



3PAR InServ® E-Class Storage Server Maintenance Manual

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Revision Notice

This is the second release of this manual. A complete revision history is provided at the end of this manual.

Changes

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This device complies with Part 15 of FCC Rules. Operation is subjected to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Compliance Statement

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Japanese Compliance Statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance can arise. When such trouble occurs, the user might be required to take corrective actions.

European Compliance Statement:

This product complies with CENELEC EN55022 Class A and EN55024:1998/A1:2001 specifications for Information Technology Equipment (ITE).

WARNING: This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

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1.1 Related Documentation

The following documents provide information related to 3PAR InServ Storage Servers:

Table 1-1. Related Documentation

For information about...	Read the...
Upgrading the InServ Storage Server	<i>3PAR InServ E-Class Storage Server Upgrades Guide</i>
Using the InForm Command Line Interface (CLI) to configure and manage the InServ Storage Servers	<i>3PAR InForm OS CLI Administrator's Manual</i>
Understanding the InServ Storage Server and its features	<i>3PAR InForm OS Concepts Guide</i>
Using the InForm Management Console (IMC) user interface to configure and administer InServ Storage Servers	<i>3PAR InForm Management Console Online Help</i>
CLI commands and their usage	<i>3PAR InForm OS Command Line Interface Reference</i>
Identifying storage server components, detailed alert information, and service messages	<i>3PAR InForm OS Messages and Operator's Guide: Service Edition</i>
Using 3PAR Remote Copy	<i>3PAR Remote Copy User's Guide</i>

1.2 Organization

The procedures in this guide are divided into four sections and five appendices.

- [Chapter 1, *Introduction*](#) (this chapter), provides an overview of the this manual, including information on audience, document conventions, and related documentation.
- [Chapter 2, *Precautions*](#), provides general safety instructions that should be followed before attempting any procedure in this guide.
- [Chapter 3, *Connecting the Maintenance PC*](#), describes the procedure for connecting and configuring the Maintenance PC to perform maintenance procedures on the storage server.
- [Chapter 4, *Powering Down the Storage Server*](#), provides instructions on safely powering down the storage server to perform maintenance on the server's components.
- [Chapter 5, *Understanding LED Status*](#), describes the storage server's component LEDs.

Drive Chassis Maintenance Procedures

- [Chapter 6, *Replacing a Drive Cage FCAL Module*](#), details the procedure for replacing an FCAL module.
- [Chapter 7, *Replacing a Disk/Drive Magazine*](#), provides instructions on replacing a drive magazine.

Controller Node Maintenance Procedures

- [Chapter 8, ,](#) describes how to replace a failed controller node.
- [Chapter 9, *Servicing a Controller Node for Internal FRU Service*](#), describes how to safely handle, remove, and replace a controller node when servicing the node's internal components.
- [Chapter 10, *Replacing an LED Board*](#), provides instructions on removing and replacing the node LED board.
- [Chapter 11, *Replacing a Node Fan*](#), presents details on replacing a faulty controller node cooling fan.
- [Chapter 12, *Replacing Components in Controller Slots*](#), provides instructions on replacing a controller node's Fibre Channel SFP modules and adapters, Gigabit Ethernet (GigE) adapters, and iSCSI adapters.

- [Chapter 13, *Replacing Control Cache*](#), provides instructions on replacing control cache DIMMs in a controller node.
- [Chapter 14, *Replacing Data Cache*](#), describes how to replace data cache DIMMs.
- [Chapter 15, *Replacing a Controller Node Disk*](#), provides the procedure for safely replacing an node disk in a controller node.
- [Chapter 16, *Replacing a Clock Battery*](#), describes how to replace the clock battery in a controller node.
- [Chapter 17, *Replacing a Controller Node Chassis*](#), provides instructions on safely replacing a controller node chassis.

Power System Maintenance Procedures

- [Chapter 18, *Replacing a Controller Node Power Supply*](#), describes the procedure for safely replacing a controller node power supply.
- [Chapter 19, *Replacing a Drive Chassis Power Supply*](#), presents the procedure for safely replacing a drive chassis power supply.
- [Chapter 20, *Replacing a Battery Assembly Unit*](#), provides instructions on replacing the storage server's battery backup units.
- [Chapter 21, *Replacing a Power Distribution Unit \(PDU\) in a 3PAR Cabinet*](#), describes how to safely replace a power distribution unit.
- [Chapter 22, *Replacing an AC Cord*](#), presents how to safely replace a failed AC cord.

Service Processor Maintenance Procedures

- [Chapter 23, *Service Processor Replacement and Upgrade*](#), provides the procedure for removing and replacing a service processor.

Appendixes

- [Appendix A, *Tools*](#), lists the tools required for performing maintenance procedures.
- [Appendix B, *Node Rescue*](#), presents instructions on performing automatic and manual node rescue through the Maintenance PC.
- [Appendix C, *Guided Maintenance Overview*](#), describes how to use guided maintenance scripts to facilitate maintenance procedures.
- [Appendix D, *Illustrated Parts Catalog*](#), lists all field replaceable parts for the E-Class InServ Storage Server.

- [Appendix E, Agency Compliance Statements](#), contains safety precautions and agency compliance notices for InServ Storage Servers and storage server components.

This guide also contains an index and a revision history for your reference.

1.3 Typographical Conventions

The following typographical conventions are used in this guide:

Typeface	Meaning	Example
ABCDabcd	Used for dialog box elements such as titles and button labels.	Enter your system name in the Value box and click OK .
<i>ABCDabcd</i>	Used for file names, paths, and screen output, and for text you are to enter.	Found < 12 > 73G disks. Enter <code>cli</code> at the Windows command prompt.
ABCDabcd	Used to contrast your input with system output.	<code>cli% removevv VV1</code> Removing vv VV1.
<i>ABCDabcd</i> ABCDabcd	Used for variables in file names, paths, and screen output, and variables in user input.	<code>[root@(systemID-nodeID)root]</code> To continue Enter your system name ==> systemname

1.4 Advisories

Before performing any of the procedures described in this guide, read [Appendix E, Agency Compliance Statements](#), to obtain important safety information.

To avoid injury to people or damage to data and equipment, be sure to observe the cautions and warnings in this guide. ***Always be careful when handling any electrical equipment.***

The following types of alert messages are used to emphasize important information:



NOTE: Notes are reminders or suggestions that supplement the procedures included in this guide.



CAUTION: Cautions alert you to actions that can cause damage to equipment, software, or data.



WARNING: Warnings alert you to actions that can cause injury to people or irreversible damage to data or the operating system.

1.5 Using This Guide

The maintenance procedures described in this guide should only be used in instances where online guided maintenance is not available for the hardware that requires servicing. Refer to [Appendix C, Guided Maintenance Overview](#), for a list of Field Replaceable Units (FRUs) with available guided maintenance.

2

Precautions

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2.1 General Precautions

Follow these general precautions when servicing the InServ Storage Server to avoid injury, data loss, and damage to the server:

- Prepare an Electrostatic Discharge (ESD) safe work surface by placing an antistatic mat on the floor, or table, near the InServ E-Class Storage Server. Attach the ground lead of the mat to an unpainted surface of the rack.
- Always use a wrist grounding strap. A wrist grounding strap is provided with the storage server. Attach the grounding strap clip directly to an unpainted surface of the rack.

- Clothing can carry an electrostatic charge, avoid contact between replacement parts and clothing.



CAUTION: Field Replaceable Units (FRU's) should be within 10° C (18° F) of the temperature of the computer room before power is applied to them in an InServ system. This is especially true for disk drives. The maximum rate of change (gradient) in temperature for the FRU should be 10° C (18° F) per hour. For additional environmental specifications, see the 3PAR InServ E-Class Storage Server Physical Planning Manual.

2.2 Drive Magazine Precautions

When handling drive magazines, observe the following precautions:



CAUTION: If you require more than 30 minutes to replace a drive magazine, install a drive magazine filler panel over the empty drive magazine slot to prevent overheating while you are working. Refer to the *3PAR InServ E-Class Storage Server Installation, Deinstallation, and Upgrade Guide* for filler panel installation procedures.



CAUTION: To avoid damage to hardware and the loss of data, never power off or remove a drive magazine from an InServ E-Class Storage Server without confirming that the fault LED is solid amber while the activity LED is slowly blinking, indicating that the drive magazine is hot-plug ready.

2.3 Power Supply Precautions

When handling power supplies, observe the following precautions:



CAUTION: To prevent overheating of the drive chassis, this procedure requires a maximum service time of 10 minutes.



CAUTION: Power supply units are heavy. Use care when replacing the units.



NOTE: If power supplies on other chassis are amber, check the PDUs by verifying that all power indicators on the PDUs appear normal. For instructions on replacing a failed PDU see [Chapter 21, *Replacing a Power Distribution Unit \(PDU\) in a 3PAR Cabinet*](#).

2.4 Battery Assembly Unit Precautions

When handling a battery assembly unit, observe the following precautions:



WARNING: Do not attempt to disassemble battery assembly units. If a battery inside the unit fails, you must replace the entire battery assembly unit.

2.5 Power Distribution Unit Precautions

When handling a power distribution unit, observe the following precautions:

Before replacing a 3PAR PDU with one or more unlit indicators, verify proper functioning of the power source at the operating site by using a volt meter to test the AC line that services the PDU.



WARNING: Do not operate a storage server if any of the main power cords show evidence of damage or wear. Immediately replace a PDU with a damaged power cord by following the procedures described in this section.



WARNING: To avoid possible injury, damage to storage server equipment, and potential loss of data, do not use the surplus power outlets in the 3PAR PDUs. Never use outlets in the 3PAR PDUs to power components that do not belong to the storage server or to power storage server components that reside in other cabinets.

Upon testing, if the AC line is:

- not delivering proper voltage, consult a qualified electrician.
- not functioning properly, replace the failed PDU.

2.6 AC Cord Precautions



WARNING: To avoid serious injury, never touch a damaged power cord before switching off the PDU and power supply to which the damaged cord connects.

2.7 Controller Chassis Fan Precautions



CAUTION: The controller chassis fan blades will continue spinning for several seconds after removal. Do not place any objects beyond the fan guard.



CAUTION: At least one controller chassis fan must be running at all times during operation to prevent overheating and storage server shutdown.

3

Connecting the Maintenance PC

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Many of the maintenance procedures described in this manual require the use of a separate maintenance PC to issue Command Line Interface (CLI) commands used for performing and verifying maintenance procedures. This chapter describes procedures for connecting and configuring the maintenance PC.

3.1 Connecting to a Controller Node

The maintenance PC connects directly to a controller node through a serial cable using terminal emulation software.

To connect the maintenance PC to a node:

- 1 Insert a standard Category 5 cable into the maintenance port of one of the controller nodes as shown in [Figure 3-1](#).

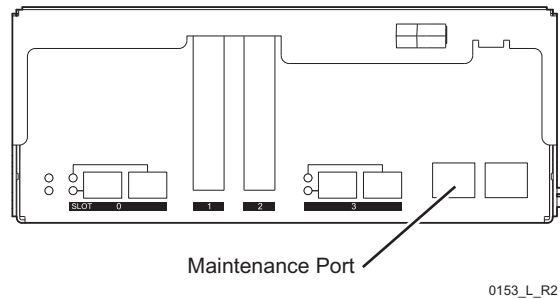


Figure 3-1. Location of the Maintenance Port

- 2 Attach a DB-9 female serial to RJ45 adapter assembly (P/N 180-0055) to the free end of the Ethernet cable and then insert the adapter into the DB-9 serial port (**COM 1**) of the maintenance PC.



NOTE: A cable with adapter (P/N 180-0055) should be connected to the Service Processor (SP). Disconnect the ethernet cable from the RJ-45 to DB-9 adapter attached to the SP (P/N 180-0059).

- 3 Attach a DB9 female to RJ45 serial adapter assembly (P/N 180-0055) to the free end of the Ethernet cable and then insert the adapter into the DB9 serial port (**COM 1**) of the maintenance PC, see [Figure 3-2](#).

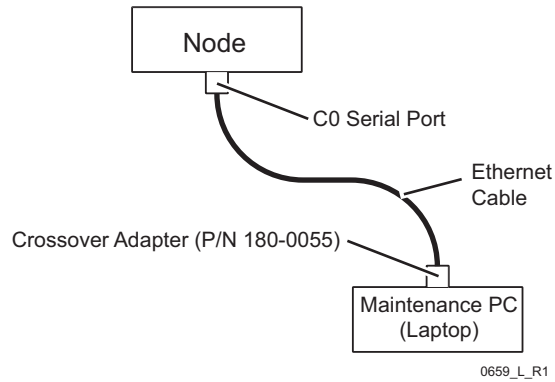


Figure 3-2. Connecting the Ethernet Cable

- 4 Power on the maintenance PC.
- 5 On the taskbar, click the **Start > Programs > Accessories > Communications > HyperTerminal**.

- 6 In the **Connection Description** dialog box, enter a session name in the **Name** box for which you are configuring the maintenance PC, and then click **OK** (Figure 3-3).



0167_S_R1

Figure 3-3. Entering a Session Name

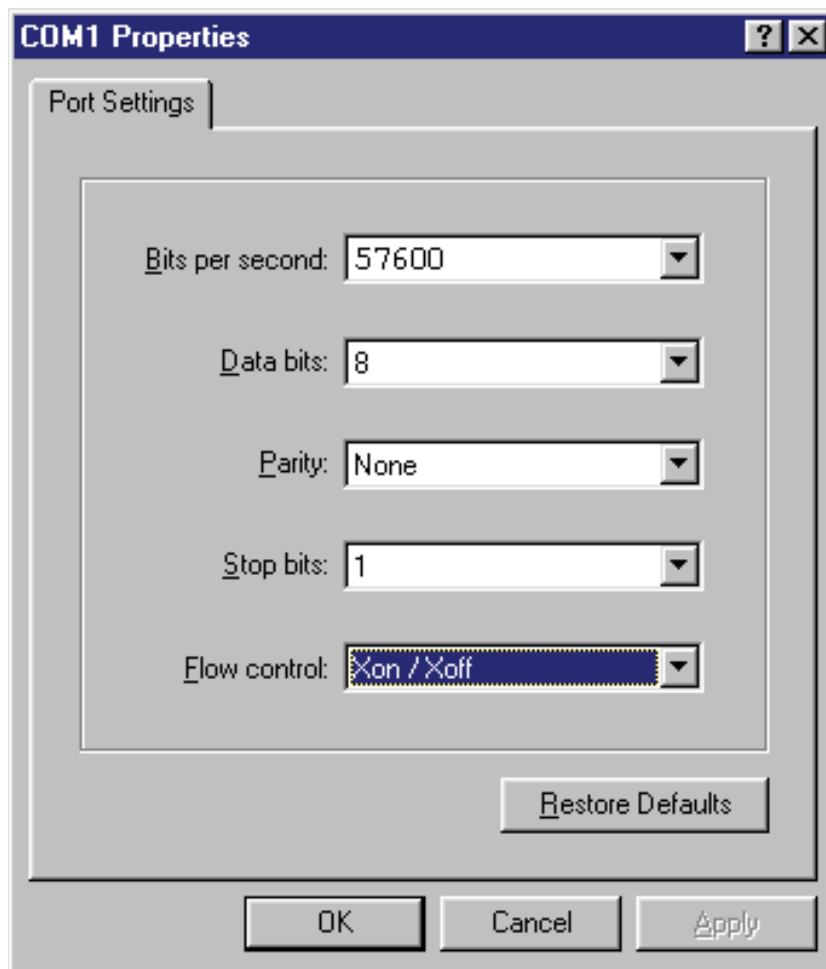
- 7 In the **Connect To** dialog box, select serial port, **COM1** from the **Connect using** list, and then click **OK** (Figure 3-4).



0168_S_R1

Figure 3-4. Selecting Serial Port COM1

- 8 In the **COM1 Properties** dialog box, select **57600** from the **Bits per second** list and select **Xon/Xoff** from the **Flow control** list. Then click **OK** (Figure 3-5).

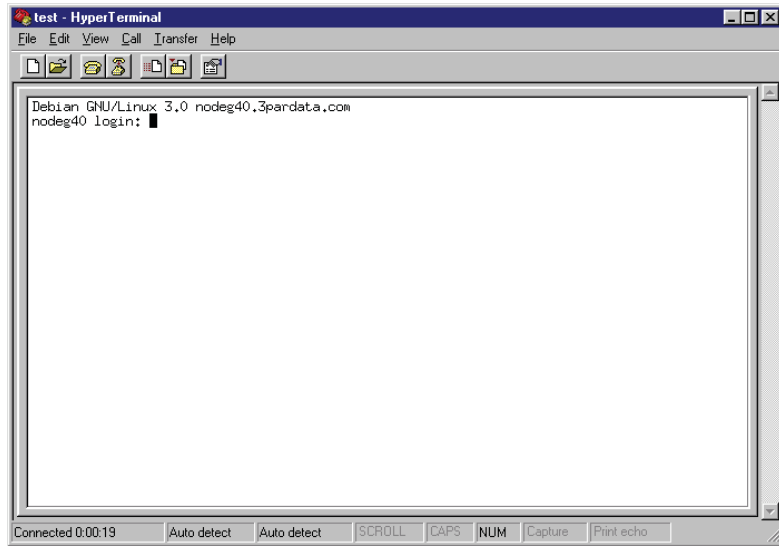


0169_S_R1

Figure 3-5. Configuring Serial Port COM1

A serial connection is established between the controller node and the maintenance PC.

- 9 Press ENTER to display the login prompt in the terminal window. A display similar to the one shown in [Figure 3-6](#) appears:

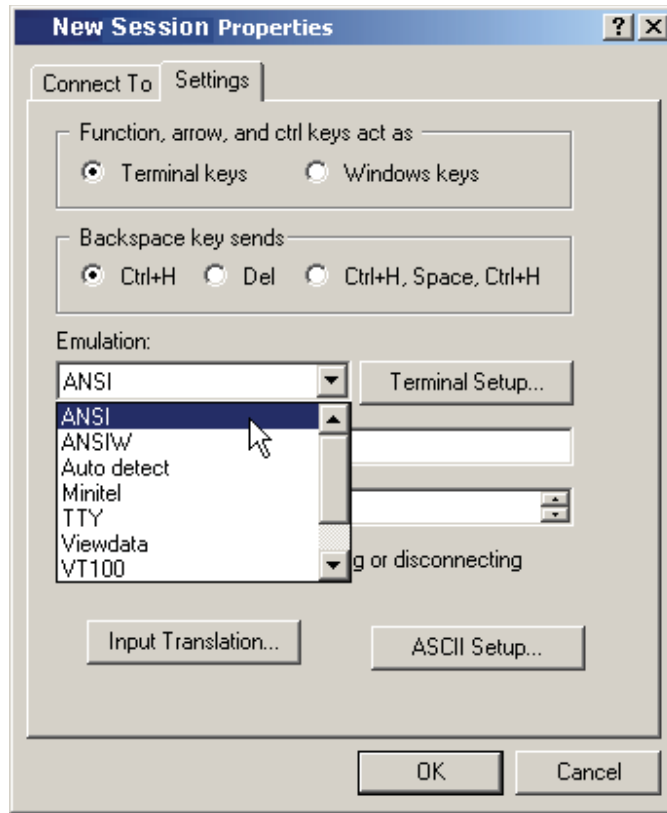


0286_S_R1

Figure 3-6. HyperTerminal Login Prompt

- 10 In the HyperTerminal main window, click **File > Properties**.

The **New Sessions Properties** dialog box opens (Figure 3-7).



0171_S_R1

Figure 3-7. New Sessions Properties Dialog Box

- 11 Click the **Settings** tab. From the **Emulation** list, select either **ANSI** or **VT100** to set the session emulation type. Then click **OK**.
- 12 Enter your login ID and password to begin maintenance procedures.



NOTE: If you do not have a login ID and password, contact your 3PAR Authorized Service Provider.

3.2 Connecting to the Service Processor

The maintenance PC can connect to the service processor either through serial connection or through the Local Area Network (LAN).

When a connection is established, use a terminal emulation program to communicate with the service processor.



NOTE: Connecting to the service processor through the LAN (Ethernet) requires establishing a secure shell session (SSH). If you do not have SSH, connect to the serial port of the service processor.

3.2.1 Using a Serial Connection

To use a serial connection:

- 1 Locate the service processor. Attach the DB9 female serial adapter (P/N 180-0055) that is at the free end of the blue Ethernet cable to the **Serial** port on your maintenance PC. A standard Category 5 Ethernet cable with the appropriate RJ-45 to DB9 adapters at each end should already be connected to the service processor's DB9 Serial port ([Figure 3-8](#) and [Figure 3-9](#) and [Figure 3-10](#)).



NOTE: See [Serial Cable Pinouts](#) on page 3.29 for serial cable pinout diagrams.

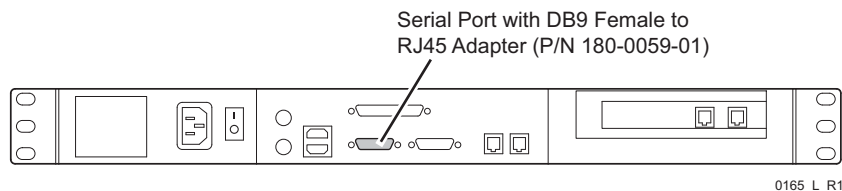


Figure 3-8. Connection Port for the Wintec Service Processor

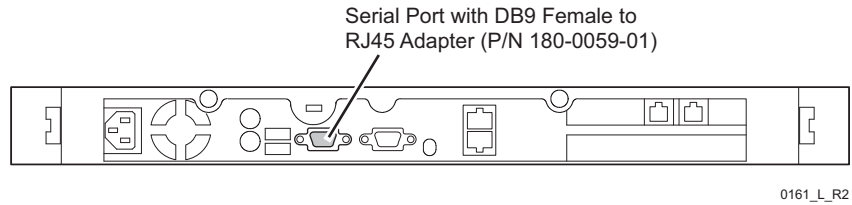


Figure 3-9. Connection Port for the Dell 750 Service Processor

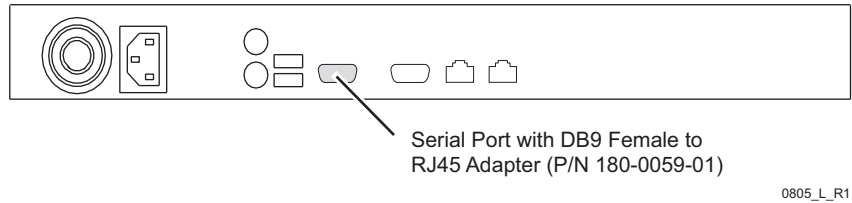


Figure 3-10. Connection Port for the Supermicro and Supermicro II Service Processor

- 2 Attach the DB9 female serial to RJ45 crossover adapter assembly (P/N 180-0055) to the free end of the Ethernet cable and then insert it into the **DB-9 serial** port on the maintenance PC (Figure 3-11).

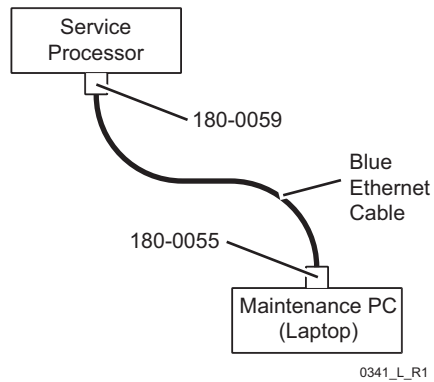


Figure 3-11. Service Processor to Laptop Connection



NOTE: The following instructions assume a Windows operating system with a laptop PC.

- 3 On the taskbar, click the **Start > Programs > Accessories > Communications > HyperTerminal**.
- 4 In the **Connection Description** dialog box, enter a session name in the **Name** box that you are configuring the maintenance PC, and then click **OK** (Figure 3-12).



0167_S_R1

Figure 3-12. Entering a Session Name

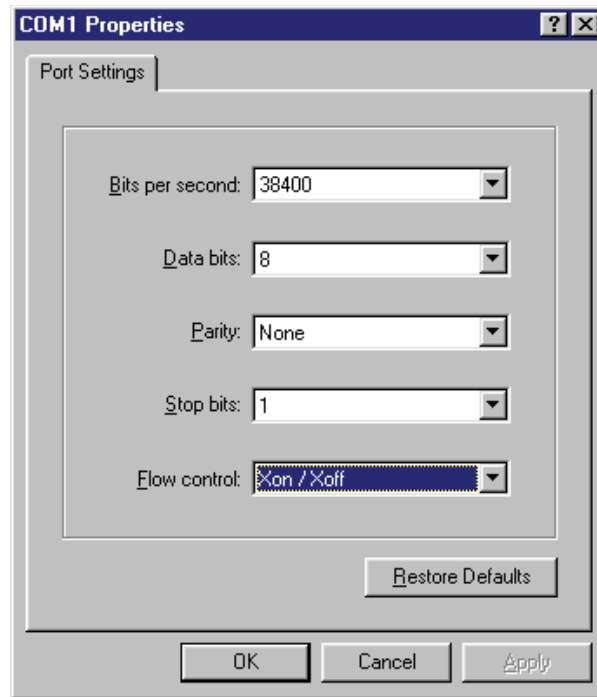
- 5 In the **Connect To** dialog box, select serial port, **COM1** from the **Connect using** list, and then click **OK** (Figure 3-13).



0168_S_R1

Figure 3-13. Selecting Serial Port COM1

- 6 In the **COM1 Properties** dialog box, select **38400** from the **Bits per second** list and select **Xon/Xoff** from the **Flow control** list. Then click **OK** (Figure 3-14).

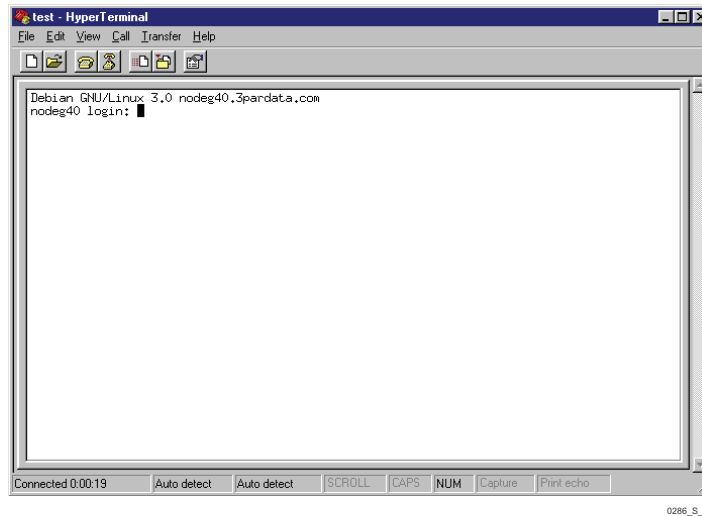


0288_L_R1

Figure 3-14. Configuring Serial Port COM 1

HyperTerminal establishes a serial connection with the service processor to which the maintenance PC is physically connected.

- 7 Press ENTER to display the login prompt in the terminal window. A display similar to the one shown in [Figure 3-15](#) appears:

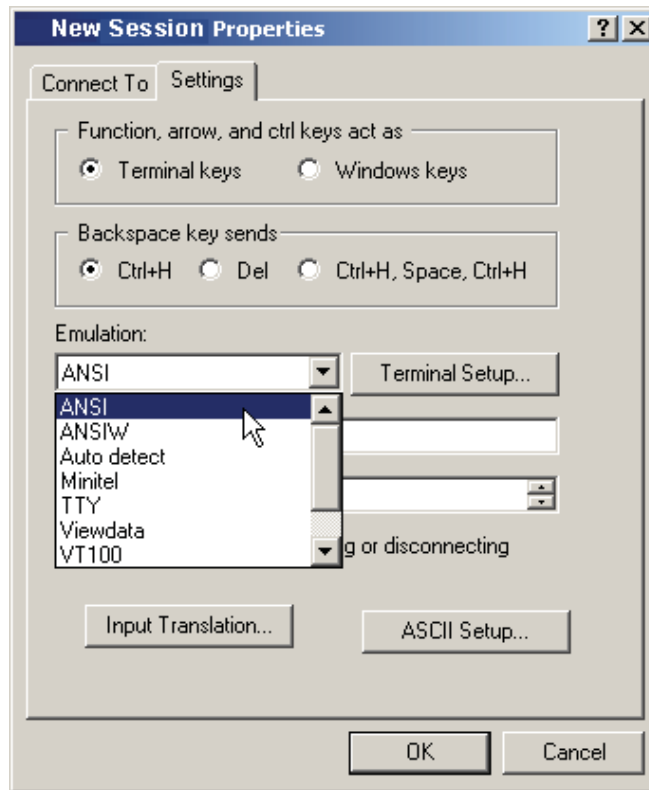


0286_S_R1

Figure 3-15. HyperTerminal Login Prompt

- 8 In the HyperTerminal main window, click **File > Properties**.

The **New Sessions Properties** dialog box opens (Figure 3-16).



0171_S_R1

Figure 3-16. New Sessions Properties Dialog Box

- 9 Click the **Settings** tab. From the **Emulation** list, select either **ANSI** or **VT100** to set the session emulation type. Then click **OK**.
- 10 Enter your login ID and password to begin maintenance procedures.



NOTE: If you do not have a login ID and password, contact your 3PAR Authorized Service Provider.

3.2.2 Using an Ethernet Connection

To connect the maintenance PC to the service processor through the private Local Area Network (LAN) using an Ethernet cable, you must first configure the LAN settings on the maintenance PC.

To configure the LAN settings on the maintenance PC:

- 1 Your system should already have a crossover Category 5 Ethernet cable inserted into the appropriate Ethernet port. If necessary, insert a crossover Category 5 Ethernet cable (RJ45 to RJ45) into the Int (private) Ethernet port. Use port **ETH1** at the rear of the service processor (Figure 3-17 and Figure 3-18 and Figure 3-19).

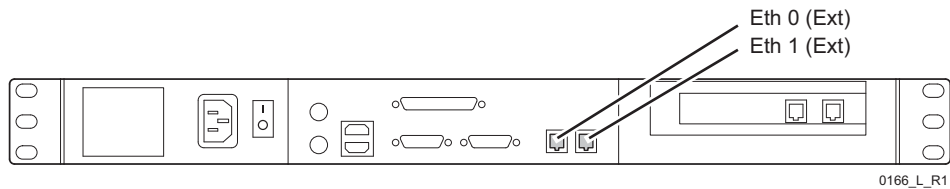


Figure 3-17. Wintec Service Processor Ethernet Ports

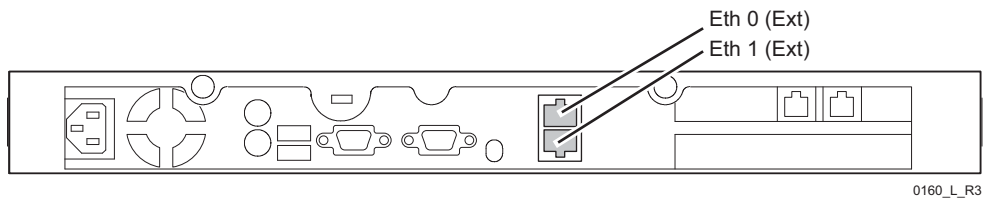


Figure 3-18. Dell 750 Service Processor Ethernet Ports

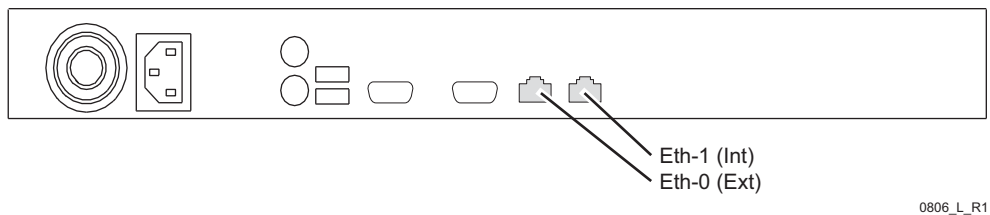


Figure 3-19. Supermicro and Supermicro II Service Processor Ethernet Ports



NOTE: The Wintec Service Processor Ethernet port (Eth 0) corresponds with the front NIC Port LED 1 and Ethernet port (Eth 1) corresponds with the front NIC Port LED 2.

- 2 Connect the free end of the crossover Ethernet cable to the Ethernet port in the maintenance PC

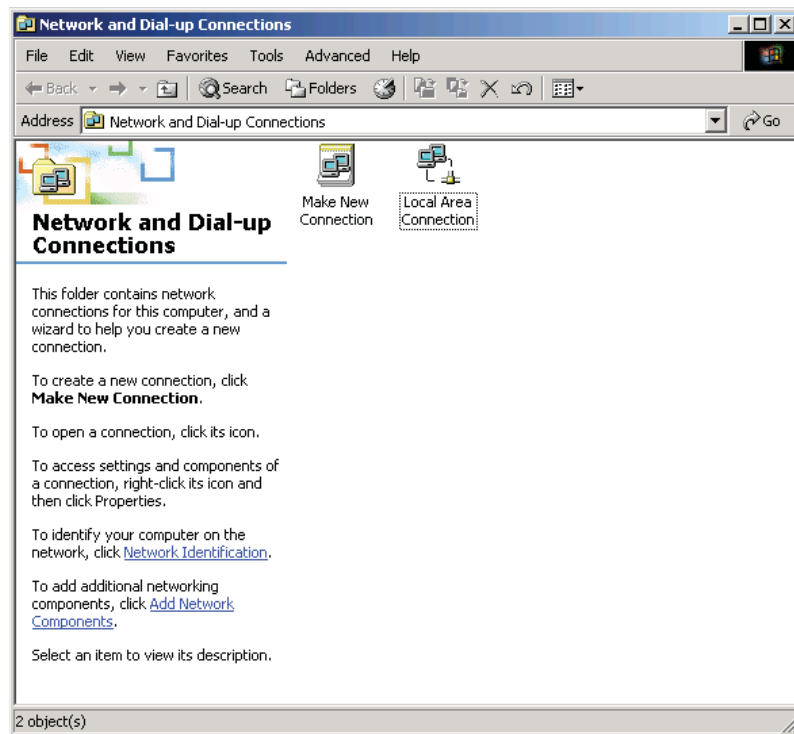


NOTE: The following instructions assume a Windows operating system with a laptop PC.

- 3 Right-click the **My Network Places** desktop icon to bring up the shortcut menu.

4 Click **Properties**.

The **Network and Dial-up Connections** window appears (Figure 3-20).



0172_S_R1

Figure 3-20. Network and Dial-up Connections Window

- 5 Right-click the **Local Area Connection** icon to bring up the **Local Area Connection Properties** menu.
- 6 Click **Properties**.

The **Local Area Connection Properties** dialog box appears (Figure 3-21).

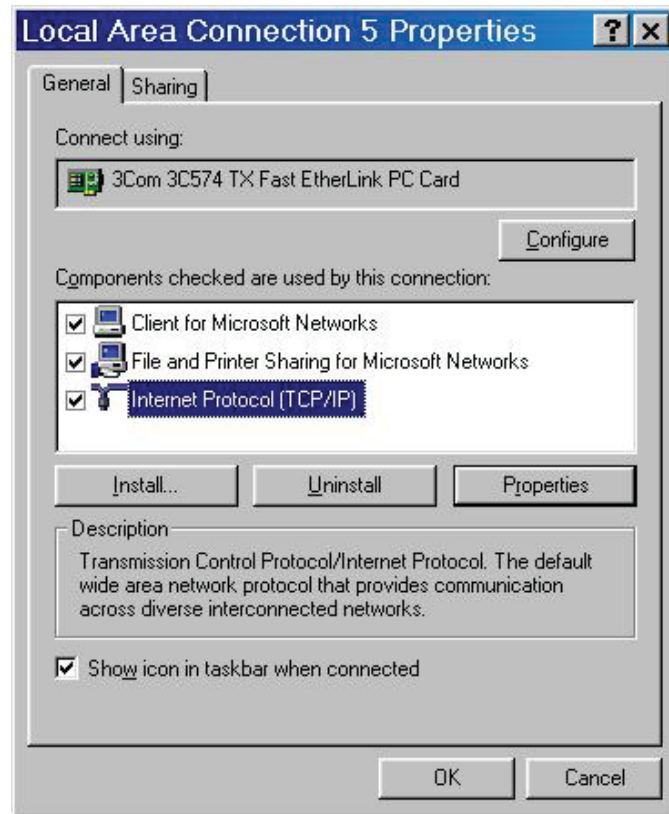
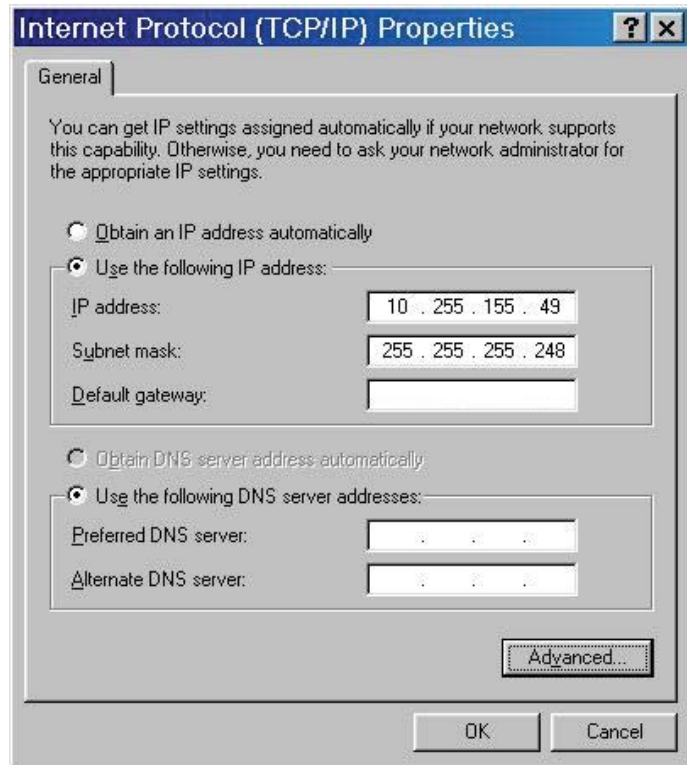


Figure 3-21. Local Area Connection Properties Dialog Box

- 7 In the **Local Area Connection Properties** dialog box, double-click **Internet Protocol (TCP/IP)**.

