Blade, see “SCSI Controller Replacement for a Single-Controller Array and the SANnet II 100 Blade” on page 7-7.

1. For the SANnet II 200 or 220 SCSI array, 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 side of the controller module clockwise until 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 counter-clockwise a quarter-turn.

For the SANnet II 200 and 220 SCSI array, the new controller automatically becomes the secondary controller.

**Caution** — Wait a minimum of 10 minutes for the firmware cross-load to be completed. If the newly installed controller is removed for any reason during the period when the status LED is amber (for 10 minutes or more), the controller can be rendered inoperable and must be returned for repair.

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 cross-loads 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 cross-loaded with the 3.25P firmware of the running controller.

To monitor this process, see “Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU” on page 7-5.

3. If you want 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 *Release Notes* 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.
7.1.2.3 Monitoring the Automatic Firmware Update with a Recently Installed Controller FRU

To monitor the status of the automatic firmware update, use the SANscape CLI `show redundancy-mode` command. SANscape CLI will display the progression of “Failed,” “Scanning,” “Detected,” and “Enabled” states.

**Note** – If you have not installed the SANscape CLI software, you must install it. For details, see the *Release Notes* for your array.

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

```
sccli> show redundancy-mode
  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 updates the firmware on the newly installed controller if it is not identical to the running firmware version. The controllers can remain in this state for up to 10 minutes depending upon system activity.

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

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