The **Internet Protocol (TCP/IP) Properties** dialog box appears (Figure 3-22).



0174_S_R1

Figure 3-22. Internet Protocol (TCP/IP) Properties Dialog Box

- 8 In the **Internet Protocol (TCP/IP) Properties** dialog box, click the **Use the following IP address** button and then type the following IP addresses:

Table 3-1. IP Addresses

IP address	10.255.155.49
Subnet mask	255.255.255.248
Default gateway	None.

- 9 Click **OK**.
- 10 Click **OK** in the **Advanced TCP/IP Settings** dialog box to finish configuring the LAN connection.

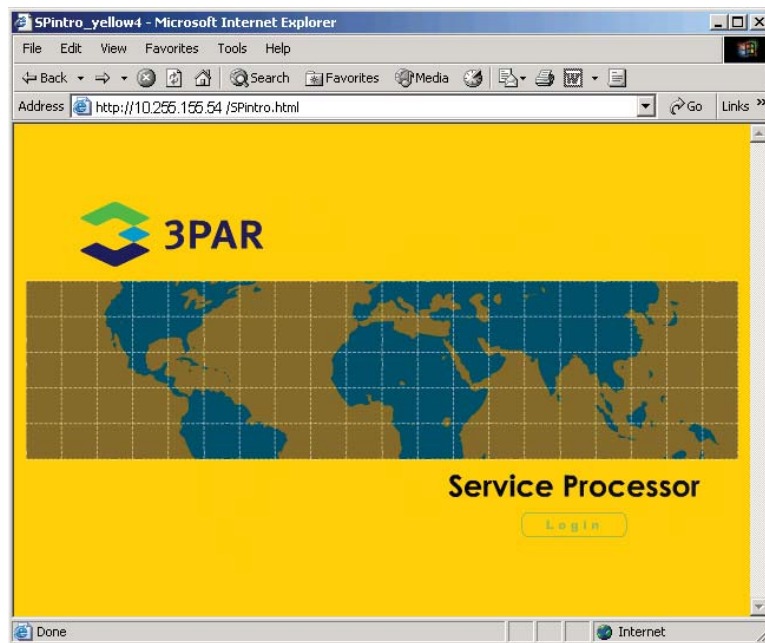
3.2.2.1 Logging into SPOCC

After the Ethernet connection is configured to the service processor, log in to the Service Processor Customer Care Interface (SPOCC) Window from the maintenance PC using any Web browser. The SPOCC is one of two service processor user interfaces along with “spmaint.” These interfaces enable you to perform various administrative and diagnostic tasks in support of both the InServ Storage Server and the service processor.

To log in to the SPOCC using a Web browser:

- 1 Type the internal (private) IP address of the service processor (10.255.155.54) in the Web browser and press ENTER.

The **Service Processor Login** screen appears (Figure 3-23).

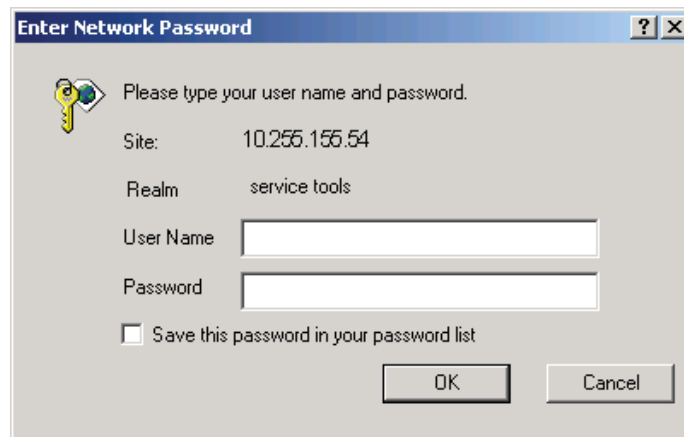


0177_S_R1

Figure 3-23. Service Processor Login Screen

- 2 Click the **Login** button.

The **Enter Network Password** dialog box appears (Figure 3-24).



0178_S_R1

Figure 3-24. Enter Network Password Dialog Box

- 3 Type your user ID and password and click **OK**



NOTE: If you do not have a user ID and password, contact your 3PAR Authorized Service Provider.

3.2.2.2 Using a Secure Shell Protocol to Access SPMAINT

After you configure the Ethernet connection to the service processor, you can also initiate an “spmaint” session using secure shell (SSH2) software such as Putty or SecureCRT. The following sections describe the various methods for obtaining an SSH connection to the service processor. An example log in from your SSH application can be:

```
ssh_<user_ID>@10.255.155.54
```

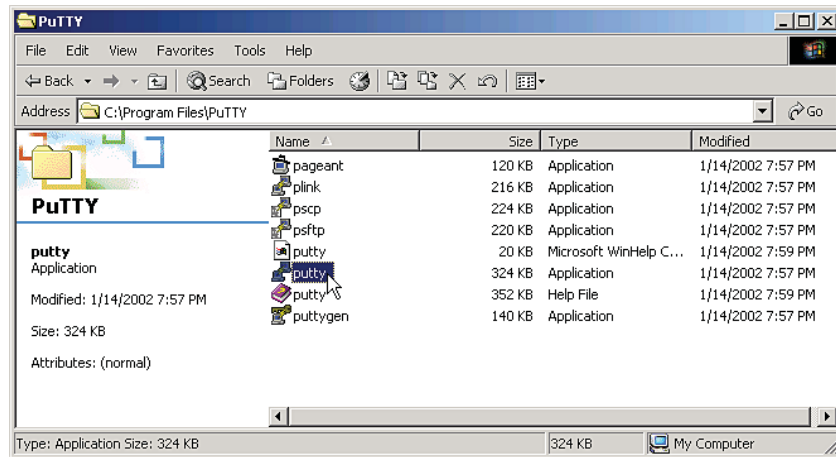
3.2.3 Using a Secure Shell Protocol

After you configure the Ethernet connection for the service processor, you can also initiate a Secure Shell Session (SSH) using PuTTY or SecureCRT. The following sections describe the various methods for obtaining an SSH connection to the service processor.

3.2.3.0.1 Using PuTTY

Follow these steps to initiate a secure shell session between the maintenance PC and the service processor using PuTTY:

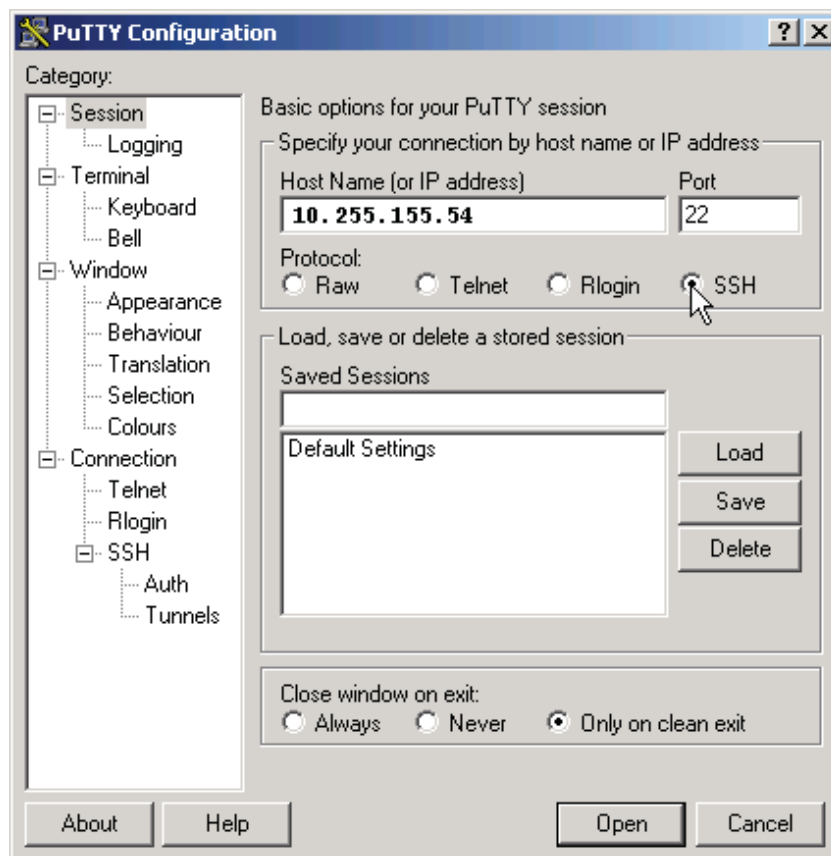
- 1 Go to the permanent location where you extracted **putty.zip** and double-click the **putty.exe** file (Figure 3-25).



0183_S_R1

Figure 3-25. Launching the PuTTY Application

- 2 In the **PuTTY Configuration** dialog box that appears, type the service processor IP address in the **Host Name (or IP address)** box, click the **SSH** radio protocol button, then click **Open** (Figure 3-26).



0184_S_R1

Figure 3-26. PuTTY Configuration Dialog Box

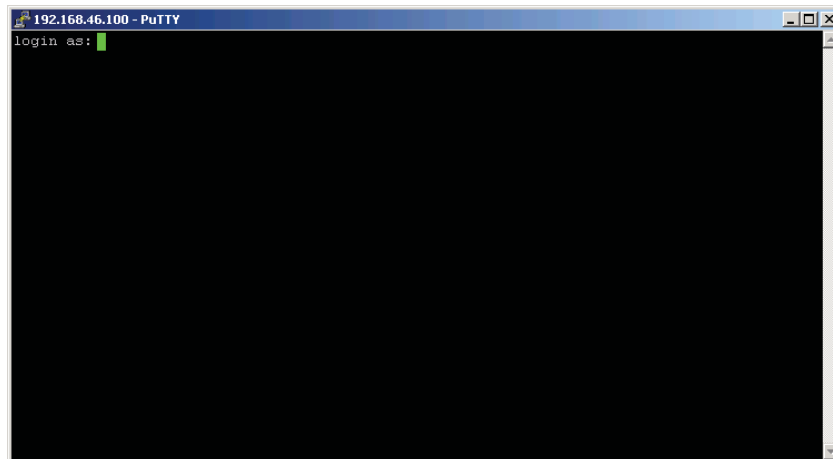
- 3 If you are connecting to the service processor for the first time, the **PuTTY Security Alert** dialog box appears. Click **Yes** (Figure 3-27).



0185_S_R1

Figure 3-27. PuTTY Security Alert Dialog Box

The **PuTTY** main window appears (Figure 3-28).



0186_S_R1

Figure 3-28. PuTTY Main Window Login Screen

- 4 Enter your user ID and press ENTER, then type your password and press ENTER.

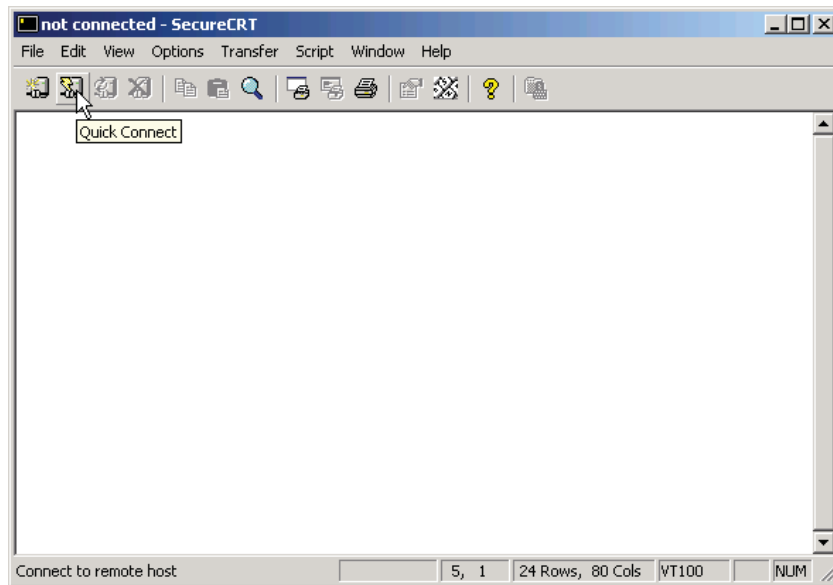


NOTE: If you do not have a user ID and password, contact your 3PAR Authorized Service Provider.

3.2.3.0.2 Using Secure CRT

To initiate a secure shell session between the maintenance PC and the service processor using SecureCRT:

- 1 On the taskbar, click **Start > Programs > SecureCRT > SecureCRT**.
- 2 In the **SecureCRT** window, click the **Quick Connect** icon (Figure 3-29).



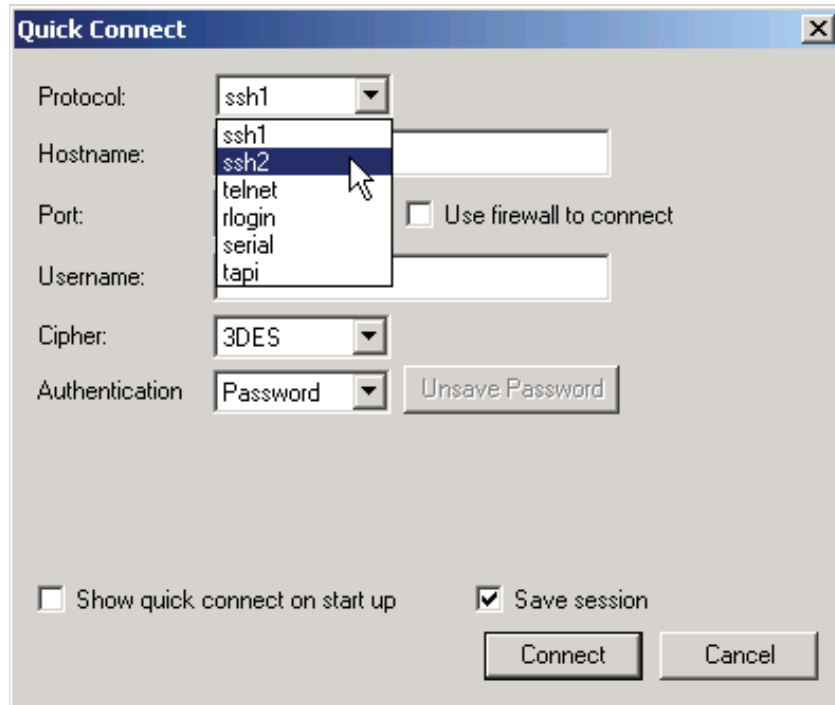
0187_S_R1

Figure 3-29. Secure CRT Window

- 3 In the **Quick Connect** dialog box that appears, select **ssh2** from the **Protocol** list, enter the IP address of the service processor in the **Hostname** box, enter your user ID in the **Username** box, then click **Connect** (Figure 3-30).



NOTE: If you are using the service processor's private network (crossover cable to Eth1), use IP address 10.225.155.54.



0188_S_R1

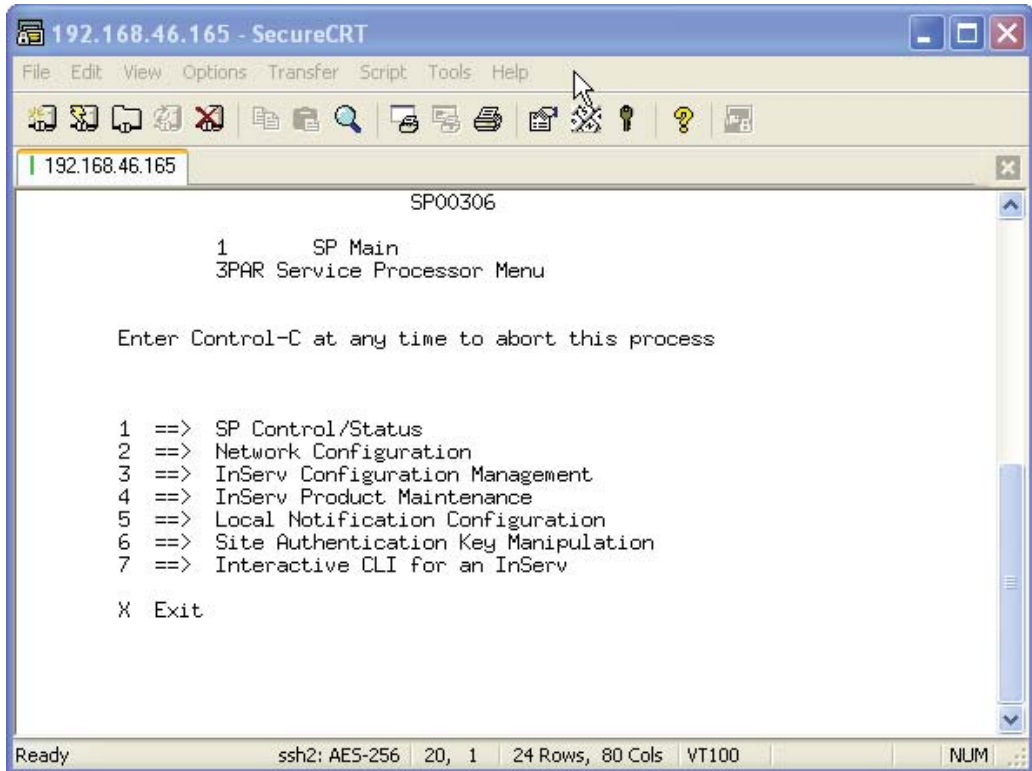
Figure 3-30. Quick Connect Dialog Box

- 4 In the **Enter Password** dialog box that appears, enter your password and click **OK**.



NOTE: If you do not have a user ID and password, contact your 3PAR Authorized Service Provider.

A window similar to the following appears (Figure 3-31).



0190_S_R2

Figure 3-31. Secure CRT Session

3.3 Serial Cable Pinouts

The following tables and diagrams illustrate the serial cable pinouts for the crossover DB9 female serial to RJ45 adapter assembly (P/N 180–0055) and the straight-through DB9 to RJ45 serial adapter (P/N 180–0059).

3.3.1 Crossover Adapter Assembly

The following table lists cable pinouts for the crossover DB9 female serial to RJ45 adapter assembly (P/N 180–0055). This connector inserts into the COM port on the maintenance PC.

Table 3-2. Crossover DB9 Female Serial to RJ45 Serial Connector Pinouts

Color	DB9 (Female) Pin	RJ45 Pin
Black	2	3
Orange	3	2
Green	5	5

Figure 3-32 illustrates the pin locations and connections for the crossover DB9 female serial to RJ45 adapter assembly (P/N 180–0055).

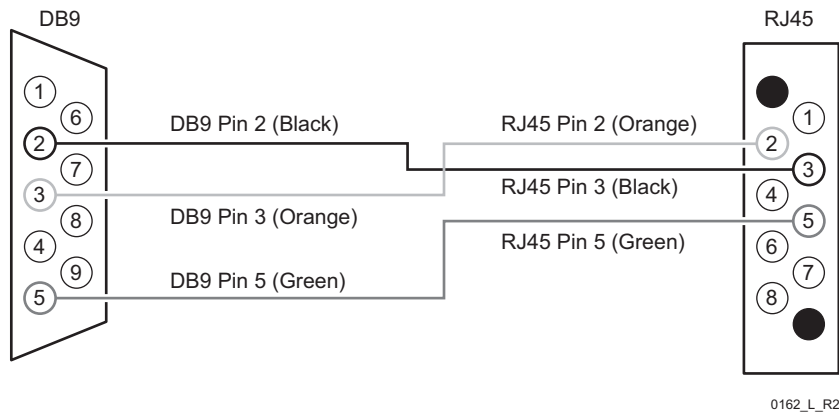


Figure 3-32. Crossover DB9 Female Serial to RJ45 Serial Connector Pinouts

3.3.2 Straight-Through Adapter

The following table lists connector pinouts for the straight-through DB9 to RJ45 adapter (P/N 180–0059). This connector inserts into the COM port on the service processor.

Table 3-3. Straight-Through DB9 to RJ45 Adapter Serial Cable Pinouts

Color	DB9 (Female) Pin	RJ45 Pin
Orange	2	2
Black	3	3
Green	5	5

Figure 3-33 illustrates the pin locations and connections for the straight-through DB9 to RJ45 adapter (P/N 180–0059).

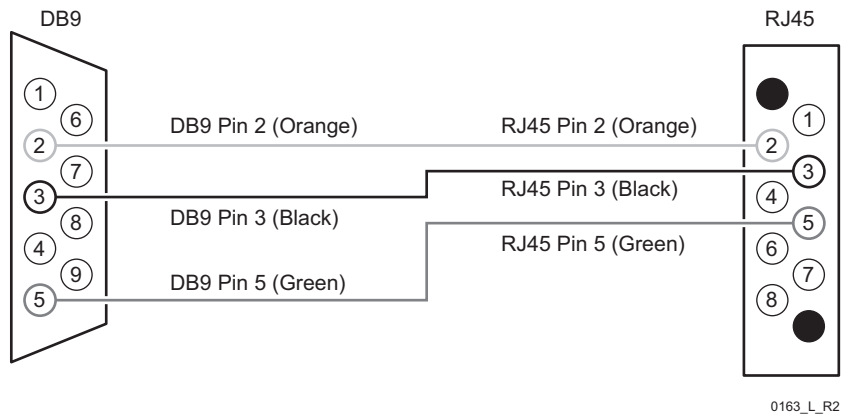


Figure 3-33. Straight-Through DB9 to RJ45 Serial Connector Pinouts

4

Powering Down the Storage Server

In this chapter

4.1 General Precautions	4.1
4.2 Power-Down Procedure	4.1

4.1 General Precautions

When powering down your Inserv Storage Server, observe the precautions described in [Chapter 2, *Precautions*](#).

4.2 Power-Down Procedure

The following procedure describes how to safely remove power from the storage server and the service processor:

- 1 Start an `spmaint` session.
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.
- 2 Select option **4, InServ Product Maintenance**.

- 3 Select option **6, Halt an InServ cluster/node.**
- 4 Select the desired InServ Storage Server.
- 5 Select option **a, all** and respond to the confirmation prompts.
- 6 Press **X** to return to the **3PAR Service Processor Menu.**
- 7 Wait until the system has completed shutdown by observing that all controller nodes in the system have the Hot-plug LED solid amber and the Power Status LED blinking fast-green (a rate of three blinks per second) ([Figure 4-1](#)).

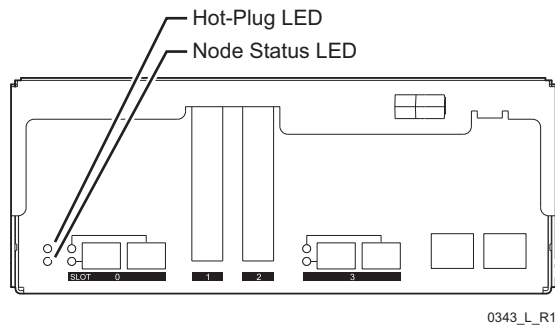


Figure 4-1. Hot-Plug LED and Power Status LED

- 8 Select option **1, SP Control/Status.**
- 9 Select option **3, Halt SP.**
- 10 When prompted, press **y** to confirm halting the service processor.
- 11 Verify the power LED on the front of the service processor is no longer illuminated.
- 12 Remove AC to the storage server by turning off the PDU circuit breakers in the cabinet ([Figure 4-2](#)).

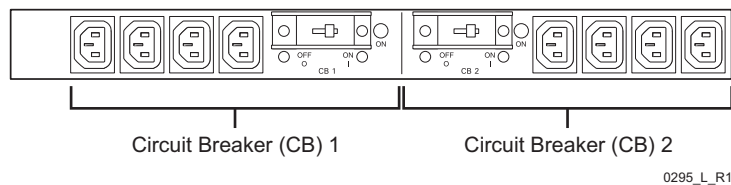


Figure 4-2. PDU Circuit Breakers

5

Understanding LED Status

In this chapter

5.1	Using the Component LEDs	5.2
5.2	Bezel LEDs	5.2
5.2.1	Removing the Bezels and Unlocking the Door	5.3
5.3	Drive Chassis LEDs	5.4
5.3.1	OPs Panel LEDs	5.5
5.3.2	FCAL Module LEDs	5.8
5.3.3	Power Supply/Cooling Module LEDs	5.10
5.3.4	Drive Magazine LEDs	5.12
5.4	Controller Node LEDs	5.13
5.4.1	LSI Logic Fibre Channel Port LEDs	5.16
5.4.2	Emulex Fibre Channel Port LEDs	5.17
5.4.3	QLogic iSCSI Port LEDs	5.18
5.4.4	Gigabit Ethernet Adapter LEDs	5.19
5.4.5	Controller Node Power Supply LEDs	5.20
5.5	Power Distribution Unit Lamps	5.21

5.1 Using the Component LEDs

InServ E-Class Storage Server components have LEDs to indicate that the hardware is functioning properly and to help identify errors. These LEDs serve as tools for diagnosing basic hardware problems.

You can quickly identify hardware problems by simply examining the LEDs on all the components. Use the tables and diagrams in the following sections to verify the hardware is functioning properly.

If you detect any problems during inspection of the LEDs, contact your 3PAR Service Provider.

5.2 Bezel LEDs

LEDs are provided at the front of the storage server on the bezel for quick assessment of node health. LEDs are provided as follows (Figure 5-1):

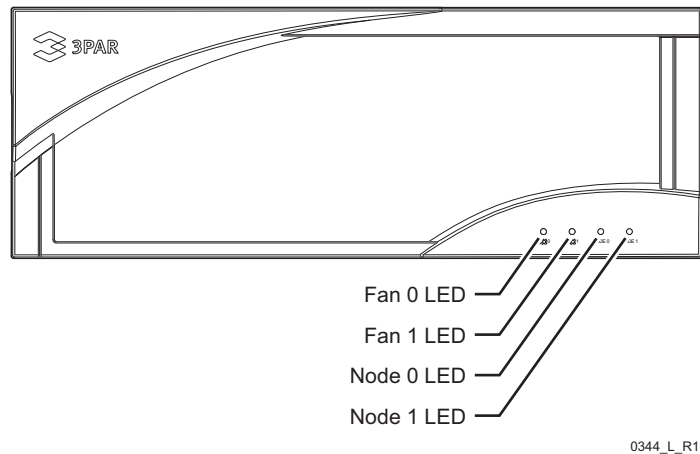


Figure 5-1. Bezel LEDs

Table 5-1. Bezel LED Meanings

LED	Appearance	Meaning
Fan 0	Solid green light	Indicates fan is operating normally.
Fan 1	Solid amber light	Indicates fan error.
Node 0	Flashing green light (1 blink per second)	Indicates node is fully functional and part of the cluster.
Node 1	Flashing amber light (1 blink per second)	Indicates the node has a failed or missing power supply, fan or battery, but the node is still operational.
	Steady green light	Indicates the node is in the process of joining the cluster.
	Rapidly flashing green (3 blinks per second), in conjunction with the Hot-plug LED being solid amber (see Controller Node LEDs on page 5.13)	Indicates the node is safe to remove.
	Steady amber light	Indicates an error within the node.

5.2.1 Removing the Bezels and Unlocking the Door



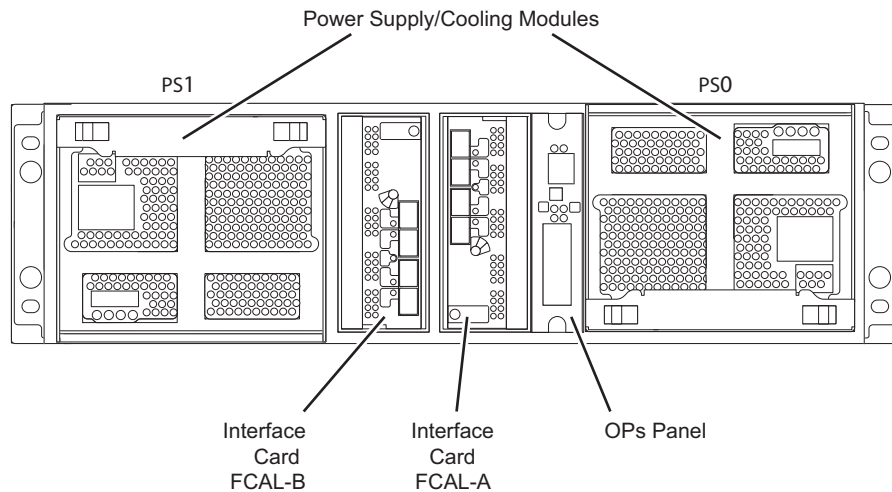
WARNING: Hazardous energy is located behind the rear access door of the storage server cabinet. Use caution when working with the door open.

To view the power supply, battery or PDU LEDs, open the rear door by unlatching the three latches located at the top, center, and bottom of the door.

5.3 Drive Chassis LEDs

The drive chassis LEDs are located at the rear of the chassis. The drive chassis houses the following components, each with their own LEDs ([Figure 5-2](#)):

- One OPs Panel
- Two FCAL modules: FCAL-A and FCAL-B
- Two Power supply/cooling modules

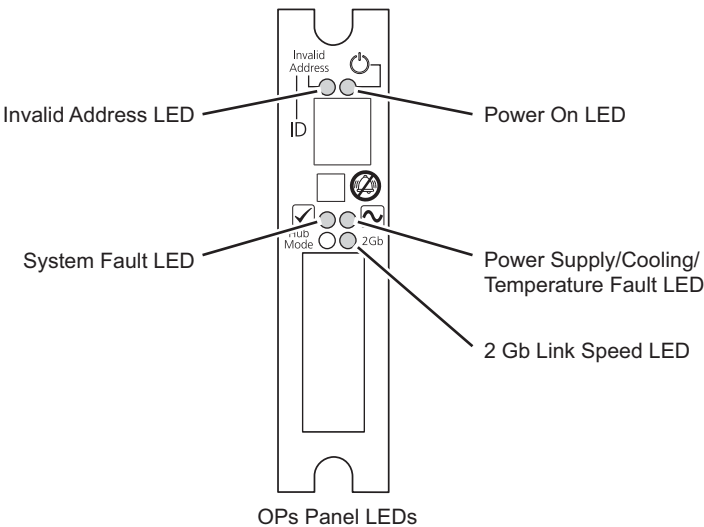


0345_L_R2

Figure 5-2. Drive Chassis Components

5.3.1 OPs Panel LEDs

The drive chassis OPs panel has the following LEDs (Figure 5-3):



0348_L_R1

Figure 5-3. Drive Chassis OPs Panel LEDs

Consult [Table 5-2](#) for OPs panel LED meanings.



NOTE: In the following table ([Table 5-2](#)), an entry of N/A indicates that the LED behavior is not relevant to the described state of the drive chassis OPs Panel.

Table 5-2. Drive Chassis OPs Panel LEDs

LED					
Power On	Power Supply/ Cooling/ Temp. Fault	System Fault	Invalid Address	1 Gb/ 2 Gb/ 4 Gb Link Speed	Description
Steady Green	Off	Off	Off	Off	5V Aux is present; overall power fail.
Steady Green	Off	Off	Off	Steady Green (2 Gb)	Power on, all functions are good.
Steady Green	Steady Amber	Off	N/A	N/A	Power supply or fan fault.
Steady Green	Steady Amber	Flashing Amber	N/A	N/A	Temperature fault.
Steady Green	Off	Steady Amber	N/A	N/A	FCAL- A or -B failed. Check FCAL LEDs.
Steady Green	Off	Steady Amber	N/A	N/A	If FCAL LEDs indicate normal operation, steady Power On and System Fault LEDs can mean one of the following: <ul style="list-style-type: none">■ Unknown FCAL type installed.■ I²C Bus failure.■ Backplane autostart watchdog failure.

Table 5-2. Drive Chassis OPs Panel LEDs *(continued)*

LED					
Power On	Power Supply/ Cooling/ Temp. Fault	System Fault	Invalid Address	1 Gb/ 2 Gb/ 4 Gb Link Speed	Description
Steady Green	Flashing Amber	Flashing Amber	N/A	N/A	One power supply has been removed and the system redundancy check option is set.
Steady Green	Off	Flashing Amber	N/A	N/A	If there is an FCAL module alarm, drives 0 and 15 are missing or failed.
Steady Green	Flashing Amber	Steady Amber	N/A	N/A	If intermittent audible alarm, OPs to FCAL communication failed.
Steady Green	N/A	N/A	Flashing Amber	N/A	Invalid address mode setting.
Steady Green	N/A	N/A	N/A	Steady Green (2 Gb)	The 2 Gb/s drive loop speed is selected.
Steady Green	Steady Amber	Steady Amber	Steady Amber	Steady Amber	5 second test state. Additionally indicated with a single beep followed with double beep.

5.3.2 FCAL Module LEDs

The FCAL modules have the following LEDs ([Figure 5-4](#)):

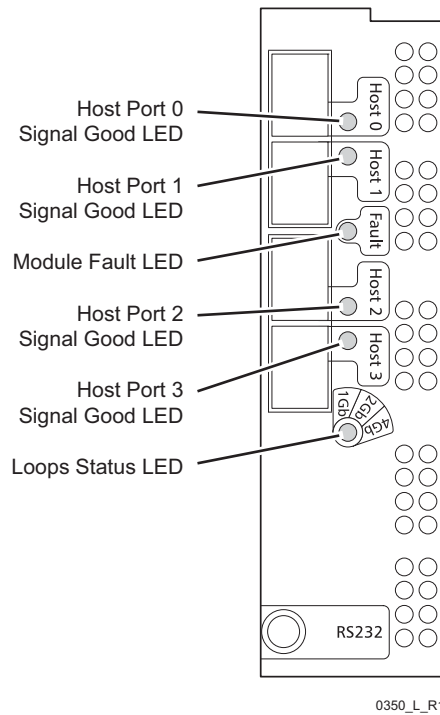


Figure 5-4. Connections and LEDs on the FCAL Modules

Consult [Table 5-3](#) to verify proper functioning and meanings of the LEDs on FCAL modules.

Table 5-3. FCAL Module LED Displays

LED	Appearance	Meaning
Host Port 0 Signal Good	Green	Incoming FC signal is established and GOOD
Host Port 1 Signal Good	Green	Incoming FC signal is established and GOOD
Host Port 2 Signal Good	Green	Incoming FC signal is established and GOOD

Table 5-3. FCAL Module LED Displays *(continued)*

LED	Appearance	Meaning
Host Port 3 Signal Good	Green	Incoming FC signal is established and GOOD
Loop Status	Blue	All device ports GOOD @ 4Gbps
	Green	All device ports GOOD @ 2Gbps
	OFF	All device ports GOOD @ 1Gb/s
	Flashing Green	Any drive has a bypassed port/loop.
Module Fault	Amber	FCAL module FAILED

5.3.3 Power Supply/Cooling Module LEDs

The drive chassis power supplies/cooling modules have the following LEDs ([Figure 5-5](#)):

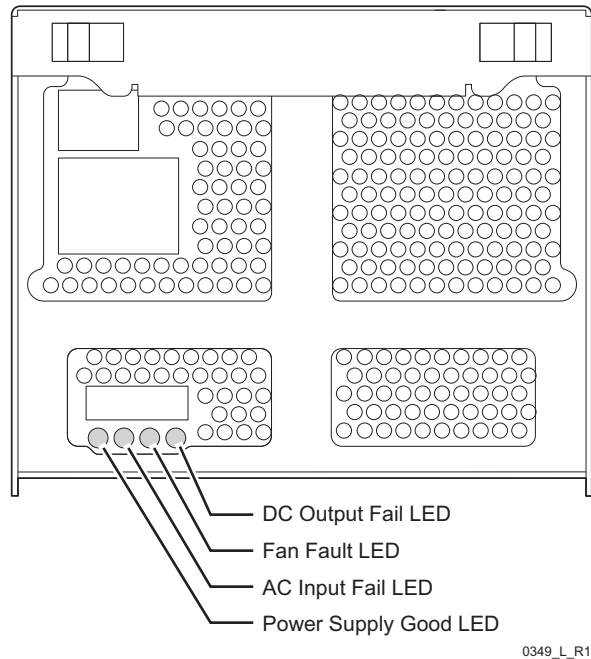


Figure 5-5. Drive Chassis Power Supply/Cooling Module LEDs

Consult [Table 5-4](#) for power supply/cooling module LED meanings.

Table 5-4. Power Supply/Cooling Module LEDs

LED	Appearance	Meaning
Power Supply Good	Steady green light	Indicates the power supply is operating normally.
	Off	Indicates the power supply is not operating correctly.

Table 5-4. Power Supply/Cooling Module LEDs *(continued)*

LED	Appearance	Meaning
AC Input	Steady green light	Indicates the AC input is normal.
	Steady amber light	Indicates AC input failure.
Fan	Steady green light	Indicates the fan is operating normally.
	Steady amber light	Indicates fan fault.
DC Output	Steady green light	Indicates the DC output is normal.
	Steady amber light	Indicates DC output failure.

5.3.4 Drive Magazine LEDs

The DC3 drive chassis holds a maximum of 16 drive magazines. See [Figure 5-6](#).

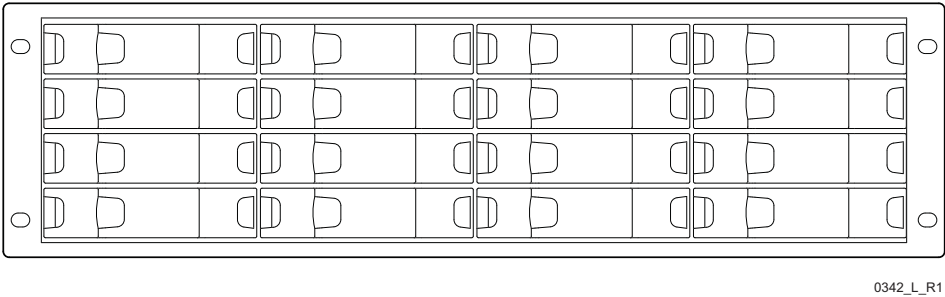


Figure 5-6. Drive Cage

Drive magazines contain the following LEDs ([Figure 5-7](#)):

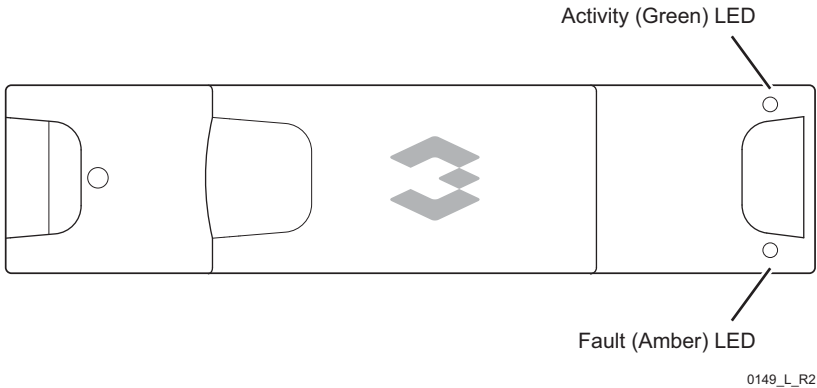


Figure 5-7. Drive Magazine LEDs.

Consult [Table 5-4](#) to verify proper functioning of disks and drive magazines.

Drive Magazine LED Displays

State of Drive Magazine	Activity (Green)	Fault (Amber)
No disk drive fitted	Off	Off
Drive Powered ON	On	Off
Drive Activity	On or blinking quickly	Off

Drive Magazine LED Displays *(continued)*

State of Drive Magazine	Activity (Green)	Fault (Amber)
Drive Fault	On	On
Drive Ready for Removal (Hot-plug ready)	Off or blinking slowly; dependent on drive type	Blinking slowly
Drive bypassed by FCAL	On	Blinking slowly



NOTE: After powering on, allow approximately one minute for the disk on the drive magazine to spin up before checking the drive magazine LEDs.

5.4 Controller Node LEDs

The E-Class Storage Server contains two controller nodes, all located in the storage server midplane.

Controller nodes contain the following LEDs ([Figure 5-8](#)):

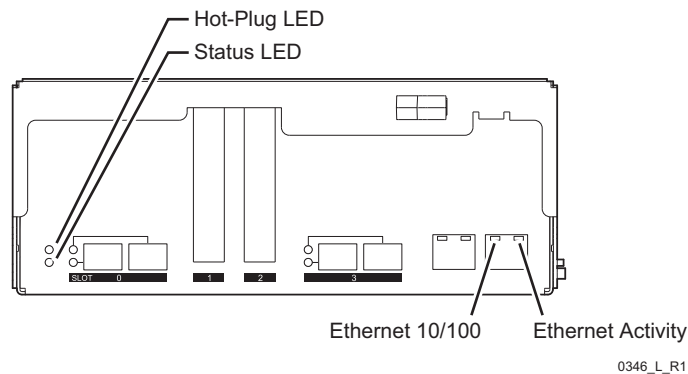


Figure 5-8. Controller Node LEDs

Consult [Table 5-5](#) to verify proper functioning of controller nodes.

Table 5-5. Controller Node LED Displays

LED	Appearance	Meaning
Status	Flashing green light (one blink per second)	Indicates node is fully functional and part of the cluster.
	Flashing amber light (one blink per second)	Indicates the node has a failed or missing power supply, fan or battery, but the node is still operational.
	Steady green light	Indicates node is in the process of joining the cluster.
	Rapidly flashing green (three blinks per second), in conjunction with the Hot-plug LED being solid amber.	Indicates the node is safe to remove.
	Steady amber light	Indicates an error within the node.
	Solid amber and Hot-plug LED amber	Fatal node failure.

Table 5-5. Controller Node LED Displays *(continued)*

LED	Appearance	Meaning
Hot-plug	Steady amber light	In combination with the Status LED blinking green three times per second, indicates the controller node is prepared for removal. In combination with the Status LED being solid, indicates a fatal node failure.
	No light	Indicates node is not prepared for removal.
Ethernet activity	Steady or flashing green light	Indicates Ethernet activity.
	No light	Indicates no Ethernet activity.
Ethernet 10/100 Mbps	Light on	100 Mb/sec mode.
	No light	10 Mb/sec mode (or disconnected).

5.4.1 LSI Logic Fibre Channel Port LEDs

The LSI Logic Fibre Channel adapters in the controller nodes also contain Fibre Channel port LEDs ([Figure 5-9](#)).

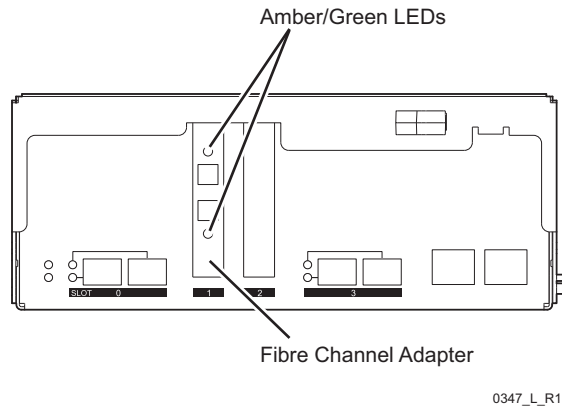


Figure 5-9. LSI Logic 2-Port Fibre Channel Port LEDs

Each port in the LSI Logic Fibre Channel adapter has one LED that is either off, green, or amber, depending on its condition.

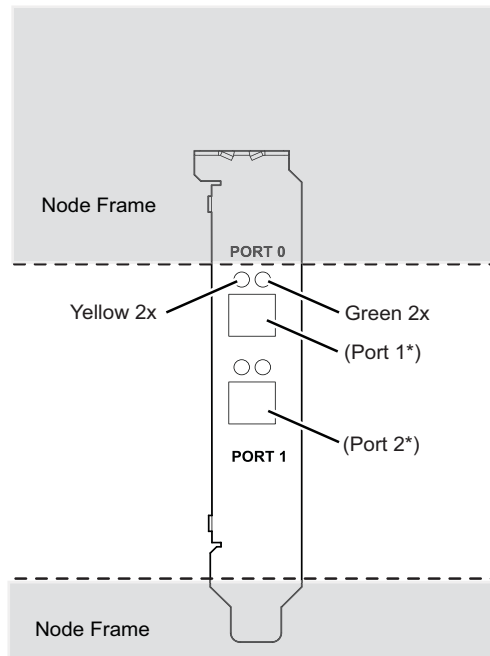
[Table 5-6](#) lists all of the LED conditions for the 2-Port LSI Logic Fibre Channel card. Consult this table to verify proper functionality of the Fibre Channel ports.

Table 5-6. Fibre Channel Port Status LED Indications (LSI Logic 2-Port Adapter)

LED Condition	Port Status
Steady amber light	Link down or cable disconnected.
Off	Link up.
Flashing green light	Indicates I/O activity.

5.4.2 Emulex Fibre Channel Port LEDs

The 2-port Emulex Fibre Channel adapters contained in the controller node contain Fibre Channel port LEDs ([Figure 5-9](#)). Two-port Emulex Fibre Channel adapters are only used in E-Class InServ Storage Servers.



*These ports correspond to the numbering as reported by the InForm OS.

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Figure 5-10. Emulex 2-Port Fibre Channel Port LEDs

Consult [Table 5-7](#) for Emulex Fibre Channel adapter LED meanings.

Table 5-7. Fibre Channel Port Status LED Indications (Emulex 2-Port Adapter)

Yellow LED	Green LED	Port Status
3PAR Internal Test Only	Off	Wake-Up Failure (dead device).
3PAR Internal Test Only	On	Normal - Link up at 1-4 Gbps.
3PAR Internal Test Only	Slow Blink	Normal - Link Down.

5.4.3 QLogic iSCSI Port LEDs

The QLogic iSCSI adapter contains two ports. There is one LED for each port as shown in [Figure 5-11](#).

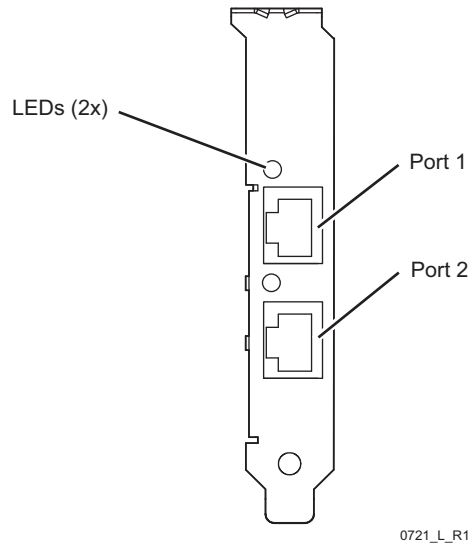


Figure 5-11. iSCSI Adapter Port LEDs

Consult [Table 5-8](#) for iSCSI adapter LED meanings.

Table 5-8. iSCSI Adapter Port LED Meanings

LED Condition	Port Status
Steady green	Indicates that a link is established.
Flashing green	Indicates receiving or transmitting activity (I/O).
Off	No connection.

5.4.4 Gigabit Ethernet Adapter LEDs

When present, the controller node Gigabit Ethernet (GigE) adapter has two LEDs ([Figure 5-12](#)).

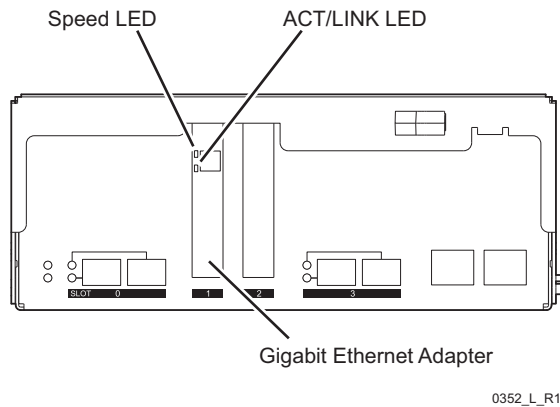


Figure 5-12. GigE Adapter LEDs

Consult [Table 5-9](#) to verify the proper functioning of GigE adapter LEDs.

Table 5-9. GigE Adapter Indicators

LED	Appearance	Meaning
ACT/LNK	Steady green light	Adapter is connected to a valid link partner.
	Flashing green light	Data activity.
	No light	No link.
Speed	No light	10 Mbps (when the ACT/LINK LED is illuminated).
	Steady green light	100 Mbps
	Steady yellow light	1000 Mbps

5.4.5 Controller Node Power Supply LEDs

Power supply units are located at the rear of all drive cages and controller nodes.

Power supplies have the following LEDs ([Figure 5-13](#)):

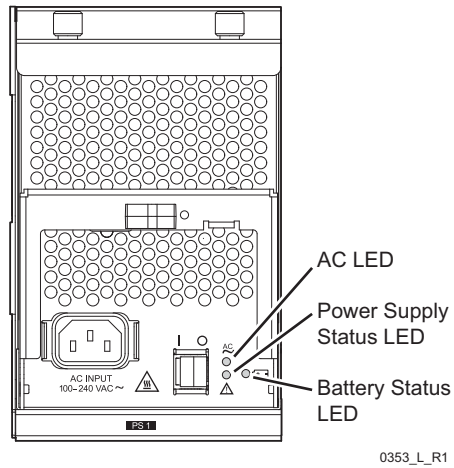


Figure 5-13. Controller Node Power Supply LEDs

Consult [Table 5-10](#) to verify proper operation of the power supplies.

Table 5-10. Power Supply LED Displays

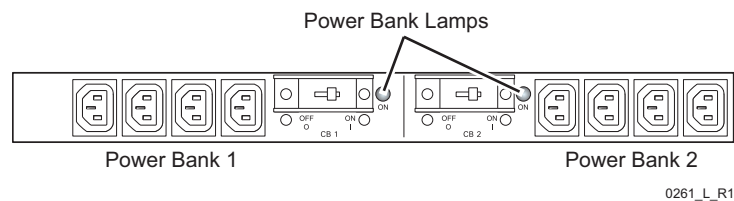
LED	Appearance	Meaning
Power supply status	Steady green light	Indicates power is on.
	Steady amber light	Indicates power supply error.
	No light	Indicates a broken connection to the power source.

Table 5-10. Power Supply LED Displays *(continued)*

LED	Appearance	Meaning
AC	Steady green light	Indicates AC is entering from an external source.
	No light	Indicates no AC is entering from an external source (for example, when power is off or when using battery power).
Battery Status	Steady green light	Indicates the battery is charged.
	Blinking green light	Battery is undergoing a test.
	Steady amber light	Indicates battery error.

5.5 Power Distribution Unit Lamps

3PAR InServ E-Class Storage Servers include two or four power distribution units (PDUs). PDUs contain two power bank lamps (Figure 5-14):

**Figure 5-14.** Power Distribution Unit Lamps

A blue illuminated lamp indicates that power is being supplied to a power bank. When the blue lamp is not illuminated, AC voltage is not present at the power bank receptacles indicating there is no input power or the circuit breaker is off.

5.6 Service Processor LEDs

5.6.1 Supermicro Service Processor

The Supermicro service processor LEDs are defined in the following section. The LEDs are located at the top of the service processor ([Figure 5-15](#)).

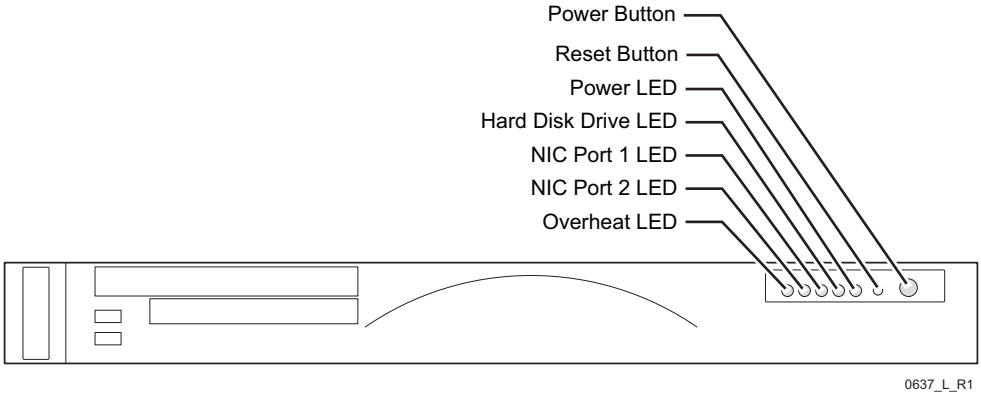


Figure 5-15. Supermicro Service Processor LEDs

Consult [Table 5-11](#) to verify proper functioning of the Supermicro service processor displays.

Table 5-11. Supermicro Service Processor Front-Panel Displays

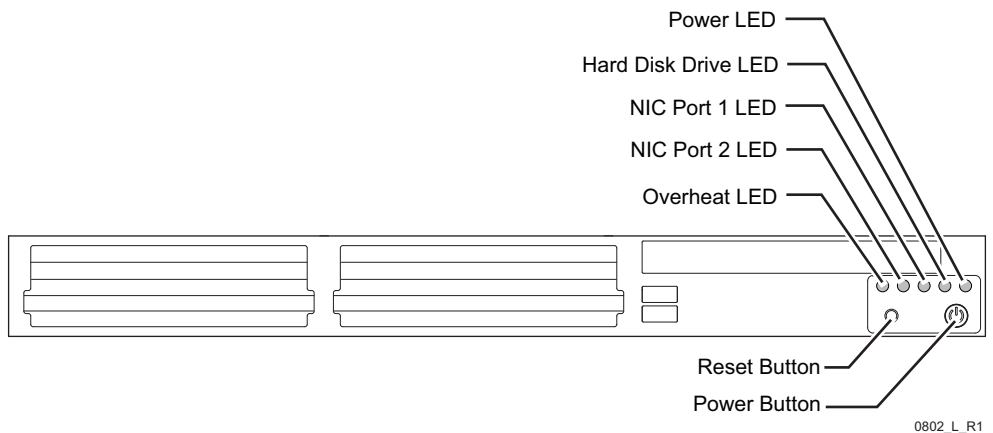
LED	Appearance	Meaning
Power	No light	Indicates the service processor is off.
	Steady green light	Indicates the service processor is on.
Hard Disk Drive	No light	Indicates no hard drive activity.
	Flashing amber light	Indicates hard drive activity.
NIC Port 2	No light	Indicates the port is not connected.
	Steady green light	Indicates the port is connected.
	Flashing green light	Indicates network activity.

Table 5-11. Supermicro Service Processor Front-Panel Displays *(continued)*

LED	Appearance	Meaning
NIC Port 1	No light	Indicates the port is not connected.
	Steady green light	Indicates the port is connected.
	Flashing green light	Indicates network activity.
Overheat	No light	Indicates the service processor temperature is normal.
	Steady red light	Indicates the service processor temperature is overheating.

5.6.2 Supermicro II Service Processor

The Supermicro II service processor LEDs are defined in the following section. The LEDs are located at the top of the service processor ([Figure 5-16](#)).

**Figure 5-16.** Supermicro II Service Processor LEDs

Consult [Table 5-12](#) to verify proper functioning of the Supermicro II service processor displays.

Table 5-12. Supermicro II Service Processor Front-Panel Displays

LED	Appearance	Meaning
Power	No light	Indicates the service processor is off.
	Steady green light	Indicates the service processor is on.
Hard Disk Drive	No light	Indicates no hard drive activity.
	Flashing amber light	Indicates hard drive activity.
NIC Port 2	No light	Indicates the port is not connected.
	Steady green light	Indicates the port is connected.
	Flashing green light	Indicates network activity.
NIC Port 1	No light	Indicates the port is not connected.
	Steady green light	Indicates the port is connected.
	Flashing green light	Indicates network activity.
Overheat	No light	Indicates the service processor temperature is normal.
	Steady red light	Indicates the service processor temperature is overheating.
	Flashing red light	Indicates the service processor has a failed fan.

5.6.3 Wintec Service Processor

The Wintec service processor LEDs are defined in the following section. The LED's are located at the top of the Wintec service processor ([Figure 5-17](#)).

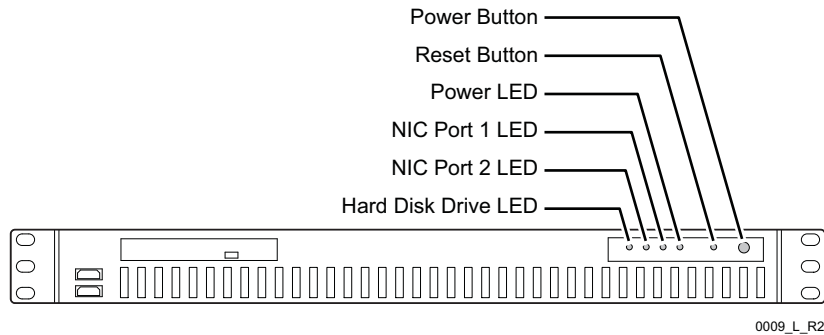


Figure 5-17. Wintec Service Processor LEDs (Typical)

Consult [Table 5-13](#) to verify proper functioning of service processor displays.



NOTE: The Wintec Service Processor NIC Port LEDs in front and Ethernet Ports in the rear are numbered differently. NIC Port 2 corresponds with Eth 1 and NIC Port 1 corresponds with Eth 0.

Table 5-13. Wintec Service Processor Front-Panel Displays

LED	Appearance	Meaning
Hard Disk	No light	Indicates no hard drive activity.
	Flashing blue light	Indicates hard drive activity.
NIC Port 2	No light	No network activity.
	Flashing amber light	Indicates network activity.

Table 5-13. Wintec Service Processor Front-Panel Displays *(continued)*

LED	Appearance	Meaning
NIC Port 1	No light	No network activity.
	Flashing amber light	Indicates network activity.
Power	No light	The service processor is off.
	Steady blue light	Indicates that the service processor is powered on.

Drive Chassis Maintenance Procedures

6

Replacing a Drive Cage FCAL Module

In this chapter

6.1	General Precautions	6.1
6.2	Removing an FCAL Module	6.2
6.3	Replacing an FCAL Module	6.8



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Chapter C, *Guided Maintenance Overview*](#) for additional information.

6.1 General Precautions

When handling FCAL modules, observe the precautions as described in [Chapter 2, *Precautions*](#).

6.2 Removing an FCAL Module

The FCAL module is located on the back of the drive cage.



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

To remove a drive cage FCAL module:

- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

- 2 Select option **7, Interactive CLI for an InServ**.
- 3 Select the desired InServ Storage Server.

- 4 For a current view of the cage issue the `showcage -d cage<x>` command, where <x> is the cage number.

```
cli% showcage -d cage0
Id  Name LoopA Pos.A LoopB Pos.B Drives  Temp RevA RevB Model Side
0  cage0 1:0:1    0 0:0:1    0      8 33-36  04  04  DC3  n/a

-----Cage detail info for cage0 -----

Position: ---
-----Midplane Info-----
VendorId,ProductId      3PARdata,DC3
Serial_Num  OPS45811C010719
Node_WWN    20000050CC010719
TempSensor_State      OK
TempSensor_Value      36
OpsPanel_State        OK
Audible_Alarm_State    Muted
ID_Switch              4
Cage_State             OK

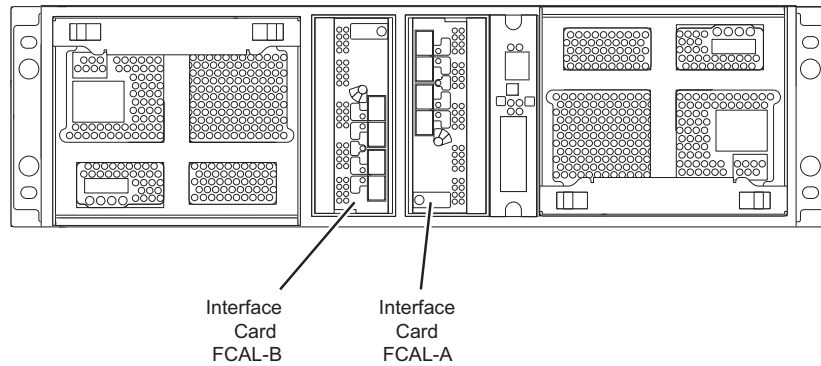
Interface Board Info  LoopA  LoopB
Firmware_status      Current Current
Product_Rev           04      04
IFC_State             OK      OK
ESH_State             OK      OK
Master_CPU            Yes     No
Loop_Map              valid   valid
Link_Speed            2Gbps   2Gbps
Port0_State           OK      OK
Port1_State           No_SFP  No_SFP
Port2_State           No_SFP  No_SFP
Port3_State           No_SFP  No_SFP

Power Supply Info State Fan State AC Model
ps0    OK   MedSpeed OK   --
ps1    OK   MedSpeed OK   --
...
```

- 5 To physically locate the cage, issue the `locatecage cage<x>` command, where <x> is the cage number..

```
cli% locatecage cage0
```

- 6 Issue the `servicecage startfc <x> cage<y>` command, where <x> is the FCAL module to be replaced and <y> is the cage name (Figure 6-1).



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Figure 6-1. Location of FCAL-B and FCAL-A

- 7 When prompted to continue, enter `y` and press ENTER.

```
cli% servicecage startfc a cage0
Are you sure you want to run "servicecage startfc a cage0"?
select q=quit y=yes n=no: y
```



NOTE: If the `servicecage` command fails, contact your 3PAR Authorized Service Provider.

- 8 Issue the `showpd` command and verify that the path for the FCAL being replaced is absent or it is not being used, as indicated by the minus sign next to the port.



NOTE: If the FCAL module or path is failed, the port will show "-----," instead of a valid N:S:P.

```
cli% showpd
```

Id	CagePos	Type	Speed(K)	State	---Size(MB)---		----Ports----	
					Total	Free	A	B
100	4:0:0	FC	15	degraded	428800	383232	2:2:1*	-----
101	4:1:0	FC	15	degraded	428800	374784	2:2:1*	-----
102	4:2:0	FC	15	degraded	428800	383232	2:2:1*	-----
103	4:3:0	FC	15	degraded	428800	374784	2:2:1*	-----

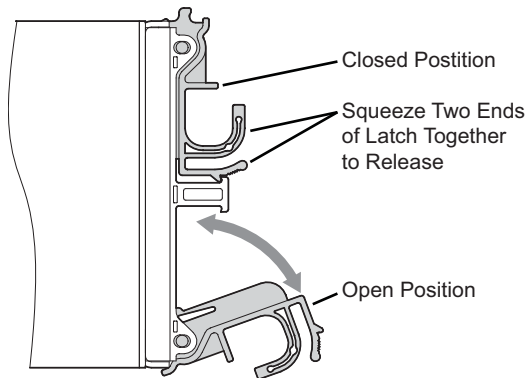
Result: The port for the FCAL being replaced shows (notice the "-" next to the port number) the disks are off the loop.



NOTE: Check the labels on the cables and ensure they get re-installed in the same location.

- 9 Detach the Fibre Channel cables from the SFP modules by squeezing the tabs on the sides of the cables and pulling to remove.

- 10** To remove the FCAL (Figure 6-2, Figure 6-3, and Figure 6-4):
- a** Using two hands, grasp each latch between the thumb and forefinger of each hand.
 - b** Squeeze thumb and forefinger together to release the latch.
 - c** Pull the latches forward to cam the FCAL out of the slot.
 - d** Slide the FCAL module out of the drive chassis using the latch on the front of the module (Figure 6-4).



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Figure 6-2. Pull Both Latches Out to the Open Position

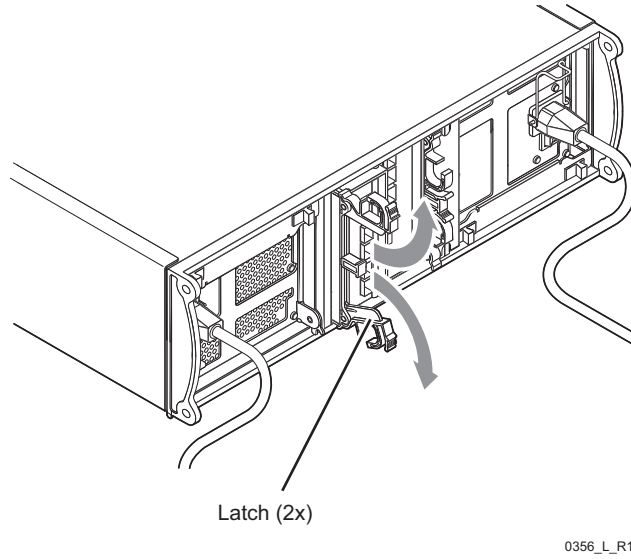


Figure 6-3. FCAL Removal

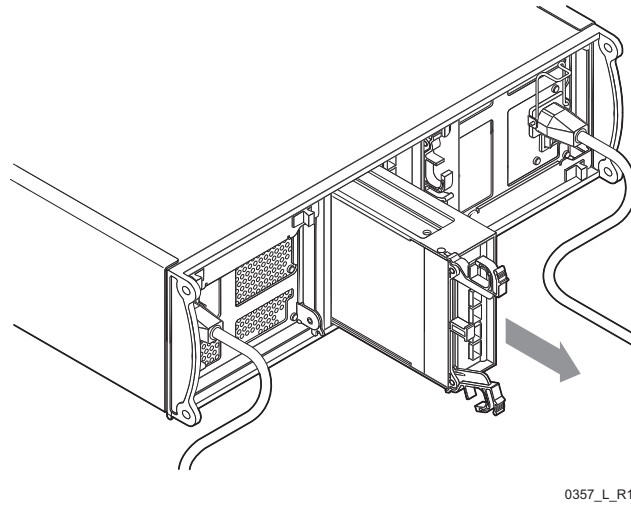


Figure 6-4. Slide the FCAL Module Out

- 11 Place the defective FCAL module on an antistatic or ESD-safe mat.

6.3 Replacing an FCAL Module

To replace a drive cage FCAL module:

- 1 Remove the replacement FCAL module from its protective packaging and place it on the antistatic mat.
- 2 For each SFP in the defective FCAL:
 - a Lift the retaining clip and gently slide the SFP module out of the defective FCAL. (Figure 6-5)

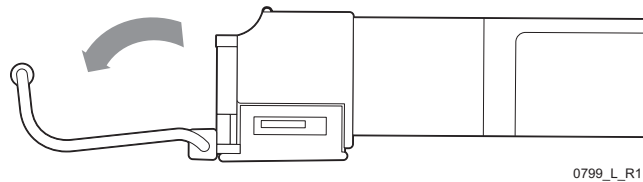


Figure 6-5. Lifting the SFP Retaining Clip

- b Carefully slide the SFP into the same port on the new FCAL until fully seated. Close and lock the retaining clip to secure the SFP in place.
- 3 Place the defective FCAL into the protective packaging for return to 3PAR.
- 4 Open the latches and slide the FCAL module into the drive chassis until it stops. Engage the FCAL by closing the latches.



NOTE: An audible click sounds when the FCAL is fully seated.

- 5 Reconnect all Fibre-Channel cables. The connected port LEDs should illuminate green.

- 6** Issue the `showcase -d cage<x>` command, where `<x>` is the cage number and verify the cage is operating normally.

```
cli% showcase -d cage0
Id  Name  LoopA Pos.A LoopB Pos.B Drives  Temp RevA RevB Model Side
0  cage0 1:0:1    0 0:0:1    0      8 33-36  04  04  DC3  n/a

-----Cage detail info for cage0 -----

Position: ---
-----Midplane Info-----
VendorId,ProductId      3PARdata,DC3
Serial_Num  OPS45811C010719
Node_WWN    20000050CC010719
TempSensor_State      OK
TempSensor_Value      36
OpsPanel_State        OK
Audible_Alarm_State    Muted
ID_Switch              4
Cage_State             OK

Interface Board Info   LoopA   LoopB
Firmware_status Current Current
Product_Rev          04      04
IFC_State             OK      OK
ESH_State             OK      OK
Master_CPU           Yes      No
Loop_Map             valid   valid
Link_Speed           2Gbps  2Gbps
Port0_State           OK      OK
Port1_State          No_SFP  No_SFP
Port2_State          No_SFP  No_SFP
Port3_State          No_SFP  No_SFP
...
```

- 7** Issue the `servicecage endfc <x> cage<y>` command, where `<x>` is either a or b and `<y>` is the cage name.

```
cli% servicecage endfc a cage0
```

- 8 Issue the `showpd` command and verify that the port for the replaced FCAL module is now active and that disks are on the loop.

```
cli% showpd
```

					---Size(MB)----		----Ports----	
Id	CagePos	Type	Speed(K)	State	Total	Free	A	B
0	0:0:0	NL	7	normal	715008	684288	0:0:1*	1:0:1
1	0:3:0	FC	10	normal	69632	1024	0:0:1	1:0:1*
2	0:4:0	NL	7	normal	715008	684288	0:0:1	1:0:1*
3	0:7:0	FC	10	normal	69632	2304	0:0:1	1:0:1
4	0:8:0	NL	7	normal	715008	684288	0:0:1*	1:0:1
5	0:11:0	FC	10	normal	69632	1024	0:0:1	1:0:1*
6	0:12:0	NL	7	normal	715008	684288	0:0:1	1:0:1*

7	total				2353920	2057216		

- 9 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- d Type your user name and password and click **OK**.
- e From the SPOCC Homepage, click **Support** from the left column menu.
- f Click **CSStatus** on the InServs Action menu.
- g Verify CSStatus indicates the system is healthy.
- h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 10 In the service processor window issue the `exit` command to stop the CLI session.
- 11 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 12 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 13 Close and lock the rear door of the server.

- 14 Package the replaced FRU and return it to 3PAR.

7

Replacing a Disk/Drive Magazine

In this chapter

7.1	General Precautions	7.1
7.2	Preparing a Drive Magazine for Replacement	7.2
7.3	Removing a Disk/Drive Magazine	7.5
7.4	Replacing a Drive Magazine	7.9



NOTE: Guided maintenance scripts are available to facilitate this procedure. See [Chapter C, Guided Maintenance Overview](#) for additional information.

7.1 General Precautions

When handling a drive magazine, observe the precautions as described in [Chapter 2, Precautions](#).

7.2 Preparing a Drive Magazine for Replacement

To prepare a drive magazine for removal and replacement:

- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears.

- 2 Select option **7, Interactive CLI for an InServ**.
- 3 Select the desired InServ Storage Server.
- 4 Issue the `showpd` command and locate the failed drive in the **State** column to determine the drive cage housing the failed drive.

```
cli% showpd
```

				---Size(MB)---		----Ports----		
Id	CagePos	Type	Speed(K)	State	Total	Free	A	B
0	4:0:0	NL	7	normal	715008	684288	0:0:1*	1:0:1
1	4:1:0	FC	10	normal	69632	1024	0:0:1	1:0:1*
2	4:2:0	NL	7	normal	715008	684288	0:0:1	1:0:1*
3	4:4:0	FC	10	normal	69632	2304	0:0:1-	1:0:1
4	4:5:0	NL	7	normal	715008	684288	0:0:1*	1:0:1
5	4:9:0	FC	10	normal	69632	1024	0:0:1	1:0:1*
6	4:11:0	NL	7	failed	715008	684288	0:0:1	1:0:1*

- 5 Issue the `servicemag start -pdid <X>` command, where X is the failed physical disk ID.



NOTE: The `servicemag start` command prepares the disks for safe removal.


```
cli% servicemag start -pdid 0 13
Are you sure you want to run servicemag?
select q=quit y=yes n=no: y
servicemag start 0 13
... servicing disks in mag: 0 13
...     normal disks: WWN [2000001D381AA54C] Id [24] diskpos [0]
...     not normal disks:
The servicemag start operation will continue in the background.
```

- 6 Issue the `servicemag status <X> <Y>` command, where X is the location of the drive cage and Y is the location of the magazine (from the previously issued `servicemag start` command), until a **Succeeded** message appears at the end of the output.

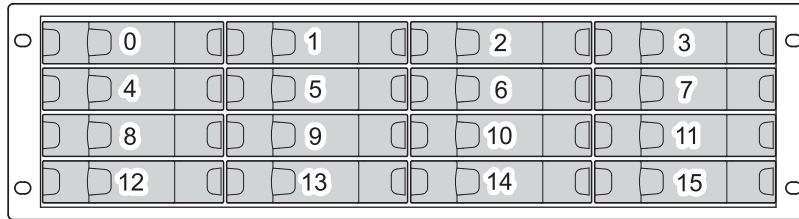
```
cli% servicemag status
Cage 0, magazine 13:
The magazine is being brought offline due to a servicemag start.
The last status update was at Mon Sep 14 14:52:08 2009.
Chunklets relocated: 10 in 2 minutes and 20 seconds
Chunklets remaining: 28
Chunklets marked for moving: 28
Estimated time for relocation completion based on 14 seconds per chunklet
is: 6 minutes and 32 seconds
servicemag start 0 13 -- is in Progress
```

```
cli% servicemag status
Cage 0, magazine 13:
The magazine was successfully brought offline by a servicemag start command.
The command completed Mon Sep 14 15:01:46 2009.
servicemag start 0 13 -- Succeeded
```

Result: When the command completes successfully, **Succeeded** appears at the end of the output, the **Activity** LED on the drive magazine is slowly blinking green or off, depending on drive type, and the **Fault** LED on the drive magazine blinks amber.



NOTE: If necessary, issue the `locatecage` command to turn on all amber LEDs for a short duration (`locatecage <cageX>`) where `<cageX>` is the cage-name/number. The drive cage number must be specified. Drive magazine locations within the drive cage are shown in [Figure 7-1](#).



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Figure 7-1. Numbered Drive Magazines

- 7 Once the Activity LED slowly blinks green or is off, and the Fault LED blinks amber, proceed to [Removing a Disk/Drive Magazine](#) on page 7.5.

7.3 Removing a Disk/Drive Magazine

To remove a disk/drive magazine:



CAUTION: It is only safe to remove a disk/drive magazine when it has been spun down and bypassed by the system software. Failure to do so can result in disk or data damage.

- 1 At the front of the storage server, confirm that the Activity LED slowly blinks green or is off, and the Fault LED blinks amber on the drive magazine that requires replacement (Figure 7-2).

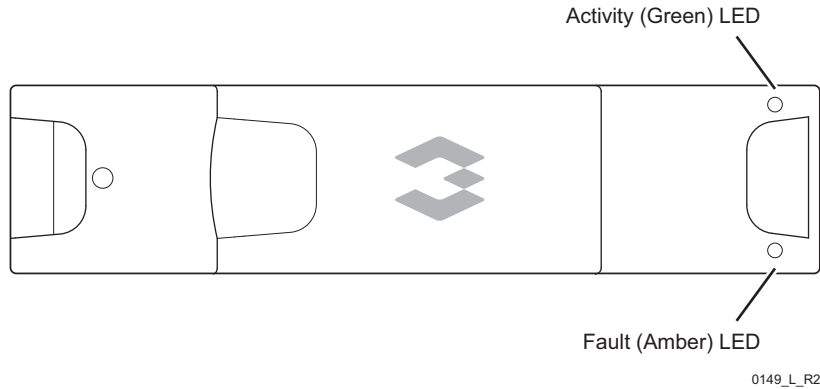
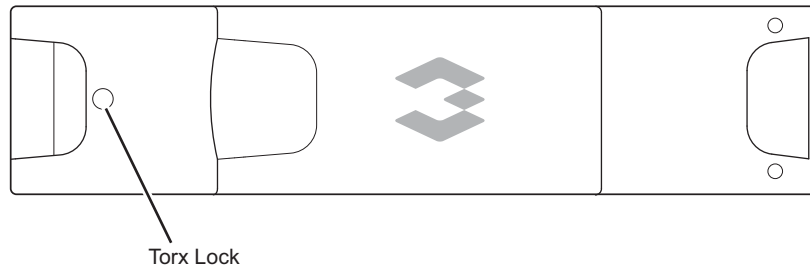


Figure 7-2. Drive Magazine LEDs

2 Remove the drive magazine.



NOTE: An optional drive magazine lock might be present. To unlock the drive magazine, use the supplied #10 Torx driver and insert it into the lock and turn counter clock-wise. (Figure 7-3)



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Figure 7-3. Drive Magazine Lock

- a Place a forefinger on the drive magazine release latch and thumb in the pocket and squeeze together to release the magazine door (Figure 7-4 and Figure 7-5).