```
... Redundancy status: Detected
Secondary controller serial number: 0
```
■ Enabled State: Redundant Controller Procedure Completed. The installed controller has completed the redundant controller procedure enabling the active-active operation.

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

7.1.3 Restoring the Configuration Settings of a Powered Off Array

If the array was powered off during the controller replacement, perform the following important steps.

1. Power on the 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.

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

   a. In the firmware application, from the Main Menu, choose **system Functions** → **Controller maintenance** → **Restore nvram from disks**.

   b. Select **Yes** to confirm.

3. Set the **Controller Unique Identifier** parameter to the correct value:

   a. On the firmware Main Menu, choose **view and edit Configuration parameters** → **Controller Parameters** → **Controller Unique Identifier <hex>**.

      Type in 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 non-zero value should only be specified if the chassis has been replaced but the original chassis serial number must be retained; this feature is especially important in a cluster environment to maintain the same disk device names in a cluster.

4. To implement the revised configuration settings from step 1 or 2, on the Main Menu, choose **system Functions** → **Reset controller**. Select **Yes** to confirm.
7.1.4  SCSI Controller Replacement for a Single-Controller Array and the SANnet II 100 Blade

Caution – Before replacing a controller module, save the configuration settings to NVRAM.

To replace a SCSI controller module in a single-controller configuration, perform the following steps.

1. If possible, make a record of the firmware version and configuration settings before replacing the controller.
   - Use the CLI `show configuration` command to output the configuration settings to a file. Refer to the `SANscape Family CLI User's Guide` for more information.

2. Save NVRAM configuration settings to disk.
   - From the firmware Main Menu choose `system Functions` → `Controller maintenance` → `Save nvram to disks`, and select `Yes` to save the contents of NVRAM to disk.

3. Remove the old controller.
   a. Keep the array powered on.
   b. Turn the thumbscrews on the left and right sides of the controller module counterclockwise until the thumbscrews are disengaged from the chassis.
   c. Hold the thumbscrews, and pull out the controller module.

4. Insert the replacement controller.
   a. Keep the array powered on.
   b. 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.

c. 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.

5. Download the desired firmware version into the replacement controller.
**Note** – All SCSI controller replacement FRUs have firmware version 3.66A. Firmware version 3.66A is a special bridge firmware that allows cross-loading between 3.25 and 4.11 firmware in a dual-controller configuration. In a single-controller configuration, you must download firmware version 3.25 or 4.11 into the new controller after installing it.

Refer to the *Release Notes* for your array for specific instructions on loading firmware into your new controller.

6. Restore the NVRAM settings.

**Note** – When the old controller and the new controller have different firmware version numbers (such as 3.25 and 4.11), you cannot restore the NVRAM configuration settings from disk. You must edit the configuration settings manually.

   a. If the old controller and the new controller have the same firmware version number, from the firmware Main Menu, choose _system Functions_ → _Controller maintenance_ → _Restore nvramp from disks_, and select _Yes_ to confirm.

   b. If the old controller and the new controller have different firmware version numbers, edit the configuration settings manually.

   Refer to the *SANnet II Family RAID Firmware User’s Guide* for instructions on setting configuration parameters.

7. Set the _Controller Unique Identifier_ parameter to the correct value:

   a. From the firmware Main Menu, choose _view and edit Configuration parameters_ → _Controller Parameters_ → _Controller Unique Identifier <hex>_.

   b. Type the value 0 (to automatically read the chassis serial number from the midplane) or type the hex value for the original serial number of the chassis (used when the midplane has been replaced).

   The Controller Unique Identifier is used to create Ethernet 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 cluster environment, to maintain the same disk device names in a cluster.

8. To implement the revised configuration settings, choose _system Functions_ → _Reset controller_ from the Main Menu, then select _Yes_ to confirm.
7.2 Replacing SCSI I/O Modules

Be sure to follow “Static Electricity Precautions” on page 1-9.

**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.

7.2.1 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.

7.2.2 Removing the SCSI I/O Module

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

1. Write down the cabling configuration for the SCSI I/O module and expansion unit connections so that you can reconnect the cables correctly with the new SCSI I/O module.
2. Power off both power supply modules on the array.
3. Remove all cables from the SCSI I/O module.
4. Write down the bus configuration (split-bus or single-bus configuration).
5. 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.

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

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

7.2.3 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 again 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.

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

5. Power on both power supply modules.
7.3 Replacing the SCSI Terminator Module

Be sure to follow “Static Electricity Precautions” on page 1-9.

7.3.1 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 7-1 Terminator Module Partially Pulled Out of the SANnet II 200 Chassis](image-url)
7.3.2 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 the controller module or modules (depending on whether you have a SANnet II 200 or a SANnet II 100 array):
   a. Gently slide each controller module into the unit until it 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 counter-clockwise a quarter-turn.

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

5. Power on the array.

7.4 Replacing the EMU Module (SANnet II 200 and 220 Only)

Be sure to follow “Static Electricity Precautions” on page 1-9. The EMU module is hot-swappable and can be replaced with the array powered on.
7.4.1 Removing an EMU Module (SANnet II 200 Only)

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.
7.4.2 Installing an EMU Module (SANnet II 200 Only)

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 counter-clockwise a quarter-turn.

7.5 Installing a RAID/Expansion Chassis FRU

The SANnet II SCSI array box FRU includes a chassis, its drive midplane, and its backplane. This product is ordered to replace a box which has been damaged or whose midplane or backplane has been damaged.

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

- Drive modules
- Two power supplies/fan modules
- Two EMU modules (SANnet II 200 only)
- 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 manual.

To configure the array, refer to the installation manual for your array.

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

1. Connect to the firmware application using the serial interface (tip for Solaris/Linux) or using 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 →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 modules, EMUs, power supply modules, and disk drives from the defective array.

10. Remove the defective chassis.

11. Obtain the replacement array chassis.

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

13. Re-install 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 using the serial interface (tip for Solaris/Linux) or using telnet.
      b. From the Main Menu, choose view and edit Configuration parameters →Controller Parameters →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 remain 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 →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. From the Main Menu, choose view and edit Configuration parameters → Controller Parameters → Controller Unique Identifier (hex).

b. 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.

c. To implement the revised parameter value, son the Main Menu, choose system Functions → Reset Controller.

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

7.6 Installing a JBOD Chassis FRU for the SANnet II 110 SCSI JBOD

The SANnet II 110 Blade SCSI JBOD 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 SANnet II 110 Blade Family Installation, Operation, and Service Manual.

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 1-9 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 the SANnet II 110 Blade Family Installation, Operation, and Service Manual for instructions about configuring the JBOD.

7.7 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 SANnet II 200 or 220 SCSI array. Most often, this occurs when you want 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 7-3.
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.
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