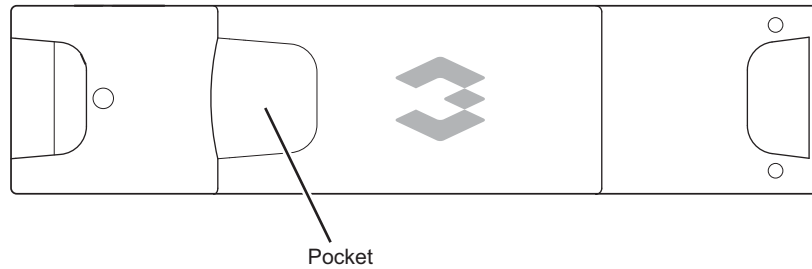
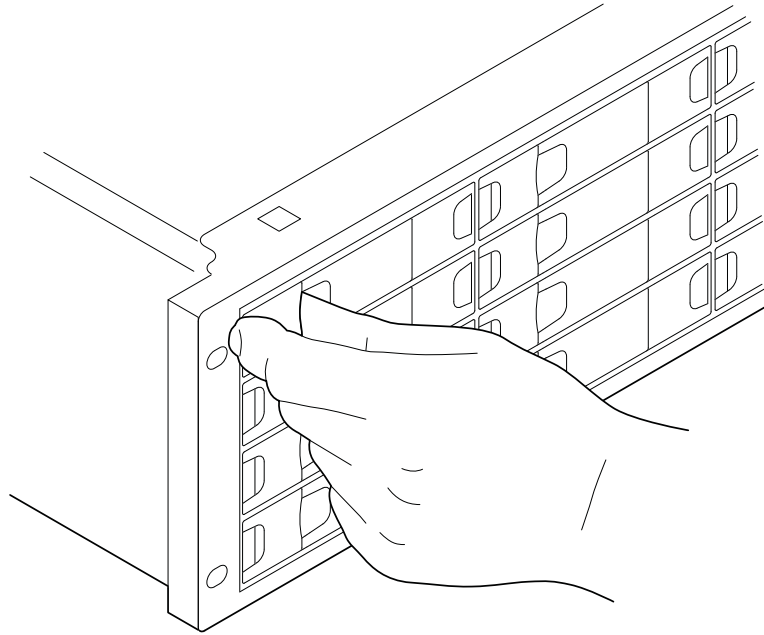


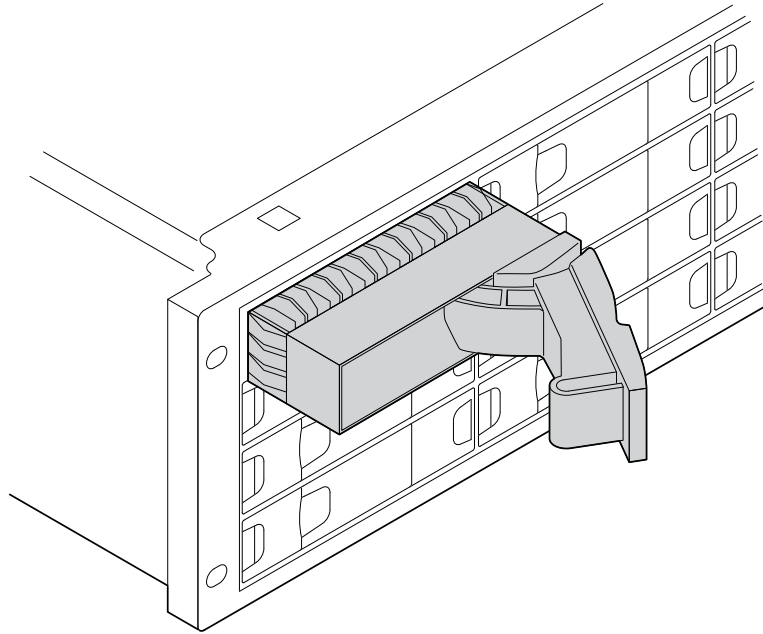
Figure 7-4. Drive Magazine Release Latch



0365_L_R1

Figure 7-5. Press the Release Latch to Open Drive Magazine Cover

- b** Swing the door outward as the magazine uncams from the drive chassis ([Figure 7-6](#)).



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Figure 7-6. Drive Magazine Cover Open

- c** Carefully slide the drive magazine out while holding firmly to the magazine door.
- 3** Place the drive magazine on an ESD-safe, level work surface.

7.4 Replacing a Drive Magazine

To replace a drive magazine:

- 1 Remove the replacement drive magazine from its protective packaging.
- 2 Open the replacement drive magazine cover (Figure 7-7).

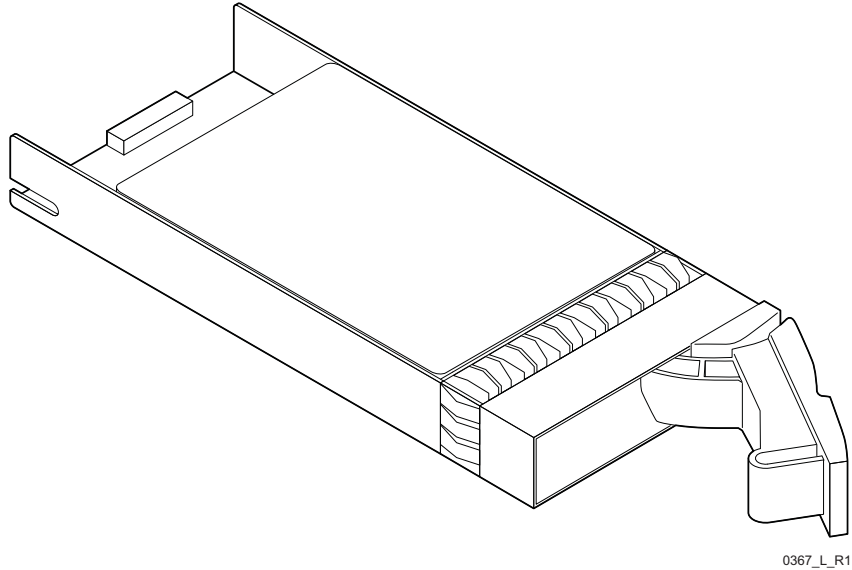
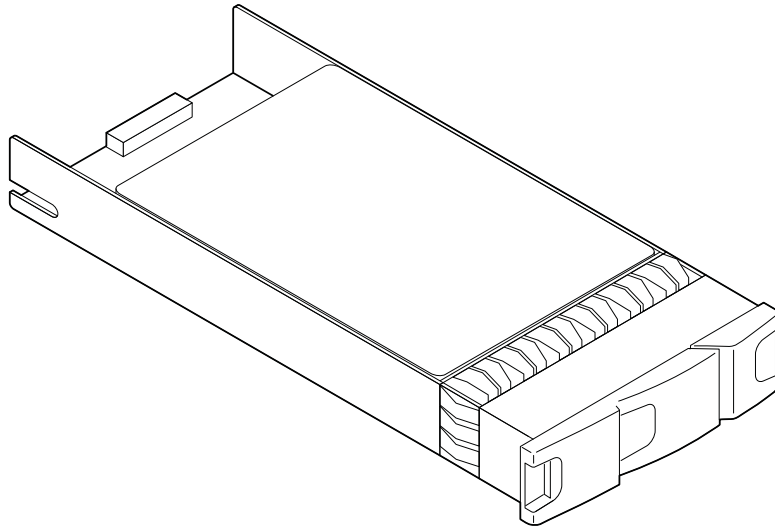


Figure 7-7. Drive Magazine Cover in the Open Position



CAUTION: Drive magazines should slide in easily. If a drive magazine does not insert smoothly, do not force it.

- 3 Carefully slide the drive magazine into the drive chassis until it stops then swing the cover to the closed position until the latch is set in place and the magazine is cammed into the drive chassis (Figure 7-8).



0366_L_R1

Figure 7-8. Drive Magazine Cover in the Closed Position



NOTE: After inserting the magazine into the drive chassis, allow approximately one minute for the disk on the magazine to spin up before checking the magazine LEDs.

- 4 Inspect the replacement magazine to confirm that the Activity LED appears steady or flashing green.
- 5 If the drive magazine was previously locked, use the #10 Torx drive and turn the lock in a clock-wise direction to secure the magazine door.
- 6 Place the failed drive magazine in the protective packaging for return to 3PAR.

- 7 In the service processor window, issue the `showpd` command and verify that the new disk is installed and in a new state.

```
cli% showpd
```

Id	CagePos	Type	Speed(K)	State	---Size(MB)---		----Ports----	
					Total	Free	A	B
-- 4:11:0	NL		7	new	715008	684288	0:0:1	1:0:1*
0 4:0:0	NL		7	normal	715008	684288	0:0:1*	1:0:1
1 4:1:0	FC		10	normal	69632	1024	0:0:1	1:0:1*
2 4:2:0	NL		7	normal	715008	684288	0:0:1	1:0:1*
3 4:4:0	FC		10	normal	69632	2304	0:0:1	1:0:1
4 4:5:0	NL		7	normal	715008	684288	0:0:1*	1:0:1
5 4:9:0	FC		10	normal	69632	1024	0:0:1	1:0:1*
6 4:11:0?	NL		7	missing	715008	684288	-----	-----

- 8 Issue the `servicemag resume <X> <Y>` command, where X is the cage number of the drive magazine and Y is the location of the drive magazine.

```
cli% servicemag resume 0 13
Are you sure you want to run servicemag?
select q=quit y=yes n=no: y
servicemag resume 0 13
... onlooping mag 0 13
... firmware is current on pd WWN [2000001D381AA54C] Id [24]
... checking for valid disks...
... checking for valid disks...
... disks in mag : 0 13
... normal disks: WWN [2000001D381AA54C] Id [24] diskpos [0]
... not normal disks:
... verifying spare space for disks 24 and 24
... playback chunklets from pd WWN [2000001D381AA54C] Id [24]

The servicemag resume operation will continue in the background.
```



NOTE: The resume process can take hours to complete depending on the number of chunklets that had to be relocated. You can continue to [step 10 on page 7.12](#) while the `servicemag resume` operation runs in the background. You can also monitor the status of the operation by using the `service mag status X Y` command.

- 9 Issue the `servicemag status <X> <Y>` command, where X is the cage number of the drive magazine and Y is the location of the drive magazine.

```
cli% servicemag status 0 13
The magazine was brought online by a successful servicemag resume command.
The command completed at Mon Sep 14 15:14:21 2009.
servicemag resume 0 13 -- Succeeded
```

When the command completes successfully, **Succeeded** appears at the end of the output.

- 10 When the resume operation completes, dismiss the old disk from the system by issuing the `dismisspd <PD_ID>` command. This step is not required if `servicemag start -pdid` was used.

- 11 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- d Type your user name and password and click **OK**.
- e From the SPOCC Homepage, click **Support** from the left column menu.
- f Click **CSStatus** on the InServs Action menu.
- g Verify CSStatus indicates the system is healthy.
- h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 12 In the service processor window issue the `exit` command to stop the CLI session.
- 13 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 14 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 15 Close and lock the rear door of the server.

Controller Node Maintenance Procedures

8

Replacing a Controller Node

In this chapter

8.1	General Precautions	8.1
8.2	Removing a Controller Node	8.2
8.3	Replacing a Controller Node	8.4

8.1 General Precautions

When handling controller nodes, observe the precautions as described in [Chapter 2, Precautions](#).

8.2 Removing a Controller Node

To remove a controller node:

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

2 Select option **4, InServ Product Maintenance**.



NOTE: If the failed node is already halted, it is not necessary to shutdown the node as it is already not part of the cluster. Skip to [step 8 on page 8.2](#).

3 Select option **6, Halt an InServ cluster/node**.

4 Select the desired InServ.

5 Select the desired node.

6 Respond to the confirmation prompts.

7 A **Site Service Presence Requirement** warning is issued. Select `y` and press ENTER to continue.

8 After the node halts (approximately 1 to 2 minutes), verify that the node status LED is rapidly flashing green and that the node hotplug LED is solid amber indicating that the node has been halted. ([Figure 8-1](#)).



NOTE: If the node is not shutdown through the software, or for example, a node failure, the Node Status LED and Hot-Plug LED may not be in the state described in [step 8](#).

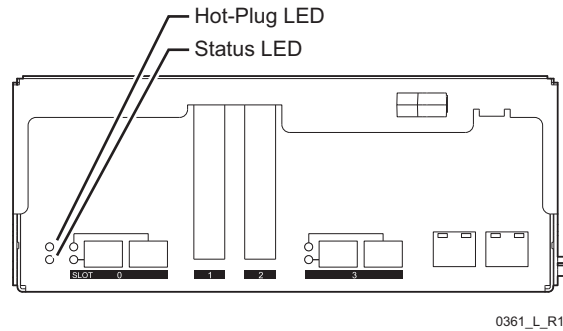


Figure 8-1. The Hot-Plug LED in the Controller Node

- 9 Remove the controller node by following the procedures as described in [Removing a Controller Node](#) on page 9.2. Return to [step 10](#) after removing the node.



CAUTION: Do not turn off the node power supplies. The node will be powered off when the node lever is lowered.

- 10 Place the removed controller node onto an ESD-safe work surface.
- 11 Remove the replacement controller node from the protective packaging and place onto the ESD-safe work surface.
- 12 Remove any PCI cards from slots 1 and 2 and install them into the same slots in the replacement controller node. Refer to the procedures in [Chapter 12, Replacing Components in Controller Slots](#) for additional information.
- 13 Remove the control cache and data cache DIMMs from the failed node and install them into the replacement node. For additional information, refer to the procedures in [Chapter 13, Replacing Control Cache](#) and [Chapter 14, Replacing Data Cache](#).
- 14 You may be able to swap the controller node disks between nodes to shorten replacement time, provided the disk in the failed node is expected to be good. For additional information, refer to [Chapter 15, Replacing a Controller Node Disk](#). If the disk in the outgoing node is questionable, do not swap the disks.
 - a If the disks are swapped:
 - ◆ It is not necessary to perform the node-rescue procedure to install the software on the node disk.

- ◆ Properly install the blank disk into the failed node to prevent damage during shipping.
 - b If the disks are not swapped, it is necessary to install software on the blank disk by performing the node-rescue procedure.
- 15 Place the failed controller node into the protective packaging for return to 3PAR.

8.3 Replacing a Controller Node



NOTE: If you installed the node disk from the failed node into the replacement node as described in [step 14](#) in the previous section, *Removing a Controller Node*, DO NOT perform the node rescue procedure. Instead, skip to [step 2](#) as follows.

- 1 Prepare the service processor for node rescue as described in [Appendix B, Node Rescue](#) before inserting the replacement node as described in [Reinstalling a Serviced Controller Node](#) on page 9.4.



CAUTION: After the new controller node is installed, DO NOT power on the node or reconnect the cables at this time.

- 2 At the rear of the storage server, slide the node into the chassis with the release lever pulled down.
- 3 Lift the node latch up into the closed position to apply power and allow it to boot. The node will boot one or two times depending on the BIOS level (the node requires approximately seven minutes per boot cycle).
- 4 Verify that the node LED is slowly blinking green indicating that the node has joined the cluster.

- 5 From the interactive CLI session screen of `spmaint`, verify that all nodes have joined the cluster by issuing the `shownode` command.

```
cli% shownode
```

Node	--Name--	-State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	1024	2048	100

- 6 Reboot the replaced node by issuing the `shutdownnode reboot <node_ID>` command.



NOTE: This additional reboot is required to insure the Port WWNs indicate the InServ Serial Number correctly.

- 7 After the node reboots (5 to 10 minutes), monitor the node status LED and verify again that all nodes have joined the cluster by issuing the `shownode` command.

```
cli% shownode
```

Node	--Name--	-State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	1024	2048	100

- 8 Re-connect the customer's Ethernet cable and all other cables to the node once the node has rebooted.

- 9 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- d Type your user name and password and click **OK**.
- e From the SPOCC Homepage, click **Support** from the left column menu.
- f Click **CSStatus** on the InServs Action menu.

- g** Verify CSStatus indicates the system is healthy.
- h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 10** In the service processor window issue the `exit` command to stop the CLI session.
- 11** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 12** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 13** Close and lock the rear door of the server.

9

Servicing a Controller Node for Internal FRU Service

In this chapter

9.1	General Precautions	9.1
9.2	Removing a Controller Node	9.2
9.3	Reinstalling a Serviced Controller Node	9.4

It is necessary to remove controller nodes from the node chassis before performing internal maintenance procedures. Read the following sections for instructions on handling, removing, and reinstalling controller nodes.



NOTE: For instructions on replacing a failed controller node, turn to [Chapter 8, Replacing a Controller Node](#).

9.1 General Precautions

When handling controller nodes, observe the precautions shown in [Chapter 2, Precautions](#).

9.2 Removing a Controller Node



NOTE: Procedures in another chapter prepared the node for shutdown and removal prior to starting the following instructions.

To remove a controller node:

- 1 Confirm the hot-plug LED appears solid amber on the controller node requiring removal (Figure 9-1).



CAUTION: To avoid damage to hardware and the loss of data, never power off or remove a controller node from the storage server without confirming that the hot-plug LED on the node appears solid amber.

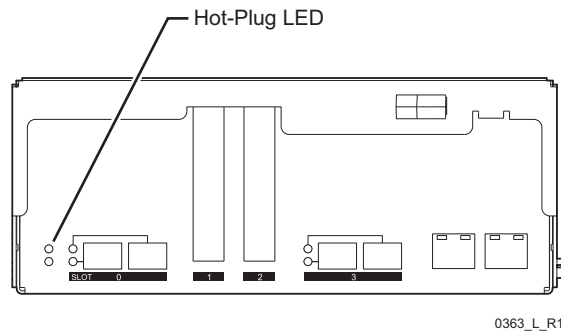


Figure 9-1. Hot-Plug LED on a Controller Node

- 2 At the rear of the server, ensure all cables that connect to the controller node have labels, indicating where they are connected. If not, note the locations and remove the cables.



CAUTION: Do not turn off the node power supplies. The node will be powered off when the node lever is lowered.

- 3 Push the release tab of the controller node lever to the left ([Figure 9-2](#)).

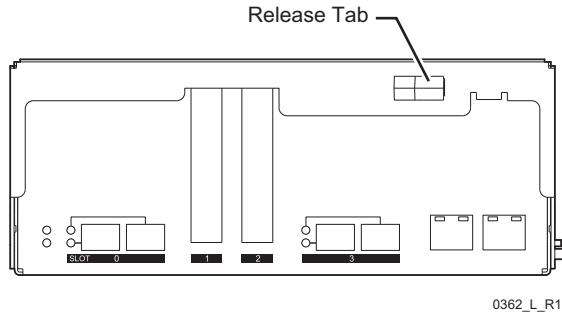


Figure 9-2. Controller Node Release Tab

- 4 Pull down on the release lever until the controller node disengages from the storage server midplane.
- 5 With one hand on the release lever and the other hand supporting the weight of the controller node from beneath, slide the node out of the chassis, as shown in [Figure 9-3](#).

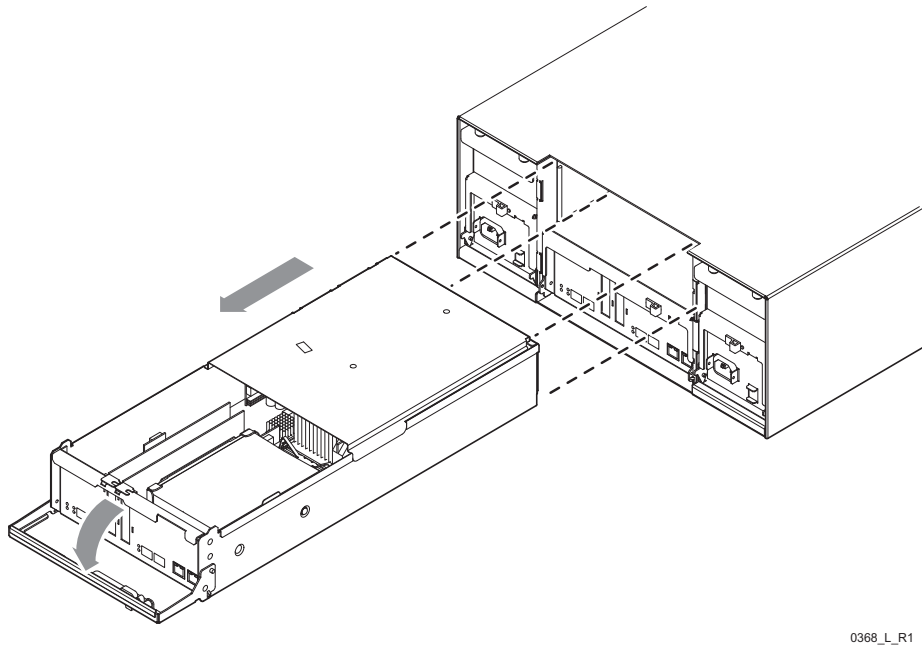


Figure 9-3. Extracting the Controller Node from the Chassis

- 6 Place the node on an ESD-safe work surface.
- 7 Perform the necessary service action.

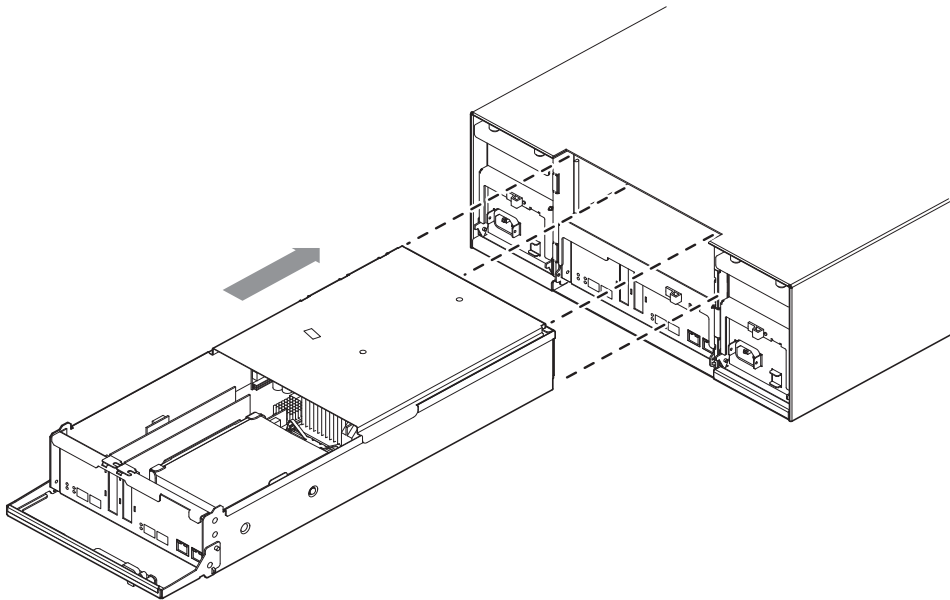
9.3 Reinstalling a Serviced Controller Node

To reinstall a controller node:

- 1 At the rear of the storage server, slide the node with the release lever completely pulled down into the chassis until the node stops.
- 2 While pressing the release tab to the right, raise the release lever completely upright until the release lever clicks.
- 3 Pull the release lever to ensure the node is locked into position, then push firmly on the release lever to ensure the node fully remains seated, as shown in [Figure 9-4](#).



CAUTION: Do NOT lift the controller node handle up to the closed position. Closing the insertion handle immediately supplies power to the controller node..



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Figure 9-4. Reinstalling the Controller Node

- 4 If the node disk is replaced or if the node is replaced and the node disk is NOT swapped with the failed node, perform the node rescue procedure before continuing here. See [Appendix B, Node Rescue](#). Otherwise, continue.
- 5 If node rescue is not performed, secure the node in its slot and raise the lever to apply power and start the node boot process.
- 6 Reconnect the cables to the rear of the controller node.
- 7 At this point, return to the FRU replacement procedure for the remainder of each FRU's instructions to bring the reinstalled node back up.

10

Replacing an LED Board

In this chapter

10.1	General Precautions	10.1
10.2	Removing an LED Board	10.2
10.3	Replacing an LED Board	10.3

10.1 General Precautions

When handling a controller chassis LED board, observe the precautions shown in [Chapter 2, Precautions](#).

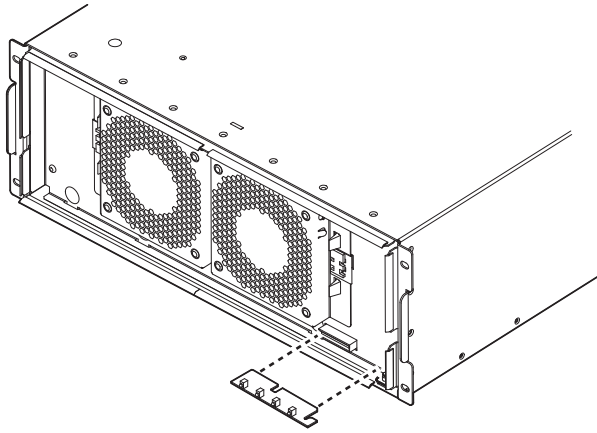


NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

10.2 Removing an LED Board

To remove the controller chassis LED board:

- 1 Remove the front bezel cover by placing your hands on the sides and carefully pulling it from the magnetic fasteners.
- 2 Hold both sides of the LED board firmly and pull the board from the card edge connection and the guide pin, as shown in [Figure 10-1](#).



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Figure 10-1. E-Class LED Board

10.3 Replacing an LED Board

To replace the controller chassis LED board:

- 1 Remove the replacement LED board from its protective packaging.
- 2 Carefully insert the LED board into the card connector (Figure 10-2).



CAUTION: Be sure to align the notched board with the groove of the guide pin.

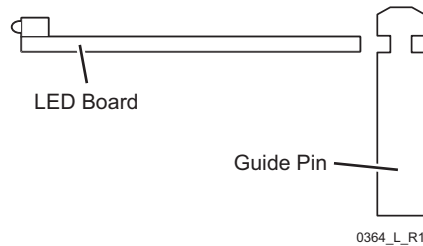


Figure 10-2. Aligning LED Board with Guide Pin

- 3 Verify all four LEDs illuminate. If they do not illuminate, troubleshoot the problem.



NOTE: The LED color is driven by the nodes, such as when the nodes are setting amber, the LED should be the same.

- 4 Replace the front bezel cover by engaging it to the magnetic fasteners.
- 5 Place the removed LED board into protective packaging for return to 3PAR.

11

Replacing a Node Fan

In this chapter

11.1	General Precautions	11.1
11.2	Removing a Controller Chassis Fan	11.1
11.3	Replacing a Controller Chassis Fan	11.3



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

11.1 General Precautions

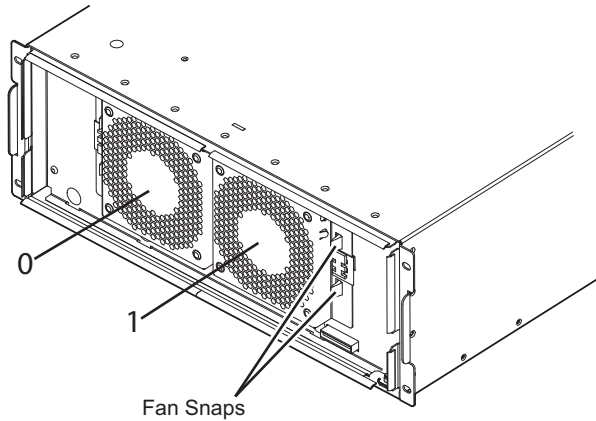
When handling a controller chassis fan, observe the precautions shown in [Chapter 2, Precautions](#).

11.2 Removing a Controller Chassis Fan

Each E-Class controller chassis contains two cooling fans.

To remove a node cooling fan:

- 1 Remove the front bezel cover by firmly grasping the sides and pulling it from the magnetic fastener.
- 2 Identify the fan that requires replacement ([Figure 11-1](#)).
- 3 Push the two snaps inward to release the fan ([Figure 11-1](#)).



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Figure 11-1. Press the Snaps Toward the Fan

- 4 Swing the fan outward to unhook the opposite side from the retaining tabs ([Figure 11-2](#)).

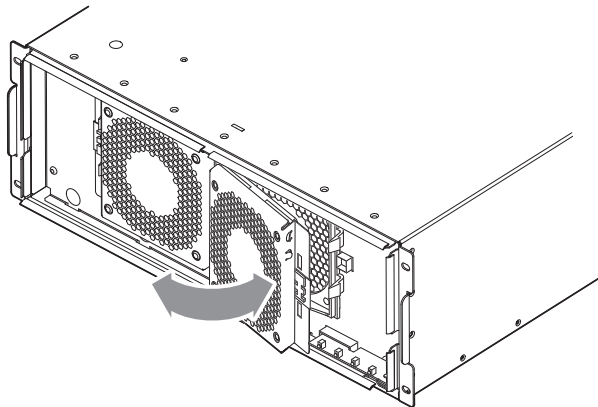


Figure 11-2. Detach the Fan from the Chassis

11.3 Replacing a Controller Chassis Fan

To replace a node cooling fan:

- 1 Remove the replacement fan from its protective packaging.
- 2 Angle the side of the replacement fan to latch onto the retaining tabs and swing the opposite end into the snaps.



NOTE: To ensure the fan is securely in place, push the fan slightly to the center to cover the silver lining next to the two snaps. The fan is properly seated when no silver lining is visible.

- 3 Verify that the fan spins and the fan LED on the bezel is green.
- 4 Replace the front bezel cover by engaging it to the magnetic fasteners.
- 5 Place the removed fan into protective packaging for return to 3PAR.

12

Replacing Components in Controller Slots

In this chapter

12.1	General Precautions	12.2
12.2	Removing and Replacing an SFP Module	12.2
12.2.1	Removing an SFP Module	12.2
12.2.2	Replacing an SFP Module	12.3
12.3	Removing and Replacing a Gigabit Ethernet Adapter	12.4
12.3.1	Removing a Gigabit Ethernet Adapter	12.4
12.3.2	Replacing a Gigabit Ethernet Adapter	12.8
12.4	Removing and Replacing a Fibre Channel Adapter	12.10
12.4.1	Removing a Fibre Channel Adapter	12.10
12.4.2	Replacing a Fibre Channel Adapter	12.12
12.5	Removing and Replacing an iSCSI Adapter	12.16
12.5.1	Removing an iSCSI Adapter	12.16
12.5.2	Replacing an iSCSI Adapter	12.18

12.1 General Precautions

When handling PCI adapters and Small Form-factor Pluggable (SFP) modules, observe the precautions as described in [General Precautions](#) on page 2.1.

12.2 Removing and Replacing an SFP Module

This section describes the procedures to remove and replace an SFP module.

The controller node has four removable SFP modules in slots 0 and 3 ([Figure 12-1](#)).

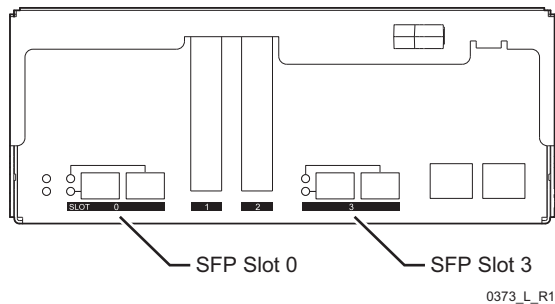


Figure 12-1. Removable SFP Modules in Slots 0 and 3

12.2.1 Removing an SFP Module

To remove an SFP module:

- 1 Unlock and open the rear door of the storage server.
- 2 Identify the SFP that requires replacement and disconnect the cable.

- 3 Lift the retaining clip and gently slide the SFP module out of the port as shown in Figure 12-2.

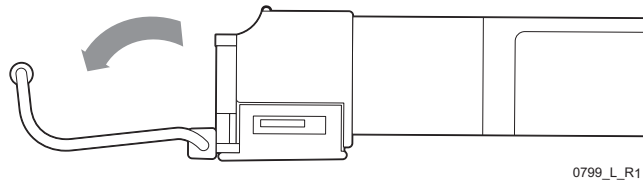


Figure 12-2. Lower the SFP Latch

- 4 Carefully slide the SFP from the port.

12.2.2 Replacing an SFP Module

To replace an SFP module:

- 1 Remove the replacement SFP from its protective packaging.
- 2 Carefully slide the SFP into the vacant port until fully seated and lift the wire handle to secure it in place.
- 3 Place the removed SFP into protective packaging for return to 3PAR.
- 4 Reconnect the cable into the replacement SFP.
- 5 Ensure the port LED goes from amber to green (I/O occurring through the port), or off (no I/O occurring).
- 6 Close and lock the rear door of the storage server.

12.3 Removing and Replacing a Gigabit Ethernet Adapter

This section describes the procedures to remove and replace the Gigabit Ethernet (GigE) adapter.



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

12.3.1 Removing a Gigabit Ethernet Adapter

The following procedures enable you to remove a GigE adapter in the controller node. The GigE adapter is configured for the use of 3PAR Remote Copy ([Figure 12-3](#)).

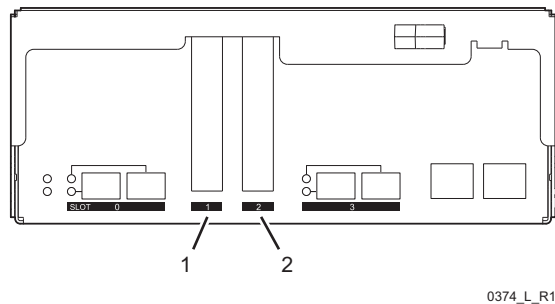


Figure 12-3. PCI Slots 1 and 2



CAUTION: To prevent overheating of the controller node chassis, this procedure requires a maximum service time of 30 minutes.

To remove a GigE adapter, perform the following:

- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.
- 2 Determine the current status of Remote Copy on the InServ Storage Server.

- a Select option **7, Interactive CLI for an InServ**.
- b Select the desired InServ Storage Server.
- c In the service processor window, issue the `shownode` command to verify the number of nodes online.

```
cli% shownode
```

Node	--Name--	--State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	AmberBlink	1024	2048	100
1	enodec33	OK	No	Yes	AmberBlink	1024	2048	100

- d Issue the `showrcopy links` command to check the state of the adapter links.

```
cli% showrcopy links
```

Target	Node	Address	Status	Options
425	0	10.101.32.175	Up	
425	1	10.100.32.175	Up	
receive 0		receive	Up	
receive 1		receive	Up	

Note that in the preceding example, the status of all links is UP. The links might not display as UP if the GigE adapter has failed.

The information in the preceding example output is interpreted as follows:

- ◆ Target. The target to which the link is affiliated.
- ◆ Node. The location of the link. For IP links, the node on which the link is established. For FC links, the node, slot, and port of the link.
- ◆ Address. The address to which the link connects.
- ◆ Status. The status of the link.
- ◆ Options. Any options that have been set for the link.
- ◆ Refer to the *3PAR Remote Copy User's Guide* for additional information about the `showrcopy` command.
- e Terminate the CLI session by issuing the `exit` command and press ENTER when prompted.

Proceed with replacing the PCI adapter.

- 3 Select option **4, InServ Product Maintenance**.
- 4 Select option **6, Halt an InServ cluster/node**.
- 5 Select the desired InServ Storage Server.
- 6 Select the desired node.
- 7 Press **y** when prompted to confirm halting the node.
- 8 Press **ENTER** when prompted to continue.
- 9 A **Site Service Presence Requirement** warning is issued. Select **y** and press **ENTER** to continue.
- 10 At the rear of the server, verify that the node status LED is flashing green and that the node hotplug LED is solid amber indicating that the node has been halted. It may take 1 to 2 minutes for the node to reach the halted state.



NOTE: If the node is failed or halted, it is not necessary to shutdown the node because it is already not part of the InServ cluster.

- 11 At the rear of the server remove the controller node from the node chassis by following the procedure described in [Removing a Controller Node](#) on page 9.2.
- 12 Place the controller node on an ESD-safe, level work surface.
- 13 Locate the GigE adapter that requires replacement ([Figure 12-4](#)).

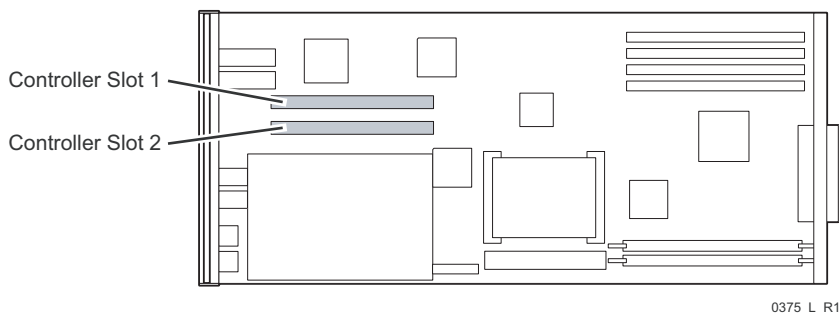
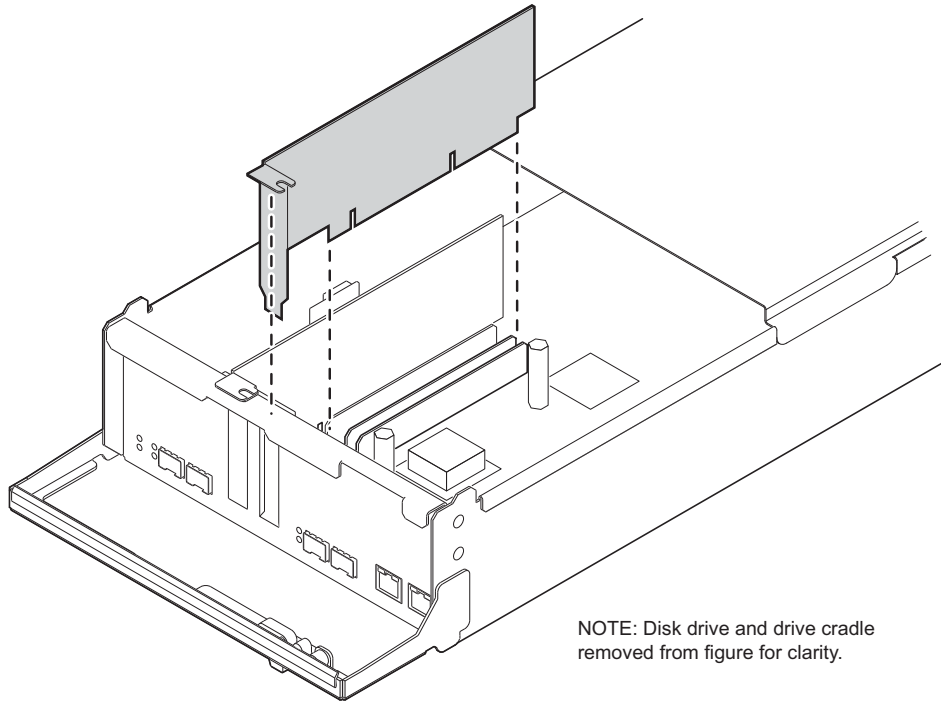


Figure 12-4. Controller Node With PCI Adapters in Controller Slots 1 and 2.

- 14 With the front of the node facing you, unlatch the PCI adapter retainer clip by rolling the clip toward you and then pulling the clip away from the node.
- 15 Remove the GigE adapter by grasping the sides of the card and pulling upward.
(Figure 12-5)



0159_L_R3

Figure 12-5. Removing a PCI Adapter from the Controller Node

12.3.2 Replacing a Gigabit Ethernet Adapter

To replace a Gigabit Ethernet (GigE) adapter:

- 1 Remove the replacement adapter from its protective packaging.



NOTE: The replacement adapter might have a longer, full-height PCI slot bracket attached to the card. If so, perform [step 2](#) through [step 3](#). Otherwise, proceed to [step 4](#).

- 2 Remove the two screws and full-height bracket from the replacement adapter.
- 3 Position the half-height adapter bracket on the replacement adapter and install the two screws.
- 4 Insert the replacement adapter into the same PCI slot that held the removed adapter. ([Figure 12-5](#))
- 5 Push down on the adapter until it is fully seated.
- 6 Install the PCI adapter retainer clip.



NOTE: When replacing adapters, make sure the EMI gasketing material is aligned properly and does not obscure the adapter LEDs at the front of the controller node.

- 7 Verify that every PCI slot contains either an adapter or blank-slot covers.
- 8 Place the removed PCI adapter into protective packaging for return to 3PAR.
- 9 Reinstall the controller node by following the procedures described in [Reinstalling a Serviced Controller Node](#) on page 9.4.
- 10 In the service processor window, select option **7, Interactive CLI for an InServ** from the **3PAR Service Processor Menu**.
- 11 Select the desired InServ Storage Server.

- 12 When the node finishes booting (the system LED should be slowly blinking green), go to the service processor window and issue the `shownode` command to verify the node has rejoined the InServ.

```
cli% shownode
```

Node	--Name--	--State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreebBlink	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlink	1024	2048	100

- 13 Verify the Remote Copy operation. Repeat [step 2 on page 12.4](#).

- 14 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
 - b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
 - c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
 - d Type your user name and password and click **OK**.
 - e From the SPOCC Homepage, click **Support** from the left column menu.
 - f Click **CSStatus** on the InServs Action menu.
 - g Verify CSStatus indicates the system is healthy.
 - h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 15 In the SP window, issue the `exit` command to stop the CLI session.
- 16 Log out of the `spmaint` session by selecting **X** to exit from the **3PAR Service Processor Menu**.
- 17 Disconnect the serial cable from the maintenance PC and coil and place the cable behind the SP.
- 18 Close and lock the rear door of the InServ.

12.4 Removing and Replacing a Fibre Channel Adapter

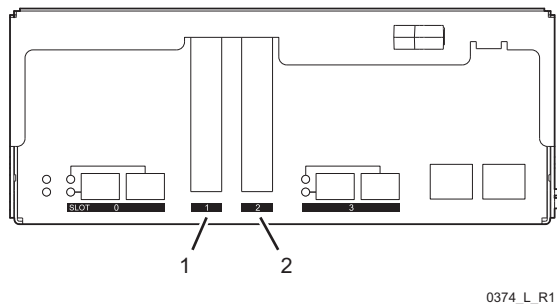
This section describes the procedures to remove and replace the Fibre Channel adapter.



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

12.4.1 Removing a Fibre Channel Adapter

The following procedure enables you to remove a Fibre Channel adapter from the controller node in controller slots 1 and 2. See [Figure 12-6](#).



0374_L_R1

Figure 12-6. PCI Slots 1 and 2.



CAUTION: To prevent overheating of the controller node chassis, this procedure requires a maximum service time of 30 minutes.

- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

- 2 Select option **4, InServ Product Maintenance**.
- 3 Select option **6, Halt an InServ cluster/node**.

- 4 Select the desired InServ Storage Server.
- 5 Select the desired node.
- 6 Press `y` when prompted to confirm halting the node.
- 7 At the rear of the server, verify that the node status LED is flashing green and that the node hotplug LED is solid amber indicating that the node has been halted. It may take 1 to 2 minutes for the node to reach the halted state.



NOTE: If the node is failed or halted, it is not necessary to shutdown the node because it is already not part of the InServ cluster.

- 8 Remove the controller node by following the procedures described in [Removing a Controller Node](#) on page 9.2.
- 9 Place the node on an ESD-safe, level work surface.
- 10 Identify the Fibre Channel adapter to be removed.

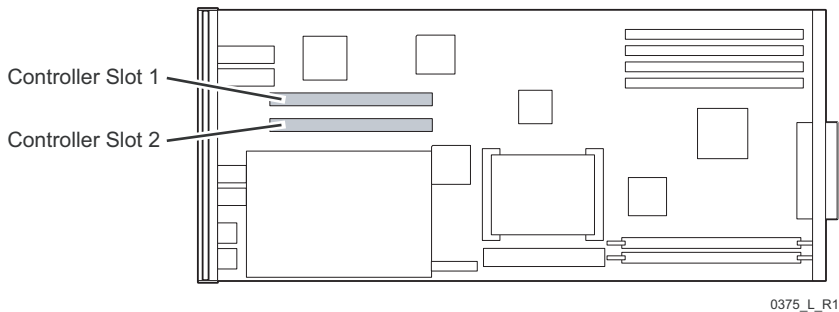
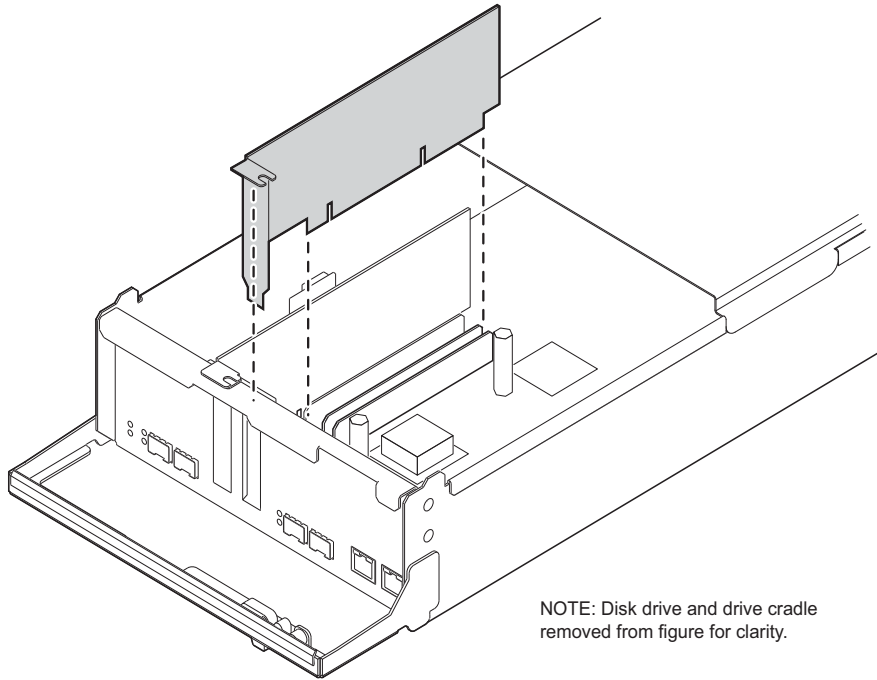


Figure 12-7. PCI slots 1 and 2

- 11 With the front of the node facing you, unlatch the PCI adapter retainer clip by rolling the clip toward you and then pulling the clip away from the node.
- 12 Remove the adapter by grasping the sides of the card and pulling upward (Figure 12-8).



0159_L_R3

Figure 12-8. Removing a Fibre Channel Adapter from the Controller Node

12.4.2 Replacing a Fibre Channel Adapter

To replace a Fibre Channel adapter:

- 1 Remove the replacement adapter from its protective packaging.



NOTE: The replacement adapter may have a longer, full-height PCI slot bracket attached to the card. If so, perform [step 2](#) through [step 3](#). Otherwise, proceed to [step 4](#).

- 2 Remove the two screws and full-height bracket from the replacement adapter.
- 3 Position the half-height adapter bracket on the replacement adapter and install the two screws.
- 4 Insert the replacement adapter into the same PCI slot that held the removed adapter (Figure 12-8).
- 5 Push down on the adapter until it is fully seated.



NOTE: When replacing adapters, make sure that the EMI gasketing material is aligned properly and does not obscure the adapter LEDs at the front of the controller node.

- 6 Install the PCI adapter retainer clip.
- 7 Place the removed Fibre Channel adapter in protective packaging for return to 3PAR.
- 8 Reinstall the controller node by following the procedures described in [Reinstalling a Serviced Controller Node](#) on page 9.4.
- 9 In the service processor window, select option **7, Interactive CLI for an InServ** from the **3PAR Service Processor Menu**.
- 10 Select the desired InServ Storage Server.
- 11 When the node finishes booting (the system LED should be slowly blinking green), go to the service processor window and issue the `shownode` command to verify the node has rejoined the cluster.

```
cli% shownode
```

Node	--Name--	--State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	1024	2048	100

- 12** Issue the `shownode -pci` command to confirm that the replaced adapter is recognized by the system.

```
cli% shownode -pci
```

Node	Slot	Type	-Manufacturer-	-Model-	----Serial----	-Rev-	Firmware
0	0	FC	LSI	7202XP	Onboard	81	1.02.23.00
0	1	FC	EMULEX	LP11002	VM71126505	01	2.70.X.3
0	2	iSCSI	QLOGIC	4052C	FS20550B13366	03	2.0.0.45
0	3	FC	LSI	7202XP	Onboard	81	1.02.23.00
1	0	FC	LSI	7202XP	Onboard	81	1.02.23.00
1	1	FC	EMULEX	LP11002	VM71337162	01	2.70.X.3
1	2	iSCSI	QLOGIC	4052C	FS20550B13333	03	2.0.0.45
1	3	FC	LSI	7202XP	Onboard	81	1.02.23.00

- 13** Issue the `showport -c` command to verify the attached hosts and drives are communicating.

```
cli% showport -c
```

N:S:P	Mode	Device	Pos	Config	Topology	Rate	Cls	Mode_change
0:0:1	initiator	cage0	0	valid	private_loop	2Gbps	3	allowed
0:0:2	initiator	---	-	---	n/a	n/a	n/a	prohibited
0:3:1	initiator	---	-	---	n/a	n/a	n/a	allowed
0:3:2	initiator	---	-	---	n/a	n/a	n/a	allowed
1:0:1	initiator	cage0	0	valid	private_loop	2Gbps	3	allowed
1:0:2	initiator	---	-	---	n/a	n/a	n/a	prohibited
1:3:1	initiator	---	-	---	n/a	n/a	n/a	allowed
1:3:2	initiator	---	-	---	n/a	n/a	n/a	allowed

- 14** Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- Type your user name and password and click **OK**.
- From the SPOCC Homepage, click **Support** from the left column menu.
- Click **CSStatus** on the InServs Action menu.
- Verify CSStatus indicates the system is healthy.

- h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 15** In the service processor window issue the `exit` command to stop the CLI session.
- 16** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 17** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 18** Close and lock the rear door of the server.

12.5 Removing and Replacing an iSCSI Adapter

This section describes the procedures to remove and replace an iSCSI adapter.



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

12.5.1 Removing an iSCSI Adapter

The following procedure instructs how to replace an iSCSI adapter from the controller node.

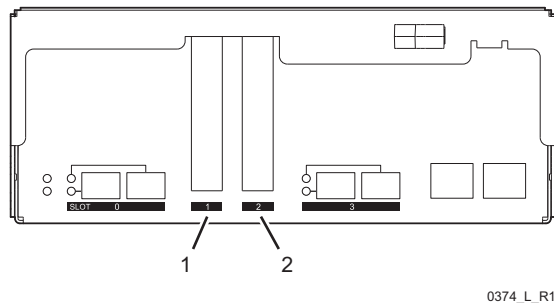


Figure 12-9. PCI Slots 1 and 2



CAUTION: To prevent overheating of the controller node chassis, this procedure requires a maximum service time of 30 minutes.

- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

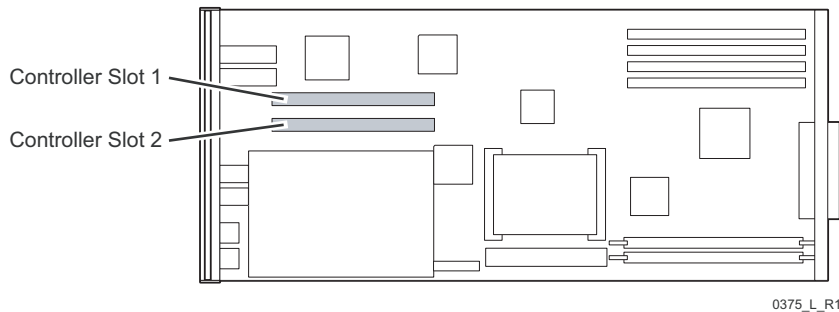
- 2 Select option **4, InServ Product Maintenance**.
- 3 Select option **6, Halt an InServ cluster/node**.

- 4 Select the desired InServ.
- 5 Select the desired node.
- 6 Press `y` when prompted to confirm halting the node.
- 7 At the rear of the server, verify that the node status LED is flashing green and that the node hotplug LED is solid amber indicating that the node has been halted. It may take 1 to 2 minutes for the node to reach the halted state.



NOTE: If the node is failed or halted, it is not necessary to shutdown the node as it is already not part of the InServ cluster.

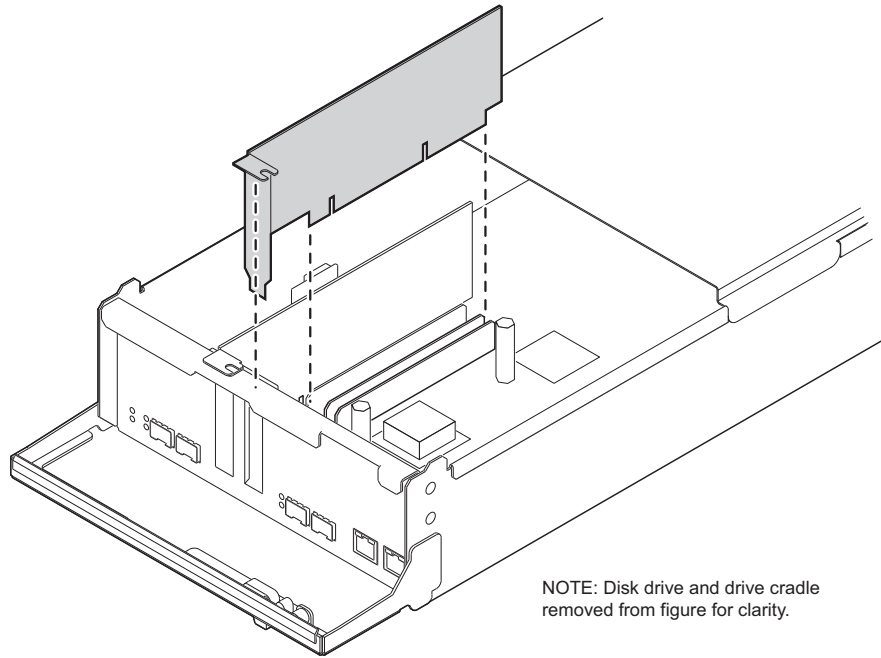
- 8 Remove the controller node by following the procedures described in [Removing a Controller Node](#) on page 9.2
- 9 Place the node on an ESD-safe, level work surface.
- 10 Identify the iSCSI adapter to be removed ([Figure 12-10](#)).



0375_L_R1

Figure 12-10. PCI slots 1 and 2

- 11 With the front of the node facing you, unlatch the PCI adapter retainer clip by rolling the clip toward you and then pulling the clip away from the node.
- 12 Remove the adapter by grasping the sides of the card and pulling upward. (Figure 12-11)



0159_L_R3

Figure 12-11. Removing a PCI Adapter from the Controller Node

12.5.2 Replacing an iSCSI Adapter

To replace an iSCSI adapter:

- 1 Remove the replacement adapter from its protective packaging.



NOTE: The replacement adapter may have a longer, full-height PCI slot bracket attached to the card. If so, perform [step 2](#) through [step 3](#). Otherwise, proceed to [step 4](#).

- 2 Remove the two screws and full-height bracket from the replacement adapter.
- 3 Position the half-height adapter bracket on the replacement adapter and install the two screws.
- 4 Insert the replacement adapter into the same PCI slot that held the removed adapter.
(Figure 12-11)
- 5 Push down on the adapter until it is fully seated.



NOTE: When replacing adapters, make sure that the EMI gasketing material is aligned properly and does not obscure the adapter LEDs at the front of the controller node.

- 6 Install the PCI adapter retainer clip.
- 7 Place the removed iSCSI adapter in protective packaging for return to 3PAR.
- 8 Reinstall the controller node by following the procedures described in [Reinstalling a Serviced Controller Node](#) on page 9.4.
- 9 In the service processor window, select option **7, Interactive CLI for an InServ** from the **3PAR Service Processor Menu**.
- 10 Select the desired InServ.
- 11 When the node finishes booting (the system LED should be slowly blinking green), go to the service processor window and issue the `shownode` command to verify the node has rejoined the InServ.

```
cli% shownode
```

Node	--Name--	--State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	1024	2048	100

- 12** Issue the `shownode -pci` command to confirm that the replaced adapter is recognized by the system.

```
cli% shownode -pci
```

Node	Slot	Type	-Manufacturer-	-Model-	----Serial----	-Rev-	Firmware
0	0	FC	LSI	7202XP	Onboard	81	1.02.23.00
0	1	FC	EMULEX	LP11002	VM71126505	01	2.70.X.3
0	2	iSCSI	QLOGIC	4052C	FS20550B13366	03	2.0.0.45
0	3	FC	LSI	7202XP	Onboard	81	1.02.23.00
1	0	FC	LSI	7202XP	Onboard	81	1.02.23.00
1	1	FC	EMULEX	LP11002	VM71337162	01	2.70.X.3
1	2	iSCSI	QLOGIC	4052C	FS20550B13333	03	2.0.0.45
1	3	FC	LSI	7202XP	Onboard	81	1.02.23.00

- 13** Issue the `showport -iscsi` command to verify the attached hosts/drives are communicating.

```
showport -iscsi
```

N:S:P	State	IPAddr	Netmask	Gateway	TPGT	MTU	Rate	DHCP	iSNS_Prim	iSNS_Sec	iSNS_Port
1:3:1	ready	192.168.9.163	255.255.255.0	192.168.9.1	131	1500	1Gbps	0	0.0.0.0	0.0.0.0	3205
1:3:2	loss_sync	0.0.0.0	0.0.0.0	0.0.0.0	132	1500	n/a	0	0.0.0.0	0.0.0.0	3205

- 14** Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a** Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
 - b** Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
 - c** Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
 - d** Type your user name and password and click **OK**.
 - e** From the SPOCC Homepage, click **Support** from the left column menu.
 - f** Click **CSStatus** on the InServs Action menu.
 - g** Verify CSStatus indicates the system is healthy.
 - h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 15** In the service processor window issue the `exit` command to stop the CLI session.

- 16 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 17 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 18 Close and lock the rear door of the server.

13

Replacing Control Cache

In this chapter

13.1	General Precautions	13.1
13.2	Removing Control Cache	13.2
13.3	Replacing Control Cache	13.5

13.1 General Precautions

When handling control cache DIMMs, observe the precautions as described in [Chapter 2, Precautions](#).

13.2 Removing Control Cache

Controller nodes contain two control cache DIMMs to support the node microprocessors.



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.



CAUTION: To prevent overheating of the controller node chassis, this procedure requires a maximum service time of 30 minutes.

To remove a control cache DIMM:

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

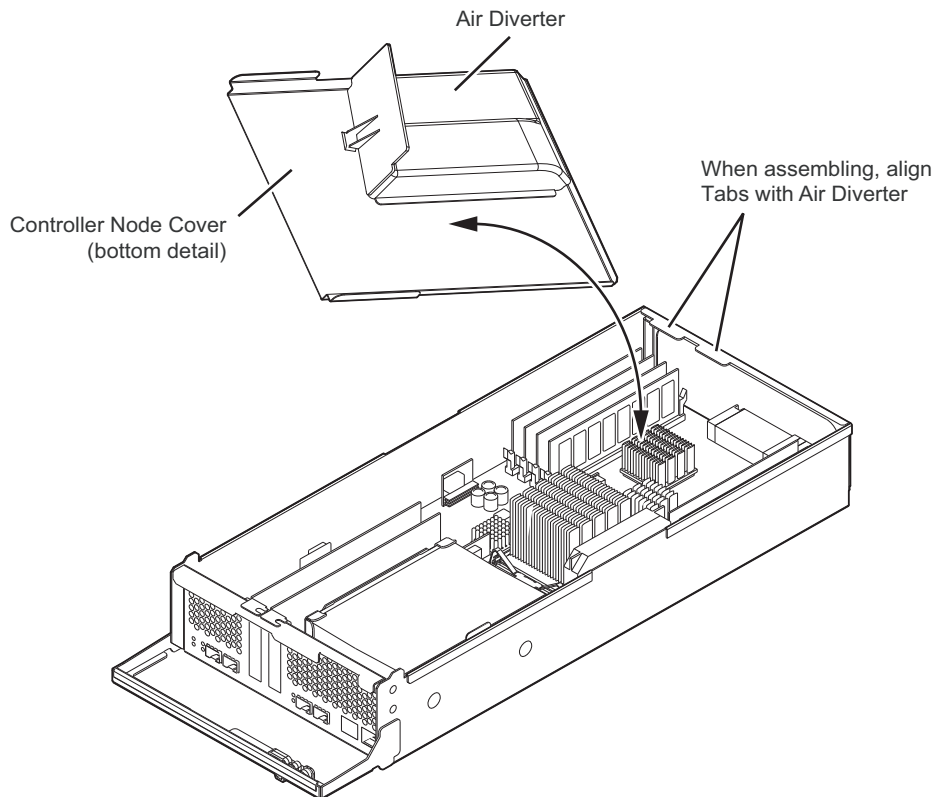
The **3PAR Service Processor Menu** appears:

- 2 Select option **4, InServ Product Maintenance**.
- 3 Select option **6, Halt an InServ cluster/node**.
- 4 Select the desired InServ.
- 5 Select the desired node.
- 6 Press `y` when prompted to confirm halting the node.
- 7 Press ENTER when prompted to continue.
- 8 Press `y` when cautioned for **site service presence**.
- 9 Press ENTER when prompted to continue.
- 10 At the rear of the server, verify that the node status LED is flashing green and that the node hot-plug LED is solid amber indicating that the node has been halted. It may take 1 to 2 minutes for the node to reach the halted state.



NOTE: If the node is failed or halted, it is not necessary to shutdown the node because it is already not part of the InServ cluster.

- 11 At the rear of the server, identify the controller node that needs the control cache replaced. To remove the node refer to the controller node removal instructions in [Removing a Controller Node](#) on page 9.2 for more information.
- 12 Remove the node top cover by lifting it up and sliding the metal tabs out from the rear of the node base. (Figure 13-1)



0025_L_R2

Figure 13-1. Controller Node Cover

- 13 Locate the control cache DIMM that requires replacement (Figure 13-2).

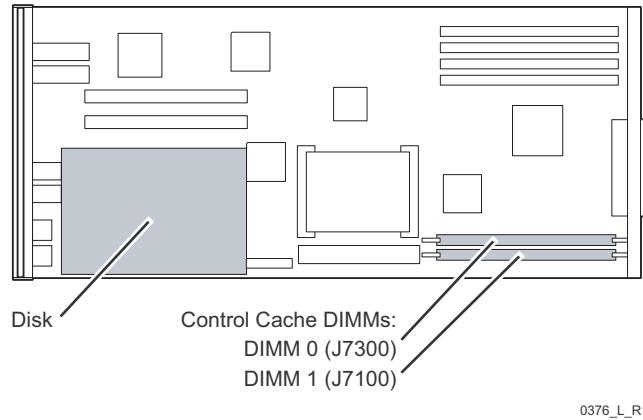


Figure 13-2. Control Cache DIMMs

- 14 Release the control cache DIMM by pressing outward on the two tabs on the sides of the DIMM, as shown in Figure 13-3.

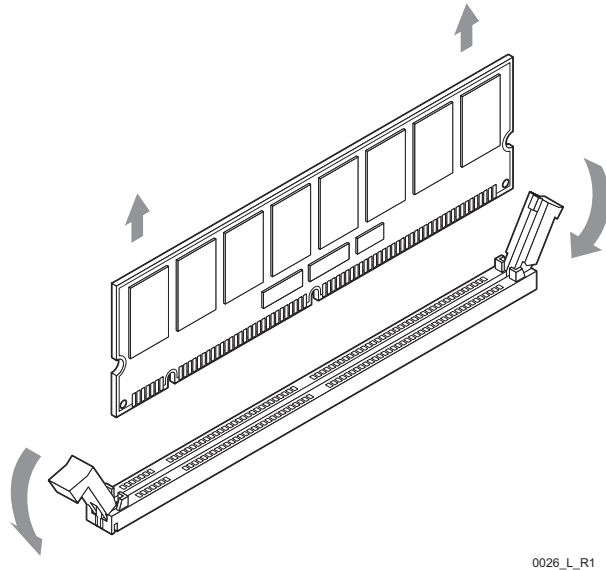


Figure 13-3. Releasing a Control Cache DIMM

13.3 Replacing Control Cache

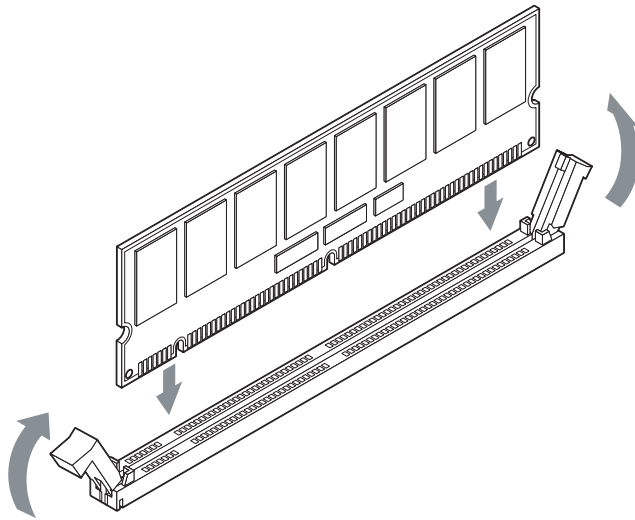
To replace a control cache DIMM:

- 1 Remove the replacement DIMM from its protective packaging.



CAUTION: Avoid touching the surface or contacts of the control cache DIMM while inserting it into the vacant slot in the controller node. Handle only by the edges of the DIMM.

- 2 Insert the control cache DIMM by pushing downward on the edge of the DIMM until the tabs on both sides snap into place. (Figure 13-4)



0027_L_R1

Figure 13-4. Inserting a Replacement Control Cache DIMM

- 3 Place the removed DIMM into protective packaging for return to 3PAR.
- 4 Reinstall the controller node by following the procedures as described in [Reinstalling a Serviced Controller Node](#) on page 9.4.

- 5 In the service processor window, select option **7, Interactive CLI for an InServ** from the **3PAR Service Processor Menu**.
- 6 Select the desired InServ.
- 7 When the boot finishes issue the `shownode -mem` command to verify the memory has been accepted.

```
cli% shownode -mem
```

Node	Riser	Slot	SlotID	-Name-	-Usage-	--Type---	--Manufacturer---	-Serial-	-Latency-	Size(MB)
0	n/a	0	J7300	DIMM0	Control	DDR_SDRAM	Micron Technology	D80C07C2	CL2.0/2.5	1024
0	n/a	1	J7100	DIMM1	Control	DDR_SDRAM	Micron Technology	D80C07C1	CL2.0/2.5	1024
0	n/a	0	J4401	DIMM0	Data	SDRAM	SimpleTech/STEC	0BF53E02	CL2.0/3.0	1024
0	n/a	1	J4402	DIMM1	Data	SDRAM	SimpleTech/STEC	0DA4790D	CL2.0/3.0	1024
0	n/a	2	J4501	DIMM2	Data	SDRAM	SimpleTech/STEC	0C8D630C	CL2.0/3.0	1024
0	n/a	3	J4502	DIMM3	Data	SDRAM	SimpleTech/STEC	0D6FFF0D	CL2.0/3.0	1024
1	n/a	0	J7300	DIMM0	Control	DDR_SDRAM	Micron Technology	D80C081B	CL2.0/2.5	1024
1	n/a	1	J7100	DIMM1	Control	DDR_SDRAM	Micron Technology	D80C0821	CL2.0/2.5	1024
1	n/a	0	J4401	DIMM0	Data	SDRAM	SimpleTech/STEC	0BD50600	CL2.0/3.0	1024
1	n/a	1	J4402	DIMM1	Data	SDRAM	SimpleTech/STEC	0D3F7A0D	CL2.0/3.0	1024
1	n/a	2	J4501	DIMM2	Data	SDRAM	SimpleTech/STEC	0EFFCD01	CL2.0/3.0	1024
1	n/a	3	J4502	DIMM3	Data	SDRAM	SimpleTech/STEC	0D567A0D	CL2.0/3.0	1024

- 8 Re-connect the Ethernet cable and all other cables to the node once the node has rebooted.
- 9 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- d Type your user name and password and click **OK**.
- e From the SPOCC Homepage, click **Support** from the left column menu.
- f Click **CSStatus** on the InServs Action menu.
- g Verify CSStatus indicates the system is healthy.
- h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 10 In the service processor window issue the `exit` command to stop the CLI session.

- 11 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 12 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 13 Close and lock the rear door of the server.

14

Replacing Data Cache

In this chapter

14.1	General Precautions	14.1
14.2	Removing Data Cache	14.2
14.3	Replacing Data Cache	14.5

14.1 General Precautions

When handling data cache DIMMs, observe the precautions as described in [Chapter 2, Precautions](#).

14.2 Removing Data Cache

Controller nodes can contain four data cache DIMMs, located in slots 0 through 3.



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.



CAUTION: To prevent overheating of the controller node chassis, this procedure requires a maximum service time of 30 minutes.

To remove a data cache DIMM:

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

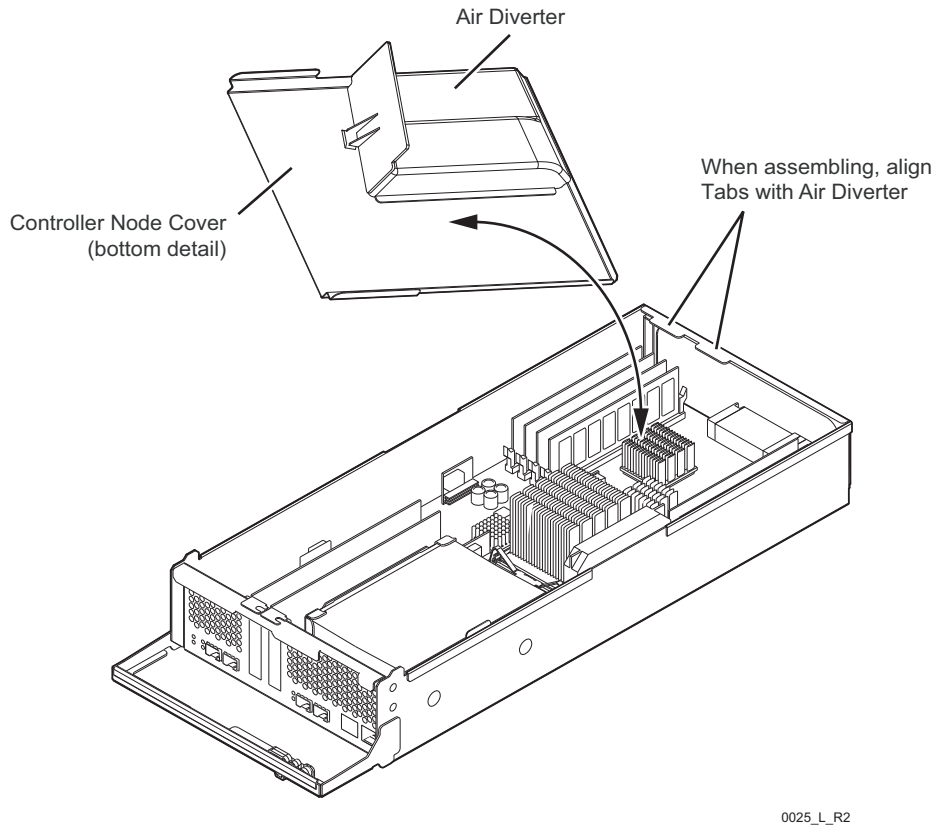
The **3PAR Service Processor Menu** appears:

- 2 Select option **4, InServ Product Maintenance**.
- 3 Select option **6, Halt an InServ cluster/node**.
- 4 Select the desired InServ.
- 5 Select the desired node.
- 6 Press `y` when prompted to confirm halting the node.
- 7 Press ENTER when prompted to continue.
- 8 At the rear of the server, verify that the node status LED is flashing green and that the node hot-plug LED is solid amber indicating that the node has been halted. It may take 1 to 2 minutes for the node to reach the halted state.



NOTE: If the node is failed or halted, it is not necessary to shutdown the node because it is already not part of the InServ cluster.

- 9 At the rear of the server, identify and remove the controller node that needs the data cache replaced. Refer to the controller node removal instructions in [Removing a Controller Node](#) on page 9.2.
- 10 Remove the node top cover by lifting it up and sliding the metal tabs out from the rear of the node base.([Figure 14-1](#))



0025_L_R2

Figure 14-1. Controller Node Cover

- 11 Locate the data cache DIMM requiring replacement (Figure 14-2).

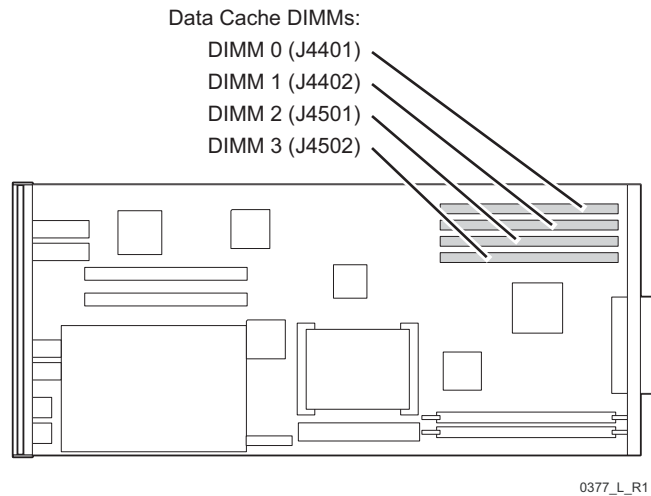


Figure 14-2. Data cache DIMM slots

- 12 Release the data cache DIMM by pressing outward on the two tabs on the sides of the DIMM, as shown in Figure 14-3.

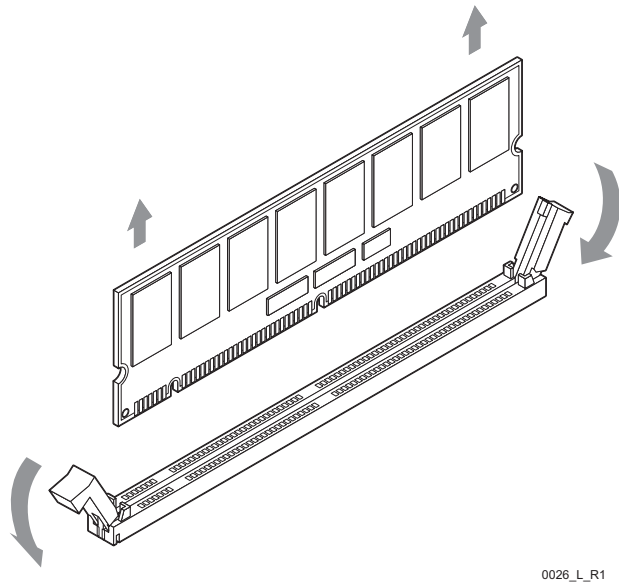


Figure 14-3. Releasing the Data Cache from the DIMM slot

14.3 Replacing Data Cache

To replace a data cache DIMM:

- 1 Remove the replacement data cache DIMM from the protective packaging.
- 2 Insert the replacement data cache DIMM into the slot that held the failed DIMM (Figure 14-4).

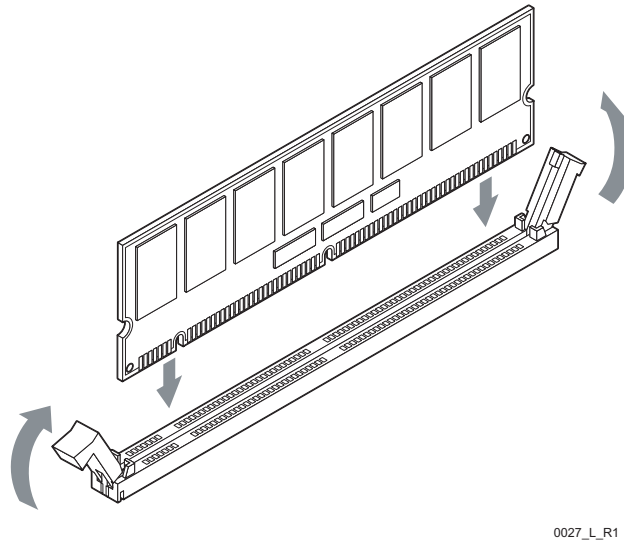


Figure 14-4. Inserting Replacement Data Cache Into the DIMM slot



CAUTION: Avoid touching the surface or contacts of the control cache DIMM while inserting it into the vacant slot in the controller node. Handle only by the edges of the DIMM.

- 3 Insert each data cache DIMM by pushing downward on the edge of the DIMM until the tabs on both sides snap into place.
- 4 Place the removed DIMM into protective packaging for return to 3PAR.
- 5 Reinstall the node top cover by carefully aligning the rear of the plastic air diverter on the underside of the cover with the two metal tabs at the rear of the controller node base. (Figure 14-1)
- 6 Reinstall the controller node by following the procedures described in [Reinstalling a Serviced Controller Node](#) on page 9.4.
- 7 In the service processor window, select option **7, Interactive CLI for an InServ** from the **3PAR Service Processor Menu**.
- 8 Select the desired InServ.
- 9 When the boot finishes issue the `shownode -mem` command to verify the memory has been accepted.

```
cli% shownode -mem
```

Node	Riser	Slot	SlotID	-Name-	-Usage-	--Type---	--Manufacturer---	-Serial-	-Latency-	Size(MB)
0	n/a	0	J7300	DIMM0	Control	DDR_SDRAM	Micron Technology	D80C07C2	CL2.0/2.5	1024
0	n/a	1	J7100	DIMM1	Control	DDR_SDRAM	Micron Technology	D80C07C1	CL2.0/2.5	1024
0	n/a	0	J4401	DIMM0	Data	SDRAM	SimpleTech/STEC	0BF53E02	CL2.0/3.0	1024
0	n/a	1	J4402	DIMM1	Data	SDRAM	SimpleTech/STEC	0DA4790D	CL2.0/3.0	1024
0	n/a	2	J4501	DIMM2	Data	SDRAM	SimpleTech/STEC	0C8D630C	CL2.0/3.0	1024
0	n/a	3	J4502	DIMM3	Data	SDRAM	SimpleTech/STEC	0D6FFF0D	CL2.0/3.0	1024
1	n/a	0	J7300	DIMM0	Control	DDR_SDRAM	Micron Technology	D80C081B	CL2.0/2.5	1024
1	n/a	1	J7100	DIMM1	Control	DDR_SDRAM	Micron Technology	D80C0821	CL2.0/2.5	1024
1	n/a	0	J4401	DIMM0	Data	SDRAM	SimpleTech/STEC	0BD50600	CL2.0/3.0	1024
1	n/a	1	J4402	DIMM1	Data	SDRAM	SimpleTech/STEC	0D3F7A0D	CL2.0/3.0	1024
1	n/a	2	J4501	DIMM2	Data	SDRAM	SimpleTech/STEC	0EFFCD01	CL2.0/3.0	1024
1	n/a	3	J4502	DIMM3	Data	SDRAM	SimpleTech/STEC	0D567A0D	CL2.0/3.0	1024

- 10 Re-connect the customer's Ethernet cable and all other cables to the node once the node has rebooted.
- 11 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.

- d** Type your user name and password and click **OK**.
 - e** From the SPOCC Homepage, click **Support** from the left column menu.
 - f** Click **CSStatus** on the InServs Action menu.
 - g** Verify CSStatus indicates the system is healthy.
 - h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 12** In the service processor window issue the `exit` command to stop the CLI session.
- 13** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 14** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 15** Close and lock the rear door of the server.

15

Replacing a Controller Node Disk

In this chapter

15.1	General Precautions	15.1
15.2	Removing a Controller Node Disk	15.2
15.3	Replacing a Controller Node Disk	15.5

15.1 General Precautions

When handling controller node disk, observe the precautions as described in [Chapter 2, Precautions](#).



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

15.2 Removing a Controller Node Disk

To remove a disk in a controller node:



CAUTION: To prevent overheating of the controller node chassis this procedure requires a maximum service time of 30 minutes.

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

- 2 Select option **7, Interactive CLI for an InServ**.
- 3 Select the desired InServ.
- 4 Issue the `showversion -b` command to display the InForm OS version currently in use in the InServ Storage Server. Make note of the InForm OS version.

```
cli% showversion -b
Release version 2.3.1.178
Patches:  None

Component Name          Version
CLI Server              2.3.1.178
CLI Client              2.3.1.178
System Manager          2.3.1.178
Kernel                  2.3.1.178
TPD Kernel Code         2.3.1.178
```

- 5 Type `exit` to end the CLI session and to return to the **3PAR Service Processor Menu**.
- 6 Select option **4, InServ Product Maintenance**.
- 7 Select option **6, Halt an InServ cluster/node**.
- 8 Select the desired InServ.

- 9 Select the desired node.
- 10 Press `y` when prompted to confirm halting the node.
- 11 Press ENTER when prompted to continue.
- 12 At the rear of the server, verify that the node status LED is flashing green and that the node hot-plug LED is solid amber indicating that the node has been halted. It may take 1 to 2 minutes for the node to reach the halted state.



NOTE: If the node is failed or halted, it is not necessary to shutdown the node because it is already not part of the InServ cluster.

- 13 Remove the controller node from the node chassis by following the procedure described in [Removing a Controller Node](#) on page 9.2.
- 14 Push the release tab of the springboard cover plate of the disk inward and lift the plate up to free the node disk ([Figure 15-1](#)).

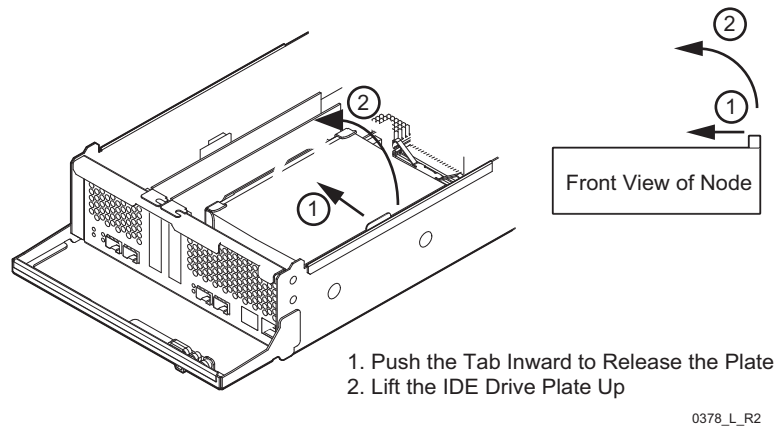


Figure 15-1. Push the Springboard Tab Inward to Release the IDE Drive Plate

- 15 Lift the node disk from the disk drive compartment and disconnect the data cable and power harness that connect to the node disk (Figure 15-2). Avoid touching any internal node components while disconnecting the cables.

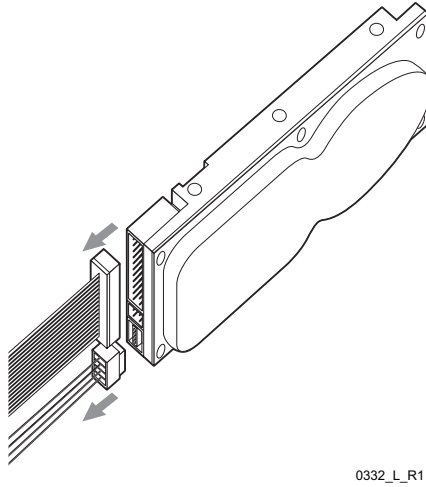


Figure 15-2. Disconnecting the Cables from the Node Disk

- 16 Remove the replacement node disk from its protective packaging.
- 17 Place the failed node disk in the packaging for return to 3PAR.

15.3 Replacing a Controller Node Disk

To replace a controller node disk:

- 1 Connect the data cable and power harness to the node disk.
- 2 Insert the replacement node disk into the empty disk drive compartment in the controller node.
- 3 Insert the springboard plate beneath the two retaining tabs and push the release tab down to secure the plate.
- 4 Reinstall the controller node by following the procedures described in [Reinstalling a Serviced Controller Node](#) on page 9.4.



NOTE: You will need to perform the auto-node rescue procedure. This is addressed in [Reinstalling a Serviced Controller Node](#) on page 9.4.

16

Replacing a Clock Battery

In this chapter

16.1	General Precautions	16.1
16.2	Removing a Clock Battery	16.2
16.3	Replacing a Clock Battery	16.5

16.1 General Precautions

When handling a clock battery, observe the precautions as described in [Chapter 2, *Precautions*](#).

16.2 Removing a Clock Battery

The clocks inside the controller nodes use a 3-V lithium coin battery that requires periodic replacement.

To remove a clock battery:



WARNING: There is a danger of explosion if the lithium coin battery inside the controller node is incorrectly replaced. Replace the coin battery only with the same or equivalent type of battery.



NOTE: Contact 3PAR to obtain batteries and other replacement parts for InServ Storage Servers.



CAUTION: To prevent overheating of the controller node chassis, this procedure requires a maximum service time of 30 minutes.

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

- 2 Select option **4, InServ Product Maintenance**.
- 3 Select option **6, Halt an InServ cluster/node**.
- 4 Select the desired InServ.
- 5 Select the desired node.
- 6 Press `y` when prompted to confirm halting the node.
- 7 Press `ENTER` when prompted to continue.
- 8 Press `y` when prompted to confirm halting the node.

- 9 Press ENTER when prompted to continue.
- 10 At the rear of the server, verify that the node status LED is flashing green and that the node hotplug LED is solid amber indicating that the node has been halted as shown in [Figure 16-1](#).

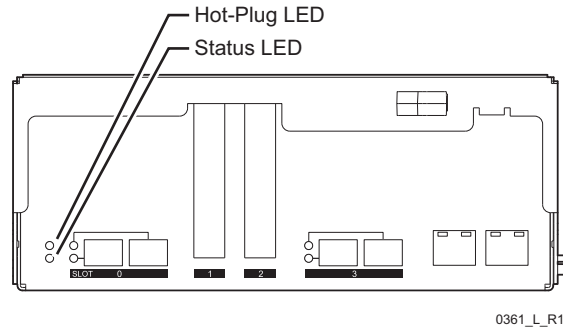


Figure 16-1. Controller Node LED Status



NOTE: If the node is failed or halted, it is not necessary to shutdown the node because it is already not part of the cluster.

- 11 In back of the storage server, identify the controller node to be removed.
Remove the controller node by following the procedures as described in [Removing a Controller Node](#) on page 9.2.
- 12 Remove the node disk by following the procedures as described in [Chapter 15, Replacing a Controller Node Disk](#). The battery is under the node disk.

- 13 Remove the clock battery by placing your finger on the edge of the battery closest to the node enclosure and pushing the battery toward the PCI cards, while lifting slightly with your finger (Figure 16-2).

If necessary, carefully use a small slotted screwdriver to lift the battery on one side. However, avoid touching the internal node components while removing the battery.

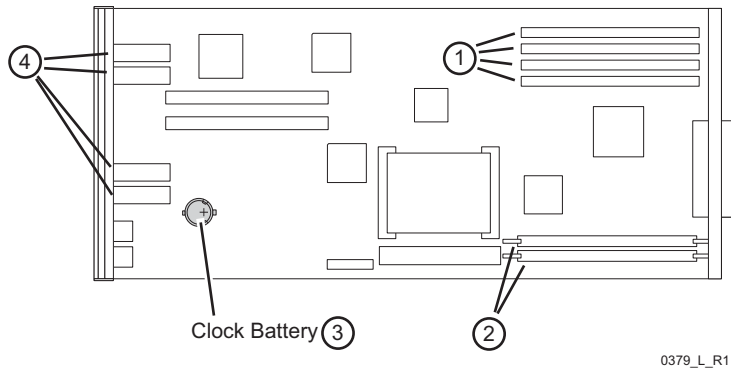


Figure 16-2. Controller Node Clock Battery Under the Node Disk



WARNING: Dispose of used batteries according to the manufacturer's instructions.

16.3 Replacing a Clock Battery

To replace a clock battery:

- 1 Insert a replacement 3-V lithium coin battery into the clock battery slot.



NOTE: The replacement battery should be installed with the positive side up.

- 2 Reinstall the node disk by following the procedures as described in [Replacing a Controller Node Disk](#) on page 15.5.



NOTE: The node disk is only reinstalled. Performing a node-rescue is **NOT** necessary.

- 3 Reinstall the controller node by following the procedures as described in [Reinstalling a Serviced Controller Node](#) on page 9.4.
- 4 In the service processor window, select option **7, Interactive CLI** for an InServ.
- 5 Select the InServ Storage Server to operate on.
- 6 Issue the `showdate` command and confirm the date setting.

```
Node Date
0    Sun Jul 09 14:09:59 PDT 2006
1    Sun Jul 09 14:09:59 PDT 2006
```

- 7 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.

- d** Type your user name and password and click **OK**.
- e** From the SPOCC Homepage, click **Support** from the left column menu.
- f** Click **CSStatus** on the InServs Action menu.
- g** Verify CSStatus indicates the system is healthy.
- h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 8** In the service processor window issue the `exit` command to stop the CLI session.
- 9** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 10** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 11** Close and lock the rear door of the server.

17

Replacing a Controller Node Chassis

In this chapter

17.1	General Precautions	17.1
17.2	Removing a Controller Node Chassis	17.2
17.3	Replacing a Controller Node Chassis	17.4

17.1 General Precautions

When handling controller node chassis, observe the precautions as described in [Chapter 2, Precautions](#).

17.2 Removing a Controller Node Chassis

To remove a controller node chassis:

- 1 Remove power from the storage server. Refer to [Power-Down Procedure](#) on page 4.1 for instructions.
- 2 Unlock and open the rear door of the storage server.
- 3 After halting the nodes (using the `shutdownsys` command), check the rear of the storage server and confirm that the hot-plug LEDs appear amber on all nodes ([Figure 17-1](#)).



CAUTION: To avoid damage to hardware and the loss of data, never power off or remove a controller node from an InServ E-Class Storage Server without confirming that the hot-plug LED on the node appears amber.

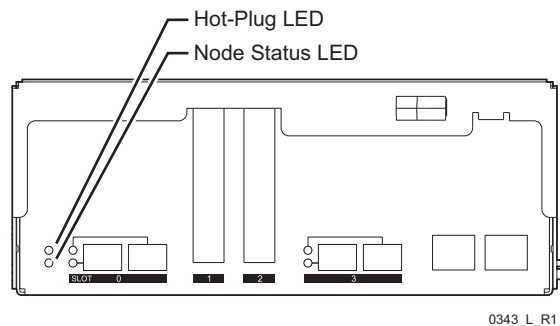
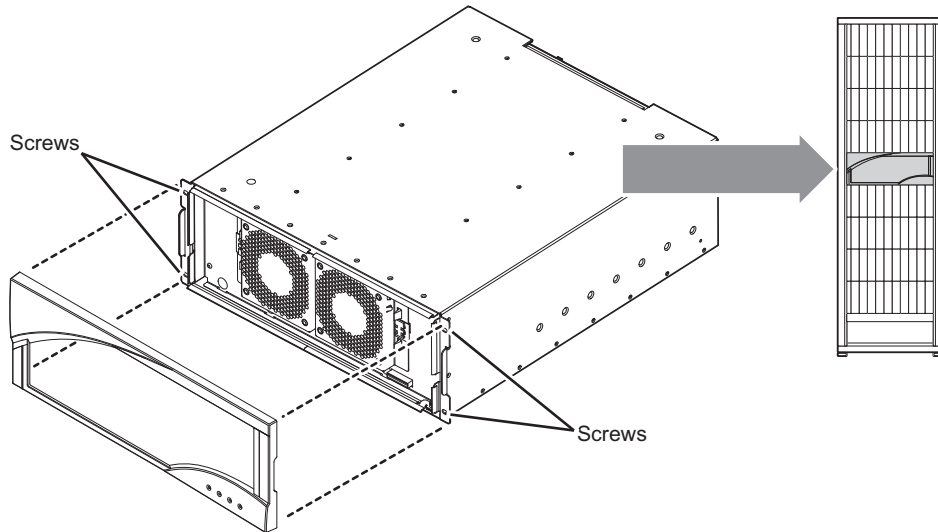


Figure 17-1. The Hot-Plug LED on the Controller Node

- 4 Remove both controller node power supplies by following the procedures as described in steps 1 through 8 in [Chapter 18, Replacing a Controller Node Power Supply](#).
- 5 Place the removed power supplies on an ESD-safe, level work surface.
- 6 Verify that all I/O and Ethernet cables are correctly labeled with NODE:SLOT:PORT information before disconnecting.
- 7 Note the location of all controller nodes in the chassis and mark the controller nodes with these locations.
- 8 Remove the controller nodes by following the procedures as described in [Removing a Controller Node](#) on page 9.2.

- 9 Place the controller nodes on an ESD-safe, level work surface.
- 10 At the front of the storage server, remove the bezel covering the controller node chassis.
- 11 Use a #2 Phillips screwdriver to remove the four screws securing the retainer bracket for the chassis being replaced (Figure 17-2).



0380_L_R1

Figure 17-2. Remove the Screws from the Controller Chassis



CAUTION: To prevent damage to the controller node chassis, do not hold or lift the chassis by the top cover.

- 12 Slide out the controller node chassis.

17.3 Replacing a Controller Node Chassis

To install a replacement controller node chassis:

- 1 Remove the replacement controller node chassis from its protective packaging.
- 2 Slide the replacement controller node chassis into the rack until it rests flush against the rack and the screw holes in the chassis align with the screw holes in the rack. Install and tighten the four screws.
- 3 Reinstall the controller nodes at the rear of the chassis and ensure that each node is returned to the same position prior to being removed. With the release lever pulled down, slide each node into the chassis. Lift up on the release lever while pushing back until the node is fully seated.
- 4 Reconnect the Ethernet and Fibre Channel cables to the controller nodes.
- 5 Reinstall the power supplies at the rear of the controller node chassis by sliding each power supply into the rear of the chassis until fully seated.
- 6 Reconnect the AC cords and secure them to the power supplies using the power supplies' bail locks.
- 7 Turn on AC power to the storage server by turning on the server's PDU circuit breakers.
- 8 Verify all power supply status LEDs appear green on the power supplies.



NOTE: Wait five minutes before checking the controller nodes status LED.

- 9 From the front of the storage server, verify that all controller nodes in the node chassis display green power status LEDs and the fans are operating.
- 10 If not already connected, connect the maintenance PC to the Service Processor. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- 11 Log in to the service processor to start an `spmaint` session by entering your login name and password.
- 12 Select option **7, Interactive CLI for an InServ**.
- 13 Select the desired InServ.

14 Issue the `showsys` and `shownode` commands to check the status of the system.

```
cli% showsys
```

ID	-Name-	---Model---	-Serial-	Nodes	Master	TotalCap	AllocCap	FreeCap	FailedCap
424	S424	InServ	E200 1100424	2	0	6277120	788736	5488384	0

```
cli% shownode
```

Node	--Name--	-State-	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	2048	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	2048	2048	100

15 Issue the `showpd` command to verify all the disks are properly connected.

```
cli% showpd
```

Id	CagePos	Type	Speed(K)	State	---Size(MB)---		----Ports----	
					Total	Free	A	B
0	0:0:0	NL	7	normal	715008	684288	0:0:1*	1:0:1
1	0:3:0	FC	10	normal	69632	1024	0:0:1	1:0:1*
2	0:4:0	NL	7	normal	715008	684288	0:0:1	1:0:1*
3	0:7:0	FC	10	normal	69632	2304	0:0:1	1:0:1
4	0:8:0	NL	7	normal	715008	684288	0:0:1*	1:0:1
5	0:11:0	FC	10	normal	69632	1024	0:0:1	1:0:1*
6	0:12:0	NL	7	normal	715008	684288	0:0:1	1:0:1*
7 total					2353920	2057216		

16 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- Type your user name and password and click **OK**.
- From the SPOCC Homepage, click **Support** from the left column menu.
- Click **CSStatus** on the InServs Action menu.

- g** Verify CSStatus indicates the system is healthy.
- h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 17** In the service processor window issue the `exit` command to stop the CLI session.
- 18** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 19** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 20** Close and lock the rear door of the server.

Power System Maintenance Procedures

18

Replacing a Controller Node Power Supply

In this chapter

18.1	General Precautions	18.1
18.2	Removing a Controller Node Power Supply	18.2
18.3	Replacing a Controller Node Power Supply	18.5



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Chapter C, *Guided Maintenance Overview*](#) for additional information.

18.1 General Precautions

When handling power supplies, observe the precautions as described in [Chapter 2, *Precautions*](#).

18.2 Removing a Controller Node Power Supply

To remove a power supply in a controller node chassis:

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

2 Select option **7, Interactive CLI for an InServ**.

3 Select the desired InServ.

4 Issue the `shownode -ps` command to verify the power supply failed.

```
cli% shownode -ps
Node PS -Serial- -PSState- FanState ACState DCState -BatState- ChrgLvl(%)
  0  0 61809231 OK         OK         OK         OK         OK         100
  1  1 0000      Failed    Failed    Failed    Failed    OK         0
```



WARNING: Before removing power from a power supply, make sure the other power supply and its associated node chassis fan are operational. When turning off a power supply, the associated node fan will stop. For example, fan 0 will stop when power supply 0 is turned off. If both fans stop, the system immediately shuts down.

5 To confirm the fan associated with the good power supply is properly working, issue the `showsys -fan` command.

```
cli% showsys -fan
PriNode SecNode -State- -LED- -Speed-
  0       1  Normal  Green  High
  1       0  Failed  Amber  Off
```

- 6 At the rear of the controller node chassis, identify the power supply requiring replacement and set it to the OFF position (Figure 18-1).

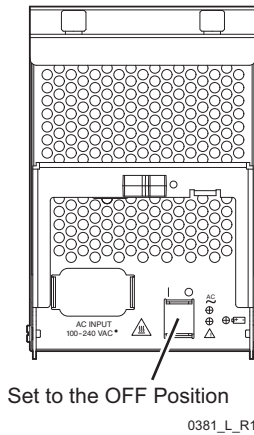


Figure 18-1. Set the Power Supply to the OFF Position

- 7 Unlatch the bail lock from the AC cord and disconnect the cord from the power supply.
- 8 Push the release tab on the lever of the power supply to the right and lower the lever to a horizontal position (Figure 18-2).

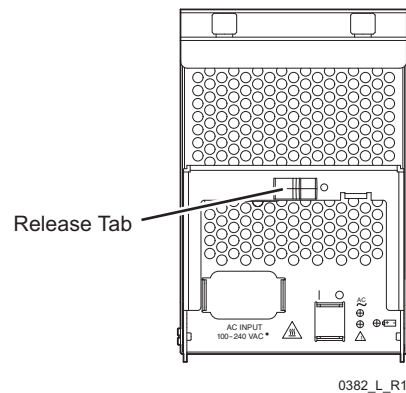


Figure 18-2. Push the Release Tab to the Right and Lower the Lever.

- 9 Using the lever, carefully remove the power supply from the chassis while supporting the base with your other hand (Figure 18-3).

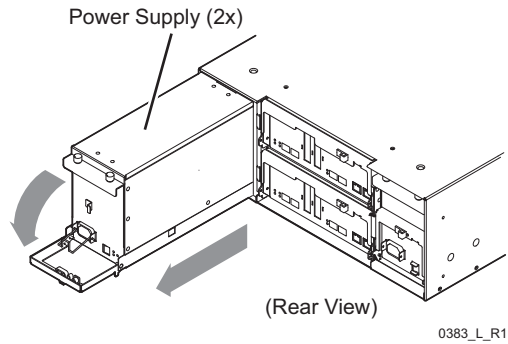


Figure 18-3. Lowering the Lever to Slide Out the Power Supply

- 10 Place the power supply on an ESD-safe, level work surface.
- 11 Loosen the two captive screws from the top plate of the power supply. If necessary, use a #1 Phillips screwdriver.
- 12 Flip the battery assembly upside down on the power supply as shown in Figure 18-4.

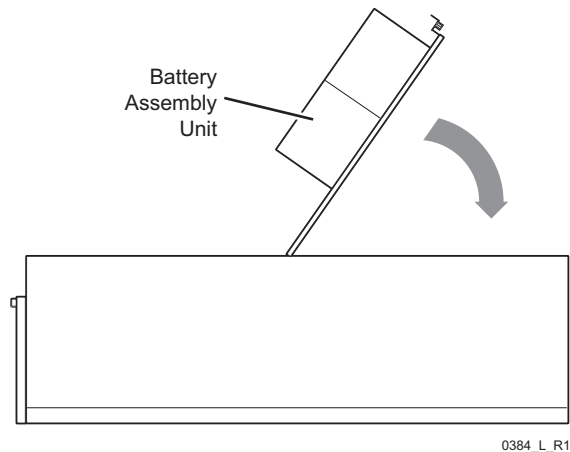


Figure 18-4. Flip the battery assembly upside down.

- 13 Disconnect the backup battery assembly wiring harness from the power supply.
- 14 Place the backup battery assembly on an ESD-safe, level work surface.
- 15 Remove the replacement power supply from its protective packaging.
- 16 Place the removed power supply into the protective packaging for return to 3PAR.

18.3 Replacing a Controller Node Power Supply

To replace a power supply unit:

- 1 Verify the replacement power supply is set to the OFF position.
- 2 Lay the backup battery assembly upside down on the cover plate of the power supply.
- 3 Connect the wiring harness from the power supply to the battery assembly.
- 4 Flip the backup battery assembly over and engage the rear locking tab as shown in [Figure 18-5](#).

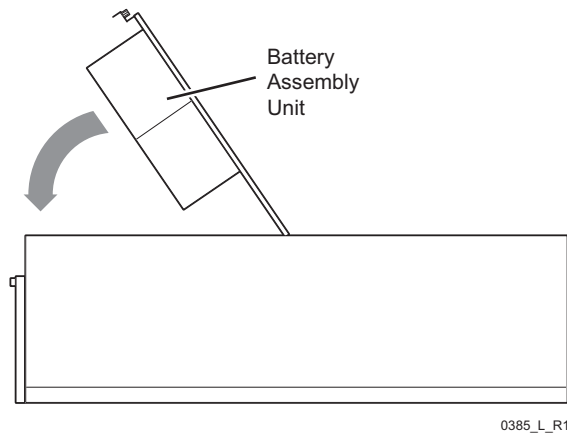


Figure 18-5. Flip the Battery Assembly Into the Power Supply.

- 5 Finger-tighten the two captive screws of the cover plate.
- 6 Record the battery serial number from the label on the battery assembly.
- 7 Push the release tab on the lever of the power supply to the right and lower the lever to a horizontal position.

- 8 Carefully insert the power supply into the chassis.

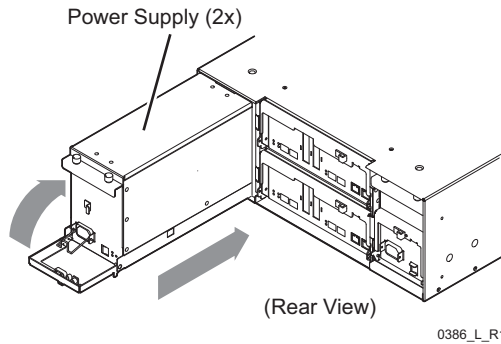


Figure 18-6. Slide Power Supply into the Node Chassis.

- 9 When the power supply does not slide any further into the chassis, raise the lever to the upright, locked position to fully engage the power supply in the chassis.
- 10 Ensure the power supply switch is in the off position ([Figure 18-7](#)).
- 11 Reconnect the AC cord to the power supply unit.
- 12 Latch the bail lock to the AC cord.
- 13 Set the power supply to the ON position ([Figure 18-7](#)).

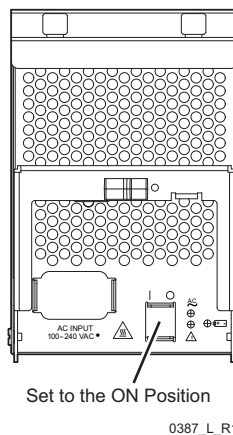


Figure 18-7. Set the Power Supply to the ON Position

14 Confirm that all three LEDs in the rear of the power supply appear green.

15 In the service processor window, issue the `shownode -ps` command and verify the node power supply's status is OK.

```
cli% shownode -ps
Node PS -Serial- -PSState- FanState ACState DCState -BatState- ChrgLvl(%)
0 0 61809231 OK OK OK OK OK 100
1 1 61809229 OK OK OK OK OK 100
```

16 Issue the `showsys -fan` command to confirm the fan is properly working.

```
cli% showsys -fan
PriNode SecNode -State- -LED- -Speed-
0 1 Normal Green Normal
1 0 Normal Green Normal
```

17 Issue the `showbattery` command to confirm the battery information is set correctly.

```
cli% showbattery
Node PS Bat Serial -State- ChrgLvl(%) -ExpDate-- Expired Testing
0 1 0 12345678 OK 100 12/12/2010 No No
1 1 0 60308193 OK 100 12/12/2010 No No
```

- a** If `showbattery` is displaying an incorrect date after replacing the power supply, issue `setbattery` command to update the battery information.

18 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a** Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b** Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c** Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- d** Type your user name and password and click **OK**.
- e** From the SPOCC Homepage, click **Support** from the left column menu.
- f** Click **CSStatus** on the InServs Action menu.

- g** Verify CSStatus indicates the system is healthy.
- h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 19** In the service processor window issue the `exit` command to stop the CLI session.
- 20** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 21** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 22** Close and lock the rear door of the server.

19

Replacing a Drive Chassis Power Supply

In this chapter

19.1	General Precautions	19.1
19.2	Removing a Drive Chassis Power Supply	19.1
19.3	Replacing a Drive Chassis Power Supply	19.4



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, *Guided Maintenance Overview*](#) for additional information.

19.1 General Precautions

When handling a drive chassis power supply, observe the precautions shown in [Chapter 2, *Precautions*](#).

19.2 Removing a Drive Chassis Power Supply

To remove a power supply in a drive chassis:

- 1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.
- 2 Select option **7, Interactive CLI for an InServ**.
 - 3 Select the desired InServ Storage Server.
 - 4 Issue the `showcage -d <cage_name>` command and verify the power supply has failed.

```
cli% showcage -d cage0
Id  Name LoopA Pos.A LoopB Pos.B Drives  Temp RevA RevB Model Side
0  cage0 0:0:1    0 1:0:1    0      8 25-28  01  01  DC3  n/a

-----Cage detail info for cage0 -----

Position: ---
-----Midplane Info-----
VendorId,ProductId      3PARdata,DC3
Serial_Num  OPS45811C010719
Node_WWN    20000050CC010719
TempSensor_State      OK
TempSensor_Value      31
OpsPanel_State        OK
Audible_Alarm_State    Muted
Cage_State             OK

Interface Board Info  LoopA  LoopB
Firmware_status Current Current
Product_Rev      01      01
IFC_State        OK      OK
ESH_State        OK      OK
Master_CPU       Yes     No
Loop_Map         valid   valid
Link_Speed       2Gbps   2Gbps
Port0_State      OK      OK
Port1_State      No_SFP  No_SFP
Port2_State      No_SFP  No_SFP
Port3_State      No_SFP  No_SFP

Power Supply Info     State  Fan State AC Model
ps0  Failed MedSpeed OK  --
ps1  OK MedSpeed OK  --
...
```

- 5 Use the power supply LEDs to identify the power supply that requires replacement. Set it to the OFF position.
- 6 Unlatch the bail lock from the AC cord and disconnect the cord from the power supply.

- 7 Push the two release tabs on the lever of the power supply together and lower the lever until it disengages from the chassis midplane (Figure 19-1).

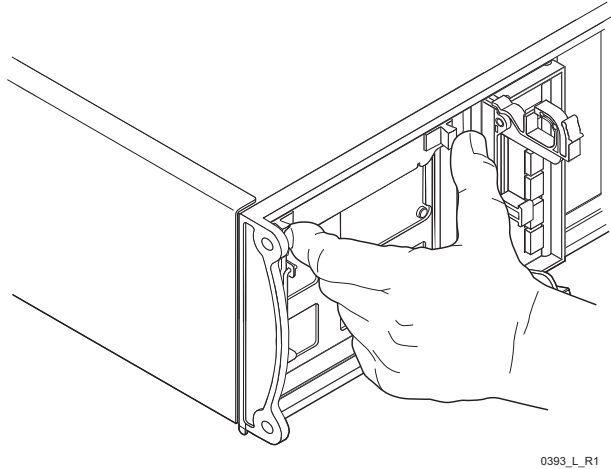


Figure 19-1. Squeeze the Two Tabs Together

- 8 Using the lever, carefully remove the power supply from the chassis while supporting the base with your other hand (Figure 19-2).

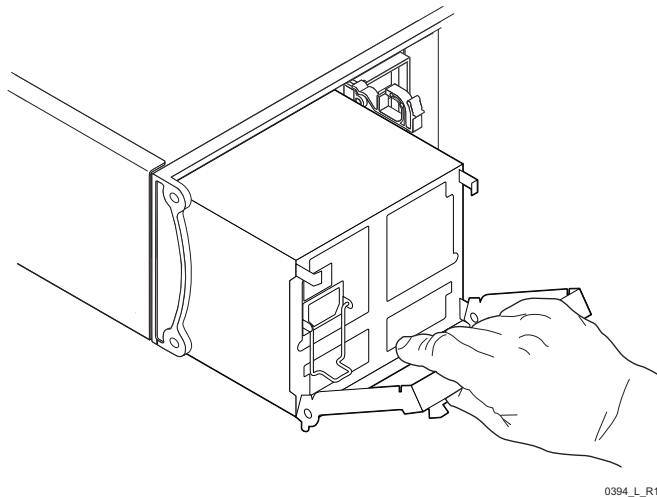


Figure 19-2. Use the Lever to Slide the Power Supply Out

- 9 Place the power supply on an ESD-safe, level work surface.

19.3 Replacing a Drive Chassis Power Supply

To replace a power supply in a drive chassis:

- 1 Remove the replacement power supply from its protective packaging.
- 2 Place the removed power supply into the protective packaging for return to 3PAR.



NOTE: The drive chassis power supply can be installed in either location in the drive chassis. Check the position of the power cord bail and perform [step 3](#) if necessary.

- 3 If necessary, unclip the power cord bail and rotate it 180 degrees.
- 4 Check to make sure the replacement power supply is set to OFF the position.
- 5 Push the two release tabs on the lever of the power supply toward each other and lower the lever.
- 6 Using the lever, carefully insert the power supply into the chassis.
- 7 When the power supply does not slide any further into the chassis, lower or raise the lever until it snaps into place.
- 8 Reconnect the AC cord to the power supply unit.
- 9 Latch the bail lock to the AC cord.
- 10 Set the power supply to the ON position.
- 11 Verify that the power supply's LEDs turn green.

- 12** In the service processor window, issue the `showcage -d cage0` command and verify the power status of the drive cage and that the power supply status LED appears green.

```
cli% showcage -d cage0
Id  Name LoopA Pos.A LoopB Pos.B Drives  Temp RevA RevB Model Side
0  cage0 0:0:1    0 1:0:1    0      8 25-28  01  01  DC3  n/a

-----Cage detail info for cage0 -----

Position: ---
-----Midplane Info-----
VendorId,ProductId    3PARdata,DC3
Serial_Num    OPS45811C010719
Node_WWN    20000050CC010719
TempSensor_State    OK
TempSensor_Value    31
OpsPanel_State    OK
Audible_Alarm_State    Muted
Cage_State    OK

Interface Board Info  LoopA  LoopB
Firmware_status Current Current
Product_Rev    01      01
IFC_State    OK      OK
ESH_State    OK      OK
Master_CPU    Yes     No
Loop_Map    valid   valid
Link_Speed    2Gbps   2Gbps
Port0_State    OK      OK
Port1_State    No_SFP  No_SFP
Port2_State    No_SFP  No_SFP
Port3_State    No_SFP  No_SFP

Power Supply Info    State  Fan State AC Model
ps0    OK      MedSpeed OK    --
ps1    OK      MedSpeed OK    --
...
```

- 13** Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a** Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b** Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c** Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.

- d** Type your user name and password and click **OK**.
 - e** From the SPOCC Homepage, click **Support** from the left column menu.
 - f** Click **CSStatus** on the InServs Action menu.
 - g** Verify CSStatus indicates the system is healthy.
 - h** Log out of SPOCC by clicking **Log Out** on the upper right window.
- 14** In the service processor window issue the `exit` command to stop the CLI session.
- 15** Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 16** At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 17** Close and lock the rear door of the server.

20

Replacing a Battery Assembly Unit

In this chapter

20.1	General Precautions	20.1
20.2	Removing a Battery Assembly Unit	20.2
20.3	Replacing a Battery Assembly Unit	20.4



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Chapter C, *Guided Maintenance Overview*](#) for additional information.

20.1 General Precautions

When handling battery assembly units, observe the precautions as described in [Chapter 2, *Precautions*](#).

20.2 Removing a Battery Assembly Unit

To replace a battery assembly unit:

1 Start an `spmaint` session:

- a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
- b Log in to the service processor by entering your login name and password.

The **3PAR Service Processor Menu** appears:

- 2 Select option **7, Interactive CLI for an InServ**.
- 3 Select the desired InServ.
- 4 Issue the `showbattery` command and identify the faulty battery.

```
cli% showbattery
Node PS Bat Serial -State- ChrgLvl(%) -ExpDate-- Expired Testing
  0  0  0 60308194 Failed      100 05/15/2008 No      No
  1  1  0 60308192 OK          100 07/21/2009 No      No
```



WARNING: Before removing power from a power supply, make sure the other power supply and its associated node chassis fan are operational. When turning off a power supply, the associated node fan will stop. For example, fan 0 will stop when power supply 0 is turned off. If both fans stop, the system will immediately shut down.

- 5 Identify the power supply that contains the faulty battery that needs to be replaced and set it to the OFF position.
- 6 Unlatch the bail lock from the AC cord and disconnect the cord from the power supply.
- 7 Push the release tab on the lever of the power supply to the right and lower the lever to a horizontal position.
- 8 Using the lever, carefully remove the power supply from the chassis while supporting the base with your other hand.

- 9 Place the power supply on an ESD-safe, level work surface.
- 10 Loosen the two captive screws from the top plate of the power supply. If necessary, use a #1 Phillips screwdriver.
- 11 Flip the battery assembly upside down, as shown in [Figure 20-1](#).

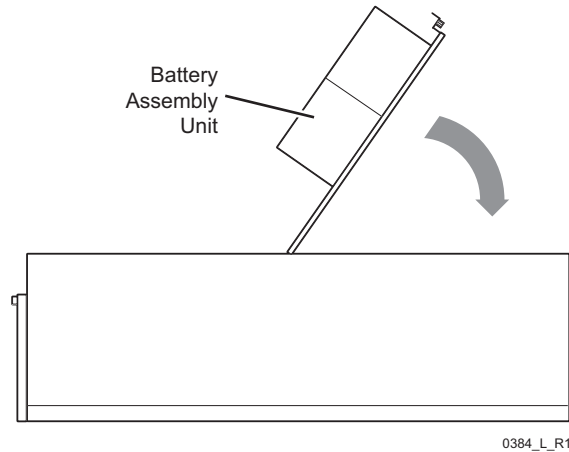


Figure 20-1. Flip the Battery Assembly Over

- 12 Disconnect the wiring harness of the battery from the power supply and place on an ESD-safe, level work surface.

20.3 Replacing a Battery Assembly Unit

To replace a battery assembly unit:

- 1 Remove the replacement battery from its protective packaging.
- 2 Lay the replacement battery assembly upside down on the top of the power supply.
- 3 Connect the wiring harness of the replacement battery to the power supply.
- 4 Flip the battery module over (Figure 20-2).

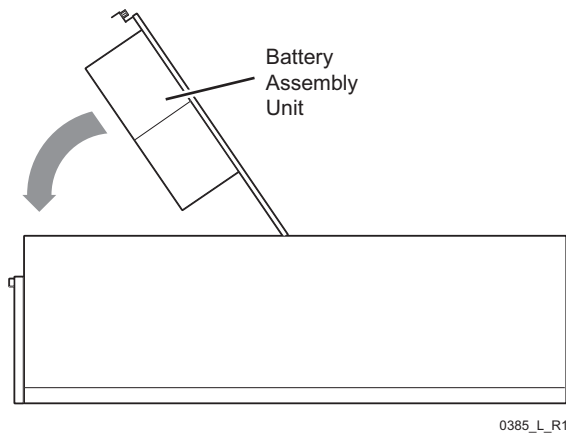


Figure 20-2. Flip the Battery Assembly into the Power Supply

- 5 Finger-tighten the two captive screws of the cover plate.
- 6 Record the new battery's serial number and expiration information.
- 7 Place the removed battery into the protective packaging for return to 3PAR.



CAUTION: Return the battery units to 3PAR for proper disposal.

- 8 If it is not already down, lower the power supply lever to a horizontal position.
- 9 Carefully insert the power supply into the chassis.
- 10 When the power supply does not slide any further into the chassis, raise the lever to the upright, locked position to fully engage the power supply into the chassis.
- 11 Ensure that the power supply is off and reconnect the AC cord to the power supply.
- 12 Latch the bail lock to the AC cord.
- 13 Set the power supply to the ON position.
- 14 Confirm that all three LEDs in the rear of the power supply appear green.
- 15 Issue the `showbattery` command to verify that the battery's information is properly set.

```
cli% showbattery
```

Node	PS	Bat	Serial	-State-	ChrgLvl(%)	-ExpDate--	Expired	Testing
0	0	0	60308194	OK	100	01/20/2010	No	No
1	1	0	60308198	OK	100	01/20/2009	No	No

- 16 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
- b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
- c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
- d Type your user name and password and click **OK**.
- e From the SPOCC Homepage, click **Support** from the left column menu.
- f Click **CSStatus** on the InServs Action menu.
- g Verify CSStatus indicates the system is healthy.
- h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 17 In the service processor window issue the `exit` command to stop the CLI session.
- 18 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.

- 19 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 20 Close and lock the rear door of the server.

21

Replacing a Power Distribution Unit (PDU) in a 3PAR Cabinet

In this chapter

21.1	General Precautions	21.1
21.2	Removing a PDU	21.2
21.3	Replacing a PDU	21.9



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, *Guided Maintenance Overview*](#) for additional information.



NOTE: Install only 3PAR PDUs onto a 3PAR rack.

21.1 General Precautions

When handling the Power Distribution Unit (PDU), observe the precautions as described in [Chapter 2, *Precautions*](#).

21.2 Removing a PDU

To remove a PDU:

- 1 Unlock and open the rear door of the storage server.
- 2 Confirm that the storage server has a valid redundant power configuration. To support redundant power, each power domain must include two power supplies that connect to separate PDUs, and each PDU must connect to an independent AC circuit.
 - [Figure 21-1](#) illustrates a valid redundant power configuration for a storage server in a 2M (40U) cabinet.
 - [Figure 21-2](#) illustrates a valid redundant power configuration for a storage server in a 1M rack.
 - [Figure 21-3](#) illustrates a valid redundant power configuration in a 1M expansion cabinet. For more information on redundant power, see the *3PAR 3PAR InServ E-Class Storage Server Installation, Deinstallation, and Upgrade Guide*.

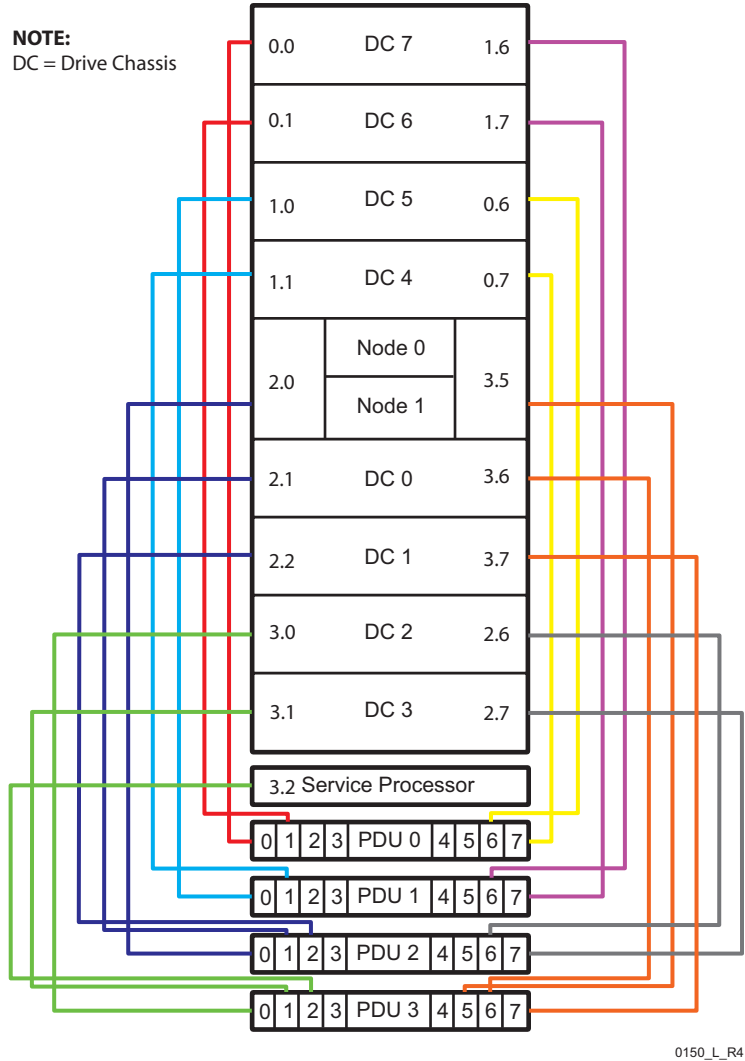


Figure 21-1. A Valid Redundant Power Configuration Diagram (2M)

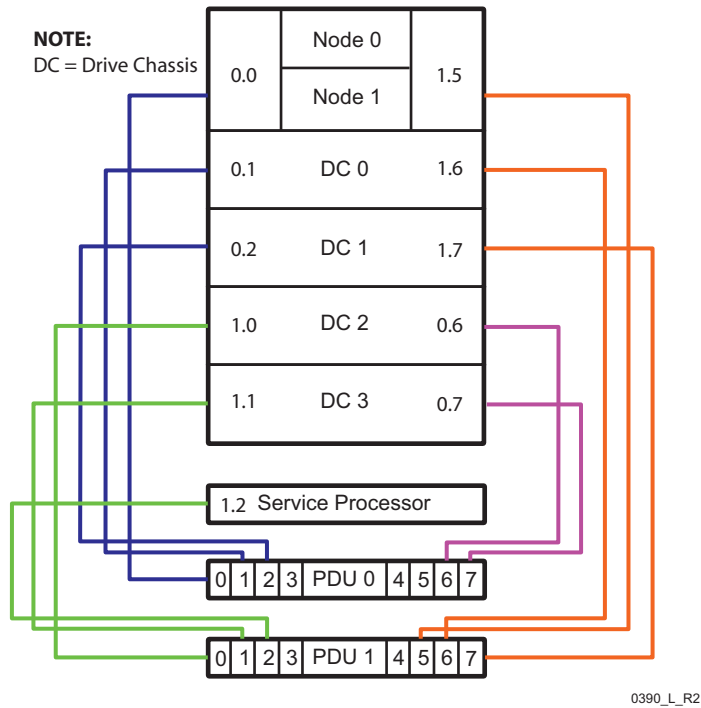


Figure 21-2. A Valid Redundant Power Configuration Diagram (1M)

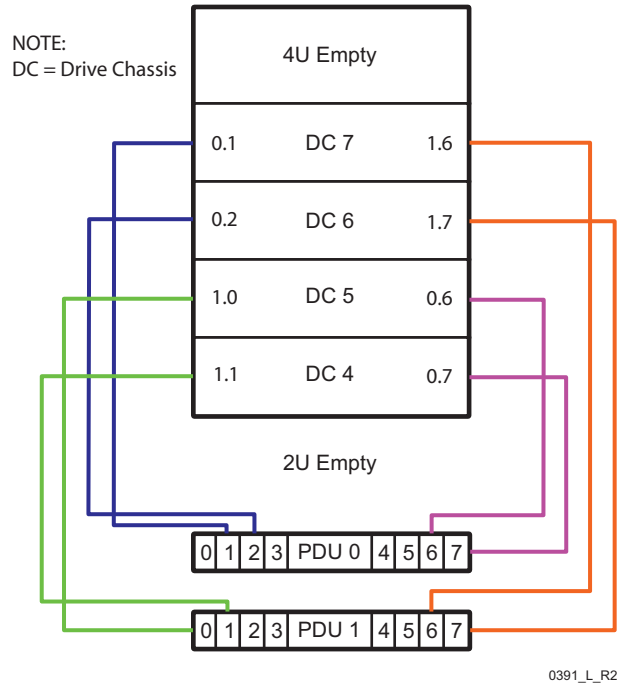


Figure 21-3. A Valid Redundant Power Configuration Diagram (1M Expansion Cabinet)

- 3 Set the power breakers on the failed PDU to the OFF position ([Figure 21-4](#)), and unplug the PDU's main power cord.

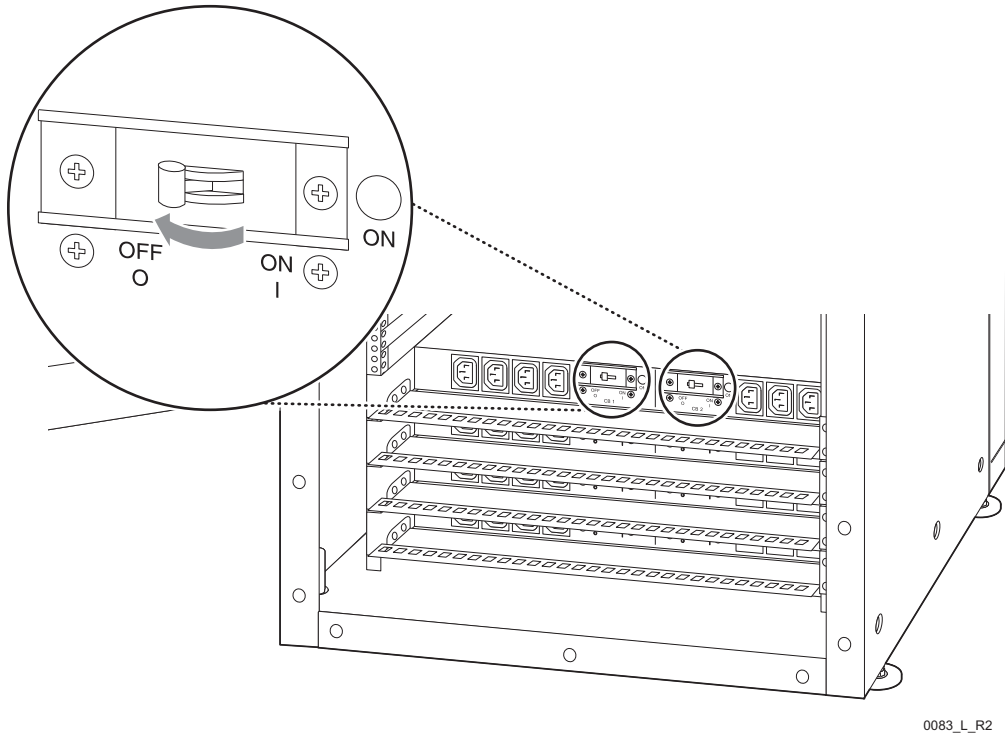


Figure 21-4. Setting the Power Breakers on the PDU to the OFF Position

To unplug the main power cord, rotate the power receptacle connector counterclockwise a quarter turn before pulling it away from the receptacle ([Figure 21-5](#)).

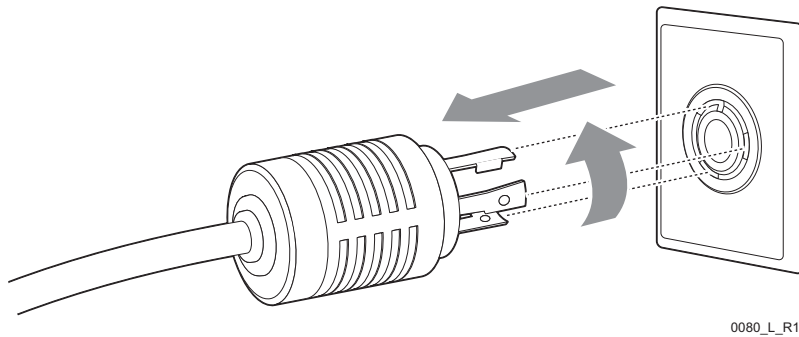


Figure 21-5. Unplugging the Power Receptacle Connector

- 4 Disconnect the AC cords that connect the power supplies to the failed PDU as follows:
 - a Note the numbers indicated on the AC cord labels and the PDU circuit breakers to which they connect. [Figure 21-6](#) shows the location and order of the two circuit breakers in the PDU.

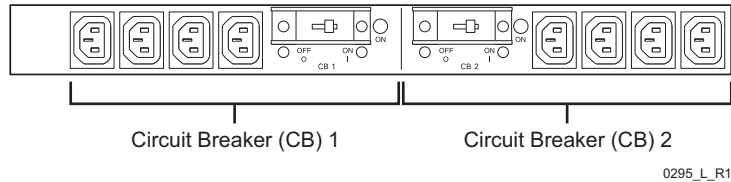


Figure 21-6. Location and Order of the Circuit Breakers in the PDU

- b Cut the plastic tie-wraps that secure the AC cords to the PDU. Be careful not to cut the cords.
 - c Unplug all AC cords from the PDU that requires replacement.
- 5 Use a $\frac{3}{8}$ -inch (10-mm) wrench to disconnect the ground wire from the cabinet, as shown in [Figure 21-7](#).

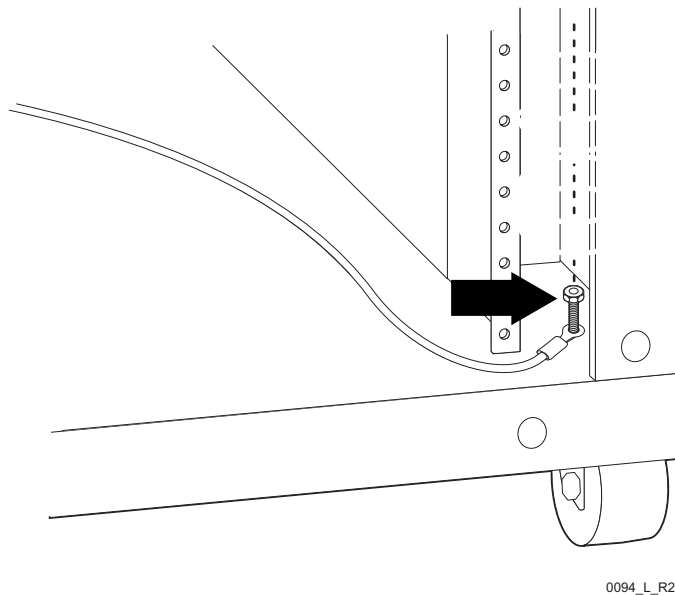


Figure 21-7. Disconnecting the Ground Wire from the Cabinet

- 6 Remove the fasteners securing the PDU to the rack using a #2 Phillips screwdriver (Figure 21-8).

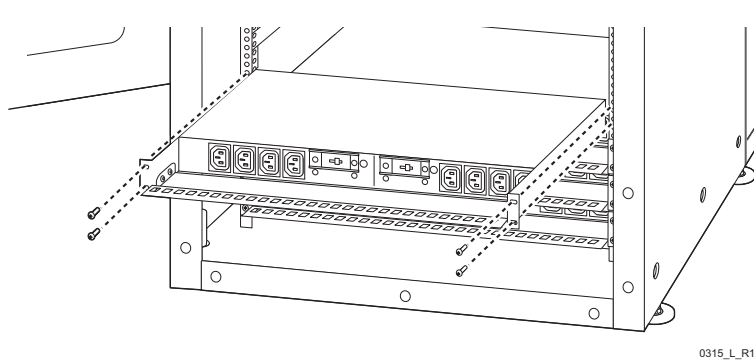


Figure 21-8. Removing the PDU from the Rack

- 7 Pull the PDU partly out from the back of the rack and rotate the PDU clockwise 90 degrees.



NOTE: The head of the power cord is larger than the 1U opening created by the PDU. If the PDU being removed is one of the lower three, it is necessary to remove the PDU through the front of the cabinet. To do this, rotate the PDU horizontally by 90 degrees, and push it through the 1U opening, removing it from the front of the cabinet.

- 8 Push the PDU back into the rack. Go to the front of the storage server and pull the PDU out from the front of the rack.

21.3 Replacing a PDU

To replace a PDU:

- 1 Remove the replacement PDU from its protective packaging.
- 2 Place the failed PDU into the packaging for return to 3PAR.
- 3 At the front of the storage server, rotate the replacement PDU horizontally by 90 degrees, then push it through the 1U opening. Then rotate the PDU so the orientation is the same as the other PDUs.
- 4 Route the replacement PDU's power cable through the cabinet similar to the other cables connected to that PDU.
- 5 Go to the rear of the storage server and pull the PDU through the rear opening.
- 6 Rotate the PDU 90 degrees so that the PDU's receptacles are facing you.
- 7 Slide the unit into the rack until the screw holes in the front of the PDU align with the screw holes in the rack.
- 8 Install and tighten the fasteners that secure the PDU to the rack using a #2 Phillips screwdriver. Do not overtighten.
- 9 Locate the green ground wire on the PDU and attach it to the grounding terminal on the cabinet where the failed PDU's ground wire was attached using a $\frac{3}{8}$ -inch (10-mm) wrench.
- 10 Confirm that the breakers on the replacement PDUs are set to the OFF position before reconnecting the AC cords that run from the power supplies to the PDU.
- 11 Secure the AC cords to the PDU.
 - a Position the AC cords between two holes in the cord retention bracket of the PDU and connect to the numbered positions as indicated on the cords.
 - b Insert the AC cords into the proper receptacles in the PDU.
 - c Route plastic tie-wraps through the holes in the bracket on either side of the AC cords and tighten.
- 12 After tightening and cutting the tie wraps, push firmly on the head of each power cord to ensure the cord is well seated.

- 13 Plug the replacement PDU's main power cord into the customer's grounded electrical circuit.



WARNING: The main power cords for InServ E-Class Storage Servers include safety features to prevent plugging them into electrical circuits that are not compatible with the storage server. To prevent serious injury to people and damage to equipment, do not override this feature by using outlet adapters or by altering the power cord.

- 14 Set the circuit breakers on the PDU to the ON position. Verify that the power indicator LEDs appear blue.
- 15 Verify that all power supply status LEDs appear green.
- 16 Close and lock the rear door of the storage server.

22

Replacing an AC Cord

In this chapter

22.1	General Precautions	22.1
22.2	Removing an AC Cord	22.2
22.3	Replacing an AC Cord	22.3



NOTE: Guided maintenance scripts are available to facilitate this procedure. Refer to [Appendix C, Guided Maintenance Overview](#) for additional information.

22.1 General Precautions

When handling an AC cord, observe the precautions as described in [Chapter 2, Precautions](#).

22.2 Removing an AC Cord

To remove an AC cord:

- 1 Unlock and open the rear door on the storage server.
- 2 Locate the faulty cable in the cable bundles secured to the storage server frame and make note of its location.
- 3 Remove the plastic tie-wraps that secure the faulty cable bundle to the storage server frame by using a pair of cutters or equivalent.
- 4 Remove the plastic tie-wraps that secure the AC cord to the PDU by using a pair of cutters or equivalent.
- 5 Turn off the power supply that connects to the damaged AC cord.
- 6 Unplug the AC cord from the PDU.
- 7 Lift up the bail lock and disconnect the damaged AC cord from the power supply.

22.3 Replacing an AC Cord

To replace an AC cord:

- 1 Remove the replacement AC cord from its protective packaging.
- 2 Place the damaged AC cord in the protective packaging for return to 3PAR.
- 3 Label the replacement cable to correspond with the cable being replaced and then route the replacement through the storage server frame.



NOTE: If possible, remove labels from the replaced (defective) cord.

- 4 Connect the replacement AC cord to the power supply and lower the bail lock over the cord.
- 5 Connect the replacement AC cord to the PDU receptacle previously occupied by the damaged cord.
- 6 Secure the AC cord to the PDU.
 - a Position the AC cord between two holes in the cord retention bracket of the PDU.
 - b Route a plastic tie-wrap through the holes in the bracket on either side of the AC cord and tighten.
 - c Push firmly on the head of the power cord to ensure it is well seated.
- 7 Turn on the power supply to connect the replaced AC cord and confirm the LED is green.
- 8 Close and lock the rear door of the storage server.

Service Processor Maintenance Procedures

23

Service Processor Replacement and Upgrade

In this chapter

23.1	Replacing a Service Processor	23.2
23.1.1	Replacing a Service Processor	23.2
23.2	Rebuilding the Software on a Service Processor	23.7
23.2.1	Requirements	23.7
23.2.2	Retrieving the Rescue File from the Service Processor	23.8
23.2.3	Rebuilding the Service Processor Software	23.10
23.2.4	Restoring Service Processor Information using Rescue Data	23.11
23.2.5	Using Ethernet for Backup File Retrieval from a Connection Portal	23.17
23.2.6	Restoring the Service Processor Configuration Information Manually	23.17

23.1 Replacing a Service Processor

The following instructions describe how to replace a service processor.



CAUTION: Before proceeding with this maintenance procedure, refer to the tools list in [Appendix A, Tools](#). Using improper tools can result in damage to the storage server.

23.1.1 Replacing a Service Processor



NOTE: If the service processor is still functional, retrieve its configuration information prior to proceeding with the following replacement procedures. Refer to [Retrieving the Rescue File from the Service Processor](#) on page 23.8 for instructions on service processor configuration information retrieval.

To replace a service processor:

- 1 Unlock and open the rear door of the storage server.
- 2 Power down the service processor if it is still functional:
 - a Start an `spmaint` session:
 - b Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - c Log in to the service processor by entering your login name and password.
 - d Select option **1, SP Control/Status**.
 - e Select option **3, Halt SP**.
 - f When prompted, press `y` to confirm halting the service processor.
 - g The service processor shutdown sequence will begin.
- 3 Verify that the power LED on the front of the service processor is no longer illuminated.
- 4 At the rear of the storage server, disconnect all cables from the service processor making note of their locations for later installation.

- 5 At the front of the storage server, use a #2 Phillips screwdriver to remove the two captive screws securing the service processor to the storage server.
- 6 Remove the service processor.
- 7 Remove the replacement service processor from its packaging. Insert the failed service processor into the packaging for return to 3PAR.
- 8 Depending on the type of the failed service processor and its replacement, proceed as follows:
 - ◆ If you are replacing a failed Dell service processor with a replacement Dell service processor, proceed to [step 10](#).
 - ◆ If you are replacing a failed Wintec service processor with a replacement Wintec service processor, proceed to [step 10](#).
 - ◆ If you are replacing a failed Dell service processor with a replacement Wintec service processor, proceed to [step 9](#).
- 9 Remove the Dell service processor's mounting rails and install the Wintec service processor's mounting rails (see [Figure 23-1](#)).



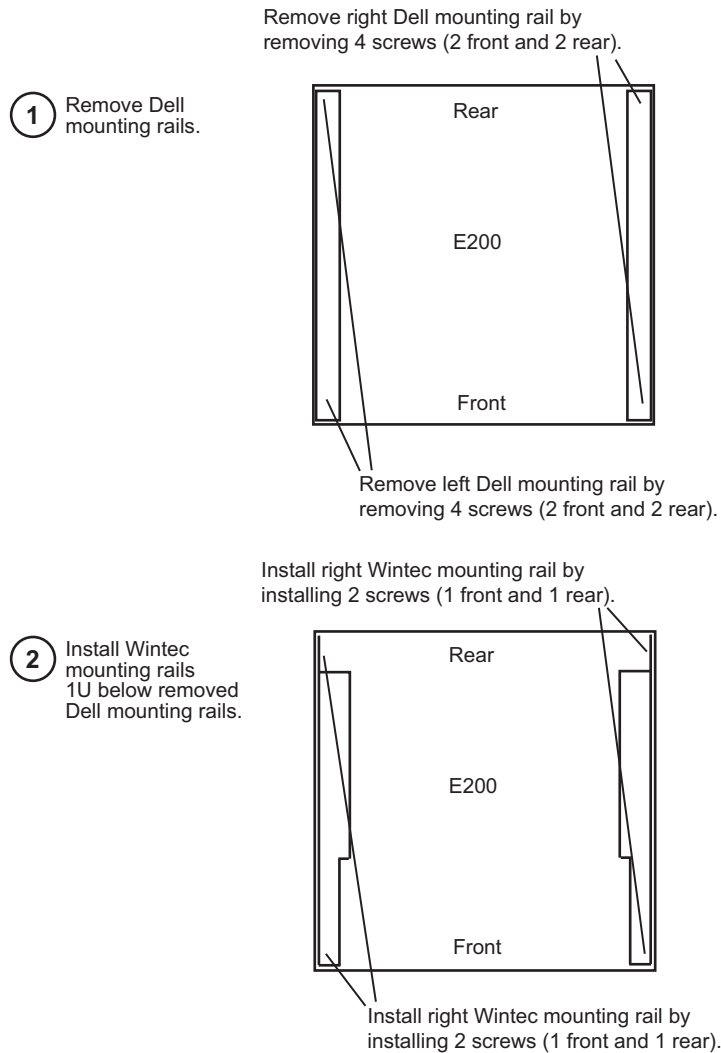
NOTE: The Wintec service processor FRU package contains the Wintec service processor mounting rails.

- a Using a #2 Phillips screwdriver, remove the eight screws (four per side) securing the right and left Dell service processor mounting rails from the storage server frame, and then remove the mounting rails.



NOTE: There must be 1U space above the Wintec service processor for accessibility.

- b Using a #2 Phillips screwdriver, install the four screws (two per side) securing the right and left Wintec service processor mounting rails in the storage server frame above the PDUs.



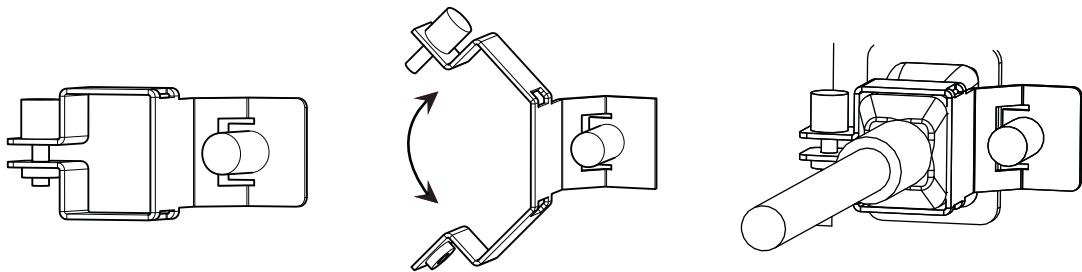
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Figure 23-1. Location of Service Processor Mounting Rails

- 10 Align the replacement service processor with its rails on the storage server chassis. Push the service processor into position until it is flush with the front of the rack.

11 Perform one of the following:

- ◆ If you are installing a Dell service processor, use a #2 Phillips screwdriver to secure the two captive screws.
- ◆ If you are installing a Wintec, Supermicro, use a #2 Phillips screwdriver to secure the four screws.
- ◆ If you are installing a Supermicro II, use a # 2 Phillips screwdriver to secure the two screws.

12 If you are replacing a Supermicro II service processor, open the AC cord lock and place it around the cord end that connects to the SP and use a #1 Phillips screwdriver to secure the captive screw ([Figure 23-2](#)).

0817_L_R1

Figure 23-2. Attaching the Supermicro II AC Cord Lock

- 13** At the rear of the storage server, replace the AC cord and any removed cabling. Refer to [Figure 23-2](#) and [Figure 23-2](#) for the location of Ethernet ports on Supermicro, Supermicro II, and Wintec service processors.
- 14** If you are replacing a Supermicro II service processor, secure the AC cord lock to the rear of the SP with a #2 Phillips screwdriver ([Figure 23-3](#)).

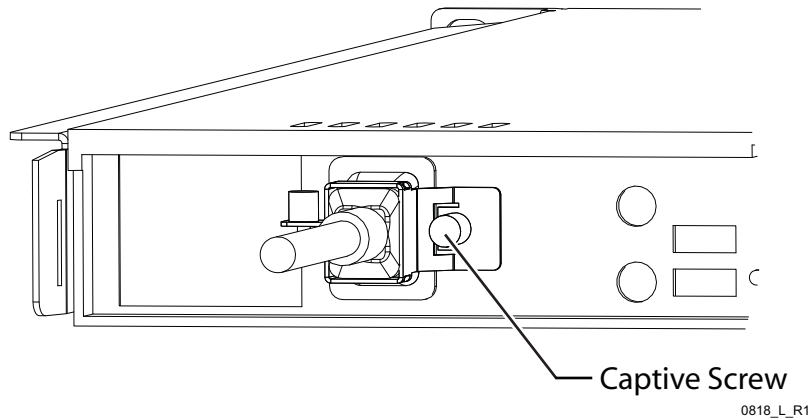


Figure 23-3. Connecting the AC Cord Lock to the Supermicro II Service Processor

- 15 At the front of the storage server, set the service processor power switch to the ON position. Verify that the power LED is illuminated.
- 16 Rebuild the software on the new service processor. See [Rebuilding the Software on a Service Processor](#) on page 23.7.

23.2 Rebuilding the Software on a Service Processor

When the service processor hardware is replaced, the appropriate service processor software must be loaded. Specific settings must be restored to allow it to communicate with the InServ Storage Server.

23.2.1 Requirements

- 1 An InForm OS Software Service Provider Kit (P/N 780-1032-xx). The service provider kit includes the following software CDs:
 - a A Service Processor Base Image CD:
for 2.2.x, P/N 790-1013-xx.
 - b A Service Processor Update Software CD:
for 2.2.2, P/N 780-1055-xx (contains InForm OS 2.2.2, 2.2.1, and 2.1.4).
- 2 Service processor configuration information is necessary to configure the newly-built service processor. This information can be copied to the replacement service processor from a previously saved service processor configuration file (SP Rescue Data), or it can be manually retrieved.

Attempt to download the SP Rescue Data from the replaced service processor because this information is stored and can be retrieved. If the service processor is not functional, the information (service processor's IP address, netmask, gateway address, and InServ Storage Server IP address) must be obtained from any or all of the following sources:

- ◆ spconfig file or RESCUE file on the connection portal.
- ◆ documents such as in the Installation Checklist or the Systems Assurance document.



NOTE: There are many other recommended and optional settings. Use the *SP Configuration Information Worksheet* when manually gathering information.

23.2.2 Retrieving the Rescue File from the Service Processor

The service processor configuration information (SP Rescue Data) can be manually retrieved from a working service processor and saved to a file on a maintenance laptop (PC), or it can be retrieved from an SP Connection Server/portal (such as Connex at 3PAR) if external communication is permitted. The rescue file is saved on the service processor whenever changes are made to service processor configuration data. The file is also transferred to a connection portal within 24 hours, if outbound communication is permitted.

To save the SP Rescue Data to a PC:

- 1 In the service processor window, issue the `spmaint` command.
- 2 Select option **1, SP Control/Status**.
- 3 Select option **17, SP File maintenance**.
- 4 Select option **4** to back up the data to a file on the service processor.
- 5 Type `y` and press **Enter** to begin the service processor backup.

After saving the information on the service processor, use SPOCC to continue the procedure:

- 6 Log in to the SPOCC and click the **files** button on the left side of the screen.
- 7 Click the folder-icon beside **files**.
- 8 Click the folder-icon beside **rescue** to select possible SP Rescue Data files.

- 9 Download the most recent rescue file by clicking the **Download** icon on the right side of the screen.



NOTE: Click the modified column heading to sort in ascending or descending order.

The file name syntax is similar to this:

SPxxxxxx.RESCUE.YYYYMMDD.hhmmss

where:

- ◆ xxxxxx is the service processor ID.
- ◆ YYYY is the year.
- ◆ MM is the month.
- ◆ DD is the day.
- ◆ hh is the hour
- ◆ mm is the minute.
- ◆ ss is the second.

- 10 Download the file to the host machine. Use the following file name syntax when saving the SP Rescue Data:

SPxxxxxx.RESCUE.YYYYMMDD.hhmmss



NOTE: Some browsers will add a 1 to the file name. Save the file without such characters.

- 11 See [Rebuilding the Service Processor Software](#) on page 23.10 for additional steps.

23.2.3 Rebuilding the Service Processor Software



NOTE: If you are replacing a service processor with a new service processor (FRU), or the service processor is running software version 2.2.0 or higher, you do not need to reimage the service processor.

The following procedure installs the service processor software onto the service processor.

23.2.3.1 Base Image Installation

- 1 Connect a laptop to communicate with the service processor's serial interface using a terminal emulator program.
- 2 Insert the service processor Base-Image CD into the service processor's CD-ROM drive and reboot the service processor.
- 3 When prompted, enter **field** to start from the CD



NOTE: Reimaging takes approximately 10 to 15 minutes.

- To install in the field type **field**<ENTER> key

There must be a terminal attached to the serial interface

- To boot the installed image press <ENTER>

There must be a terminal attached to the serial interface

boot: **field**

23.2.3.2 Service Processor OS Software Installation

- 1 Remove the Base-Image CD from the drive, and insert the SP Update CD.
- 2 Log in to the service processor as the root user (no password prompt).
- 3 Type **./installcd**.

After verification of the contents, a prompt for installation and the service processor's serial number appears.

- 4 After the software is successfully installed, remove the CD. If necessary, type **eject**.
- 5 Enter **reboot** to reboot the service processor.
- 6 Select the method to configure the new service processor, then proceed to the section that describes the selection *Restoring Service Processor Information using Rescue Data* on page 23.11.

23.2.4 Restoring Service Processor Information using Rescue Data

The following procedure restores the service processor information using SP Rescue Data (from a backup).

23.2.4.1 Restoring SP Settings from a Serial Connected PC

To restore the previously saved service processor rescue file from a PC connected through the serial port, use one of the following serial terminal emulation programs:

- ◆ SecureCRT
- ◆ HyperTerminal

- 1 After the service processor reboots to the login prompt, log in as the root user.

The Moment of Birth (MOB) process starts automatically.



NOTE: If the MOB does not start, or if the process aborts, enter **./spmob** from the root login and home directory.

- 2 At the question prompt, select option **2, Restore from a backup file**.

- 3 Answer the MOB questions appropriately, then select option **7, Serial interface**.

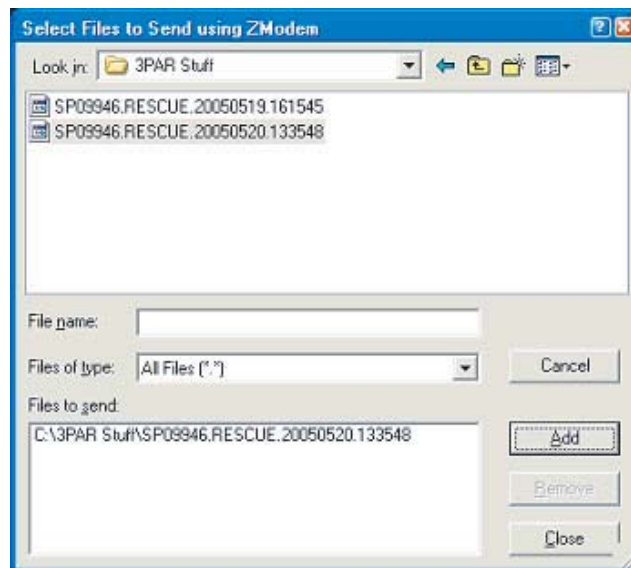


NOTE: If using Secure CRT, see steps [step 4](#) and [step 5](#). If using Hyper Terminal, see [step 6](#) through [step 9](#).

- 4 When prompted, select the needed service processor rescue file and restore the configuration to the service processor. The file syntax is:

SPxxxxxx.RESCUE.YYYYMMDD.HHMMSS

The following dialog box appears when the service processor initiates a Zmodem receive operation:

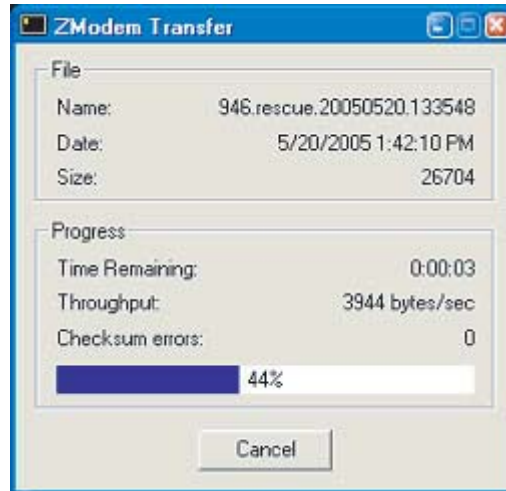


0311_S_R1

- 5 Click the file to restore from, then click **add**, followed by **close**.



NOTE: Depending on the level of SecureCRT, the following window may not appear.



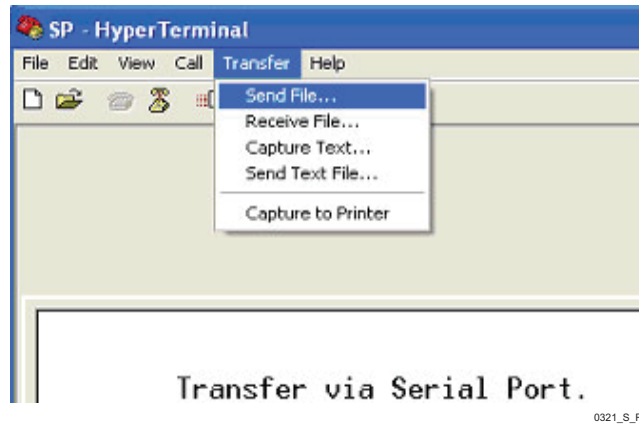
0312_S_R1

Result: A progress dialog appears detailing the transfer status.

- 6 When prompted, select the needed service processor rescue file and restore the configuration to the service processor. The file syntax is:

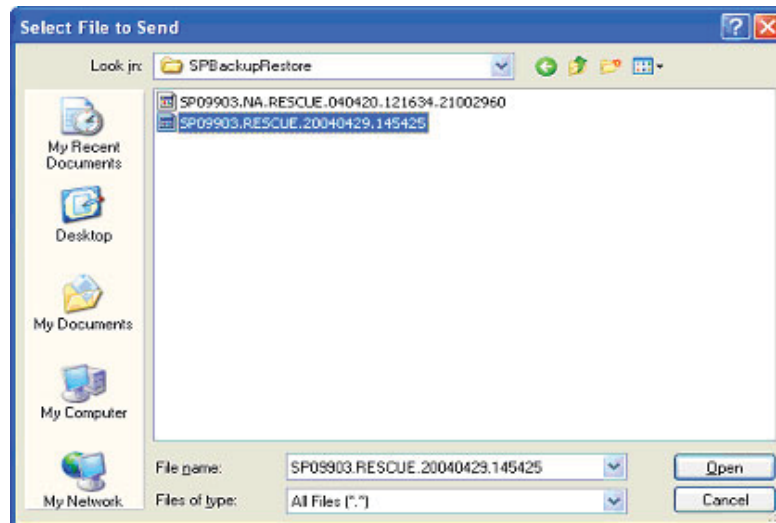
SPxxxxxx.RESCUE.YYYYMMDD.HHMMSS

Result: After selecting the option to restore the file through the serial interface, the following dialog prompt appears:



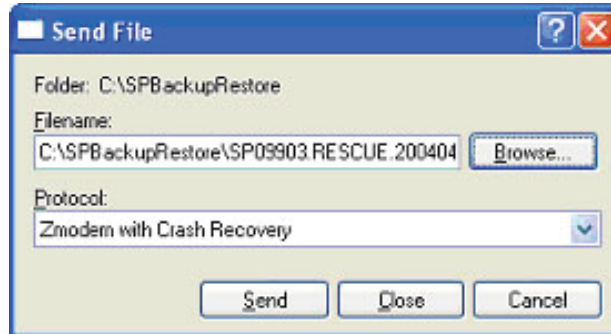
0321_S_R1

- 7 Initiate the transfer sequence by clicking **Send File**.



0322_S_R1

- 8 Click **Browse** and select the appropriate file.



0323_S_R1

- 9 Click **Send**.
- 10 After the progress dialog completes, continue MOB with the **date** and **time** settings, then reboot the service processor.
- 11 After the service processor reboots, log in to `spmaint` as `spvar` and remove and re-add the attached InServ Storage Server(s).
- 12 Compare the OS level on the CD and the service processor.

To determine the levels:

- ◆ Check the bottom of the service processor CD. For example, 780-1055-06.
- ◆ Check the **tpdSPbase** level running on the service processor from `spmaint`, enter **=1.1**.

If the OS level on the CD is higher than the level on the service processor, upgrade the service processor to the level on the CD. After upgrading, remove the CD from the CD-reader and continue to the next step.

- 13 Remove and re-add the information for the attached InServ Storage Server(s). This must be done twice, once to force the ssh-keys from the new SP onto the server and once for clean-up.
- a Display and record the server(s) IP address by entering **=3.1** from the `SPMAINT` menu.
 - b Remove the server(s) from the service processor's configuration database, enter **=3.4**, then select and remove the desired serve(s). Enter **=2.4** for SP-OS levels below 2.2.2.
- 14 From `spmaint`, enter **=3.2** to Add an InServ. Once again, adding the InServ fails because the ssh-keys do not match.

- 15 When prompted, Do you wish to forcibly add this InServ?, type **y** and enter the requested server information.
- 16 When all data is correct for manually adding the server, answer **Yes** to force an ssh-key exchange between the service processor and the server.



NOTE: Be sure to have the InServ Storage Server's IP address available. Select **Modify cluster** to display the InServ Storage Server IP address before removing, or pay attention when you are "removing" the cluster as the IP address is displayed.

- a To remove the InServ Storage Server from the service processor's configuration database, enter **=3.4**, then select and remove the necessary InServ Storage Server.
 - b To re-add an InServ Storage Server to the service processor's configuration database, enter **=3.2** and supply the IP address of the InServ Storage Server.
 - c Repeat these procedures for additional InServ Storage Servers.
- 17 Use the Interactive CLI from `spmaint` main menu to confirm proper communication with the InServ Storage Server.
- 18 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
 - b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
 - c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
 - d Type your user name and password and click **OK**.
 - e From the SPOCC Homepage, click **Support** from the left column menu.
 - f Click **CSStatus** on the InServs Action menu.
 - g Verify CSStatus indicates the system is healthy.
 - h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 19 Log out and disconnect the serial cable from the service processor's serial port.

- 20 Return the cables to the rear of the service processor and close the rear door.
- 21 If the service processor was replaced, the new serial number must be entered into 3PAR's CRM tracking system.

23.2.5 Using Ethernet for Backup File Retrieval from a Connection Portal

To use Ethernet for retrieving a backup file from a Connection Portal, the following is required:

- An IP address to assign to the service processor.
- The subnet's network mask.
- The gateway's IP address to access the public network.
- The connection portal's IP address (if it is not the 3PAR standard connection portal).

23.2.6 Restoring the Service Processor Configuration Information Manually

To restore the service processor information manually, select the New Site Install option when starting the MOB. This option requires the service processor's configuration information to be available because the configuration information is used to manually configure the service processor. Use the Service Processor Configuration Worksheet provided in [Table 23-1](#) to complete the service processor MOB tasks.

The following Service Processor Configuration Information Worksheet ([Table 23-1](#)) is available to assist with gathering this information. Use `spmaint` and SPOCC as directed to gather the information.

Table 23-1. Service Processor Information Worksheet

Service Processor Network and Communication Settings spmaint menu = 2 Option 5 also needs to be selected for service processors using modems.	Default Route (Usually same as GW)	
	Service Processor IP Address	
	Netmask	
	Gateway	
	Outbound Data Transfer	<input type="checkbox"/> Ethernet <input type="checkbox"/> Modem <input type="checkbox"/> None
	Remote Operations	<input type="checkbox"/> Ethernet <input type="checkbox"/> Modem <input type="checkbox"/> None
	Dialing Prefix (if applicable)	
	Phone Number (if applicable)	
Network Interface Card Settings spmaint menu = 2.4 Select Modify NIC parameters . Default settings are autonegotiate=ON and 100Mb/sec. Full Duplex (100FD)	Interface Speed	
	Autonegotiate (ON/OFF)	

Table 23-1. Service Processor Information Worksheet

Public Firewall Rules Settings For configured hosts on the public network interface (used for customer management of the service processor) spmaint menu = 2.3.3 Selecting Remove a host displays all IPs currently configured. NTP servers currently configured.	NTP Server	IP Address
	1	
	2	
	3	
	4	
	5	
	6	
Configured NTP Settings spmaint menu = 1.12 Selecting Remove external NTP Server will display all NTP servers currently configured.	NTP Server	IP Address
	1	
	2	
InServ Network Settings spmaint menu = 3.1 Select the desired InServ Storage Server.	InServ IP Address	
	System Name	
	Serial Number	
	TPD level	
Local Notification Settings (if enabled) SPOCC Setup Screen User setup information is too variable to list here.	Mailhost IP Address	
	Mailhost Domain Name	
	RAP Forwarding (Enabled/Disabled)	

Table 23-1. Service Processor Information Worksheet

Permissive Mode Settings	Permissive Mode (Enabled/Disabled)	
SPOCC Support Screen Firewall manipulation, permissive mode.		
Proxy Server Settings	Proxy Name	
SPOCC Support Screen Service processor configuration menu, Connection Portal control, Proxy Service.	Proxy Address	
	Proxy Type	<div><div></div> HTTP</div> <div><div></div> SOCKS4</div> <div><div></div> SOCKS5</div>
	Proxy Port	

Appendices

A

Tools

A.1 Tools Required for Performing Maintenance

The following tools are required to perform the maintenance procedures on an InServ Storage Server as described in this manual:

- Electrostatic Discharge (ESD) wrist grounding strap (provided with cabinet)
- ESD mat
- #1 Phillips screwdriver
- #2 Phillips screwdriver
- #10 Torx
- Adjustable wrench
- Diagonal cutting pliers

B

Node Rescue

In this appendix

B.1 Performing Auto-Node Rescue

B.1

B.2 Performing Manual Node Rescue

B.5

This appendix provides instructions on performing both auto-node and manual node rescue. Always perform the auto-node rescue procedure unless otherwise instructed.

B.1 Performing Auto-Node Rescue

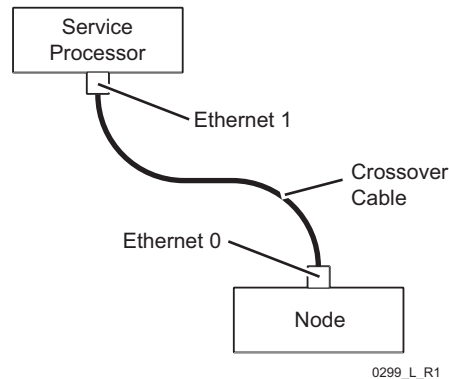
To perform Auto-Node Rescue:



NOTE: If a manual node rescue must be performed, refer to [Performing Manual Node Rescue](#) on page B.5.

- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.
- 2 Select option **4, InServ Product Maintenance**.

- 3 Select option **11, Node Rescue**.
- 4 Select option **1, Configure Node Rescue**.
- 5 Select the desired InServ Storage Server.
- 6 Enter **y** to confirm the correct level.
- 7 Select option **3, Automatic Node Rescue**.
- 8 Enter the desired node number.
- 9 Select **y** to confirm the correct node number.
- 10 Select **y** to stop all service processor tasks.
- 11 At the rear of the storage server, slide the node with the release lever completely pulled down into the chassis until the node stops.
- 12 Uncoil the red crossover Ethernet cable connected to the 3PAR private network connection of the service processor.

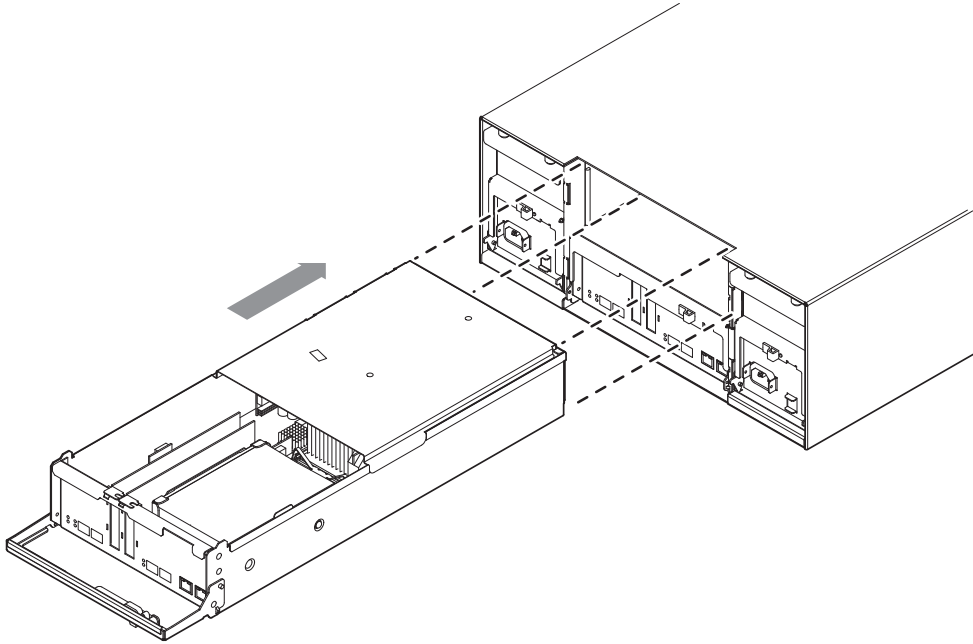


- 13 Connect ETH1 of the service processor to the Ethernet port of the node that is being rescued through the crossover cable. Depending on the location of the service processor and the nodes, route the cable under or around the side of the storage server cabinet and under the node release lever, which should still be in the down position.



NOTE: Closing the insertion handle immediately supplies power to the controller node. After the new controller node is installed, do NOT raise the lever or reconnect the cables at this time.

- 14 While pressing the release tab to the right, raise the release lever completely upright until the release tab clicks.
- 15 Pull the release lever to ensure the node is locked into position, then push firmly on the release lever to ensure the node fully remains seated, as shown in [Figure B-1](#).



0369_L_R1

Figure B-1. Reinstalling the Controller Node

When communication from the service processor to the node is established, the following appears on the service processor:

```
====+====+Interacting with CBIOS on the node...
The install kernel is loading...
Interacting with install Kernel...
Install kernel is running - please wait...
=====
Please wait...
```



NOTE: This process (rescue and rebuild of disk = five minutes) + (reboot = 5-10 minutes) takes approximately 10 to 15 minutes. When complete, the node restarts and becomes part of the cluster. If auto-node rescue fails, it may be necessary to use manual-node rescue.

- 16 Verify the node LED is blinking green indicating that the node has joined the cluster.
- 17 Select **1, Deconfigure <name of cluster> Node Rescue**.
- 18 Select **x, Return to previous menu**, continue selecting **x** until you return to the main menu.
- 19 Select option **7, Interactive CLI for an InServ**.
- 20 Select the desired InServ Storage Server.
- 21 Verify that all nodes have joined the cluster by issuing the `shownode` command.

```
cli% shownode
```

Node	--Name--	-State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	1024	2048	100

- 22 Reboot the rescued node by issuing the `shutdownnode reboot <node_ID>` command.
- 23 After the node reboots, monitor the node status LED and verify that all nodes have joined the cluster by issuing the `shownode` command.

```
cli% shownode
```

Node	--Name--	-State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlnk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlnk	1024	2048	100

- 24 Re-connect the customer's Ethernet cable and all other cables to the node once the node has rebooted.
- 25 Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps:

- a Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
 - b Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
 - c Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
 - d Type your user name and password and click **OK**.
 - e From the SPOCC Homepage, click **Support** from the left column menu.
 - f Click **CSStatus** on the InServs Action menu.
 - g Verify CSStatus indicates the system is healthy.
 - h Log out of SPOCC by clicking **Log Out** on the upper right window.
- 26 In the service processor window issue the `exit` command to stop the CLI session.
- 27 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 28 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 29 Close and lock the rear door of the server.

B.2 Performing Manual Node Rescue

The following instructions describe how to perform a manual controller node rescue using the maintenance PC:

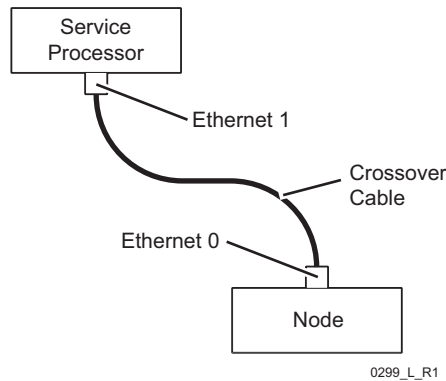
- 1 Start an `spmaint` session:
 - a Connect the maintenance PC to the service processor using the serial connection. Refer to [Connecting to the Service Processor](#) on page 3.9 for additional information.
 - b Log in to the service processor by entering your login name and password.



NOTE: Manual-Rescue builds the node disk of the node, so it contains the proper software for the cluster.

- 2 In the service processor window, issue the `spmaint` command (if necessary).

- 3 Select option **4, InServ Product Maintenance**.
- 4 Select option **11, Node Rescue**.
- 5 Select option **1, Configure Node Rescue**.
- 6 Select the desired InServ Storage Server.
- 7 Select option **2, Manual Node Rescue**.
- 8 Enter **y** to stop all service processor tasks.
- 9 At the rear of the storage server, uncoil the red crossover Ethernet cable connected to the 3PAR private network connection of the service processor.



- 10 Connect ETH1 of the service processor to the Ethernet port of the node that is being rescued through the crossover cable. DO NOT connect any other cables at this time.

A screen appears displaying the steps to perform a manual node rescue.



NOTE: 3PAR suggests cutting and pasting the following output, to help prevent typing errors.

This is the procedure for manually rescuing node(s) in InServ <name>

1. connect the node to be rescued to the SP's private network
NOTE: this requires a hub or crossover cable
2. connect a laptop to the serial interface on the node to be rescued
NOTE: 57600,N,8,1,XON/XOFF
3. reset, or power cycle, the node to be rescued
4. on the serial interface press ctrl-w after the
'PCI Fibre Channel Adapter Test' have started.
5. BIOS levels higher than 2.1.x support the "boot rescue" command
which will automate the manual-rescue entries. FRU nodes have
lower and higher levels of BIOS, however.

type: boot rescue<enter>

and if the node says it is an "unknown option", enter the
manual-rescue information as indicated below, otherwise when the
node asks for confirmation to erase the disk type: y<enter>

6. type: net netmask 255.255.255.248<enter>
7. type: net server 10.255.155.54<enter>
8. type: boot net install edit<enter>
NOTE: the node will begin booting and then pause for input.
9. press the SPACEBAR once, and then type:
ip=10.255.155.53 nm=255.255.255.248 rp=10.255.155.54::rescueide
and press <enter> NOTE: type this line exactly!!

The system will install the base OS, InFormOS, and reboot before joining the
cluster.

Wait for this before proceeding.

There may be additional instructions from 3PAR support if you are
rescuing multiple nodes.

11 Disconnect the blue ethernet (serial) cable from the adapter on the SP.

12 Connect the cable to the serial port (C1) on the node being rescued.



NOTE: The baud rate must be changed to 57,600.

13 Insert the node into the chassis with the Ethernet cable connected to begin boot and run tests.

14 Perform the following on the serial interface after the PCI Adapter tests (POST diagnostic test #36) is completed:

- a Press CTRL+W.
- b Type `net addr 10.255.155.53` and press ENTER.
- c Type `net netmask 255.255.255.248` and press ENTER.
- d Type `net server 10.255.155.54` and press ENTER.
- e Type `boot net install edit` and press ENTER.



NOTE: The node begins booting and then pauses for input.

- f Press the spacebar once and then type `ip=10.255.155.53 nm=255.255.255.248 rp=10.255.155.54::rescueide` and press ENTER.

The system installs the base OS and InForm OS.



NOTE: This process takes approximately 10 to 15 minutes (rescue and rebuild of disk = five minutes) + (reboot = 5-10 minutes). When complete, the node restarts and becomes part of the cluster.

- 15 Verify that the node LED is slowly blinking green indicating that the node has joined the cluster.
- 16 Disconnect the blue Ethernet cable from the node and reconnect to the adapter on the SP.



NOTE: The baud rate must be changed to 38,400.

- 17 Press ENTER on the service processor to continue the service processor tasks. Node rescue is de-configured.
- 18 Select option **x**, **Return to previous menu**.
- 19 Select option **7**, **Interactive CLI for an InServ**.
- 20 Select the desired InServ Storage Server.

- 21** Verify that all nodes have joined the cluster by issuing the `shownode` command.

```
cli% shownode
```

Node	--Name--	-State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlk	1024	2048	100

- 22** Reboot the rescued node by issuing the `shutdownnode reboot <node_ID>` command.

- 23** After the node reboots, monitor the node status LED and verify that all nodes have joined the cluster by issuing the `shownode` command.

```
cli% shownode
```

Node	--Name--	-State--	Master	InCluster	---LED---	Control Mem(MB)	Data Mem(MB)	Cache Available(%)
0	enodec34	OK	Yes	Yes	GreenBlk	1024	2048	100
1	enodec33	OK	No	Yes	GreenBlk	1024	2048	100

- 24** Re-connect the customer's Ethernet cable and all other cables to the node once the node has rebooted.

- 25** Issue the `checkhealth -svc` command to verify your system is healthy.

If the system is running OS 2.2.4 or earlier, complete the following steps.

- Connect the red crossover Ethernet cable to your laptop. This connects the maintenance PC to the SP's private (Eth1) network.
 - Type in the IP address (10.255.155.54) of the SP in the Web browser and press ENTER.
 - Log in to the Service Processor Onsite Customer Care (SPOCC) interface from the maintenance PC using a supported Web browser.
 - Type your user name and password and click **OK**.
 - From the SPOCC Homepage, click **Support** from the left column menu.
 - Click **CSStatus** on the InServs Action menu.
 - Verify CSStatus indicates the system is healthy.
 - Log out of SPOCC by clicking **Log Out** on the upper right window.
- 26** In the service processor window issue the `exit` command to stop the CLI session.

- 27 Log out of the `spmaint` session by selecting **X** to exit, from the **3PAR Service Processor Menu**.
- 28 At the rear of the server, disconnect the cable from the maintenance PC and coil the cable and replace it behind the service processor.
- 29 Close and lock the rear door of the server.

C

Guided Maintenance Overview

Guided maintenance scripts are provided with the service processor to help facilitate the removal and replacement of field replaceable units (FRUs). The maintenance scripts execute all CLI commands and, in some cases, select the appropriate failed component to minimize user error when performing maintenance procedures.

Guided maintenance is currently available for the following FRUs:

- Controller node FRUs:
 - ◆ Controller node power supply
 - ◆ Battery backup unit
 - ◆ Control cache DIMMs
 - ◆ Data cache DIMMs
 - ◆ PCI adapters
 - ◆ Controller node
 - ◆ Controller node fan
 - ◆ LED board
- Drive cage FRUs:
 - ◆ Drive magazine
 - ◆ Drive power supply

- ◆ FCAL module
- ◆ Fibre Channel disk
- Power system FRUs:
 - ◆ AC power cord
 - ◆ Power distribution unit

C.1 Accessing Guided Maintenance

To access the guided maintenance scripts:

- 1 Log in to SPOCC. Refer to [Logging into SPOCC](#) on page 3.21 for further instructions.
- 2 Click **Support** to access the guided maintenance procedures ([Figure C-1](#)).

Support - Service - Satisfaction	
<u>SP Version:</u>	SP-2.2.3.DEV-39
<u>Customer Controlled Access:</u>	Inbound and Outbound Transfer Enabled
<u>Data Transfer:</u>	Ethernet
<u>Remote Operations:</u>	Ethernet
<u>SP Firewall Status:</u>	UP
<u>Transfer Status:</u>	Ok
<u>SP Process Status:</u>	All processes are currently running.

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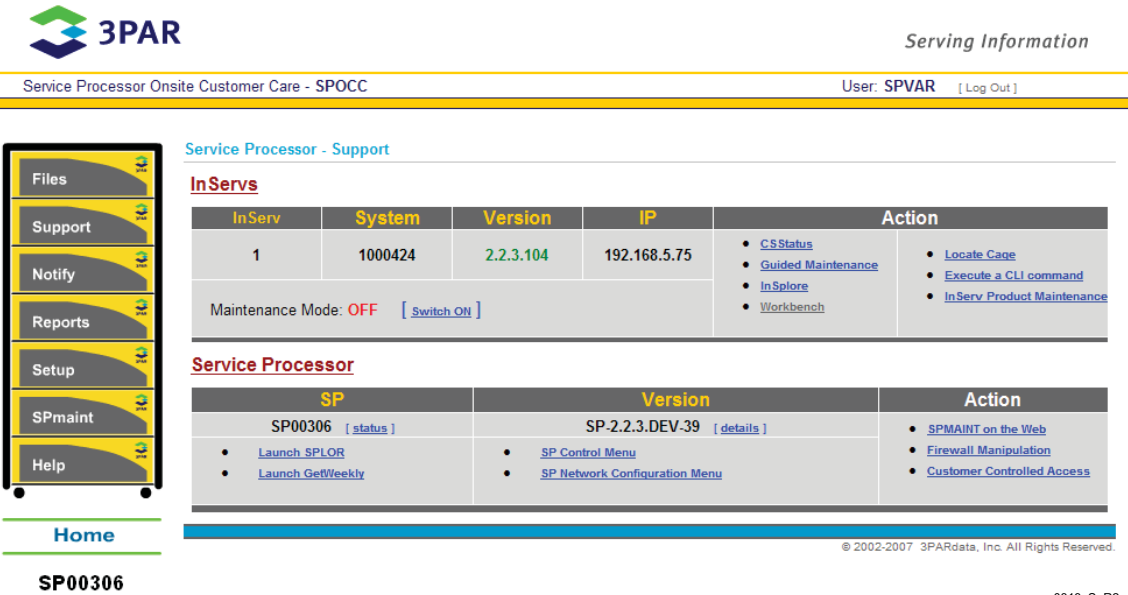
Home

SP00306

0324_S_R2

Figure C-1. SPOCC Home Page

- 3 On the **Service Processor Support** page, click **Guided Maintenance** for the InServ requiring service to perform maintenance (Figure C-2).



3PAR *Serving Information*

Service Processor Onsite Customer Care - SPOCC User: SPVAR [Log Out]

Service Processor - Support

InServs

InServ	System	Version	IP	Action
1	1000424	2.2.3.104	192.168.5.75	<ul style="list-style-type: none"> CS Status Guided Maintenance InSplore Workbench Locate Cage Execute a CLI command InServ Product Maintenance
Maintenance Mode: OFF [Switch ON]				

Service Processor

SP	Version	Action
SP00306 [status]	SP-2.2.3.DEV-39 [details]	<ul style="list-style-type: none"> SPMAINT on the Web Firewall Manipulation Customer Controlled Access
<ul style="list-style-type: none"> Launch SPLORE Launch GetWeekly 	<ul style="list-style-type: none"> SP Control Menu SP Network Configuration Menu 	

Home

SP00306

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0313_S_R2

Figure C-2. SPOCC Support Page

A new browser window is launched when you select a specific maintenance procedure.

- 4 In the Guided Maintenance window, select the guided maintenance procedure to start a replacement activity (Figure C-3).



0314_S_R2

Figure C-3. Guided Maintenance Window

D

Illustrated Parts Catalog

In this appendix

D.1 Storage Server Frame Components	D.2
D.2 Drive Chassis Components	D.5
D.3 Miscellaneous Components	D.9

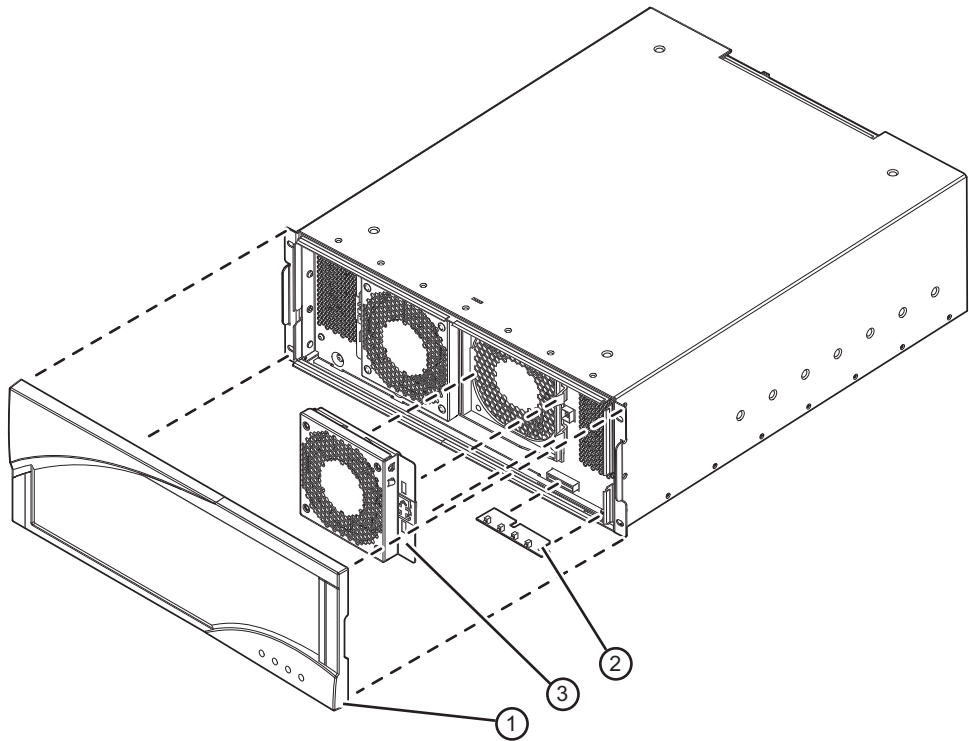
This appendix contains the illustrated parts catalog for all Field Replaceable Units (FRUs) and replaceable hardware.

Following each page of illustrated parts is a parts list containing part numbers and quantities. Part numbers that are preceded with an F are identified as FRUs.



NOTE: The part numbers shown in this catalog do not display the revision number of each FRU. For the most up-to-date revisions of each FRU, refer to document #1508 in the 3PAR Document Control System (DCS).

D.1 Storage Server Frame Components

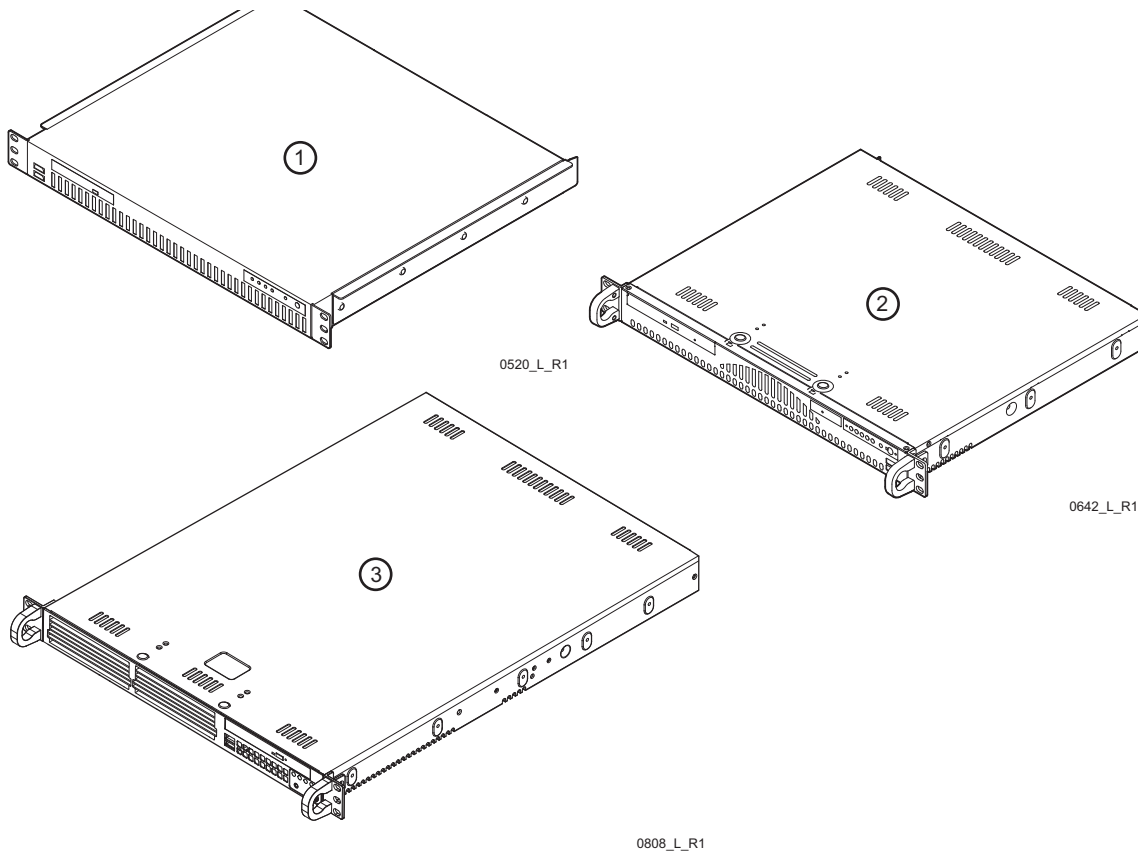


0117_L_R2

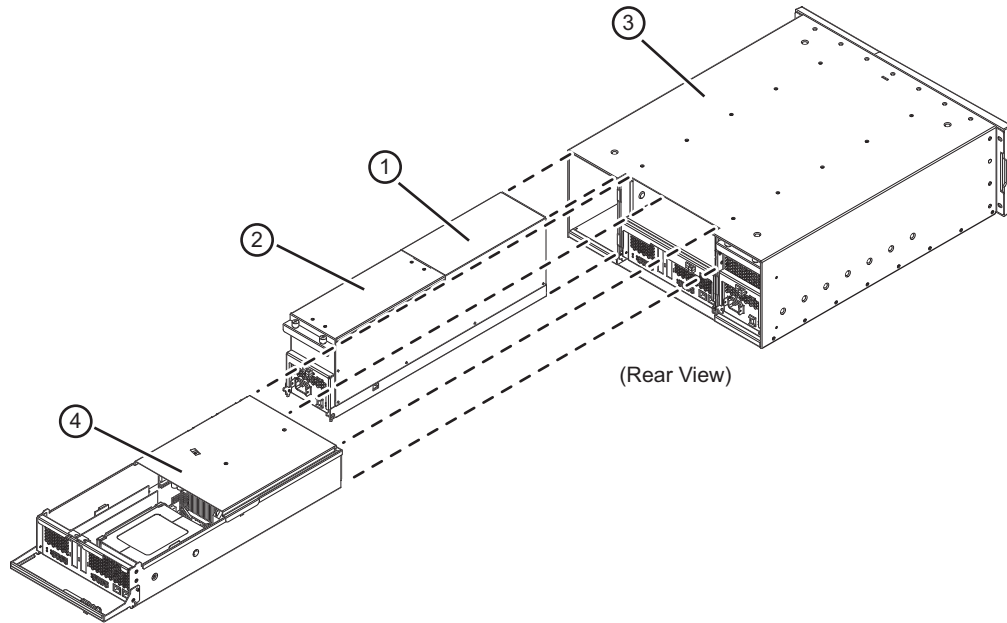
Figure D-1. Storage Server Frame FRUs

Table D-1. Storage Server Frame FRUs

Ref. Number	Part Number	Description	Qty
1	N/A	Bezel	1
2	F920-1044	LED Status Board	1
3	F960-0122	Fan Module, Node, E-Class	1
Not shown	F970-0012 F970-0016	PDU, 1U, NEMA L6-30 cord (Type P) PDU, 1U, IEC-60309 cord (Type P)	4

**Figure D-2.** Service Processor FRUs**Table D-2.** Service Processor FRUs

Ref. Number	Part Number	Description	Qty.
1	F975-0009	Service Processor, 1U (Wintec)	1
2	F975-200035 F979-200051	Service Processor, 1U (Supermicro)	1
3	F975-200010	Service Processor, 1U (Supermicro II)	1
Not shown	F960-0101	Mounting Kit, 1U Service Processor	1
Not shown	F850-0047	Power Cord, service processor	1

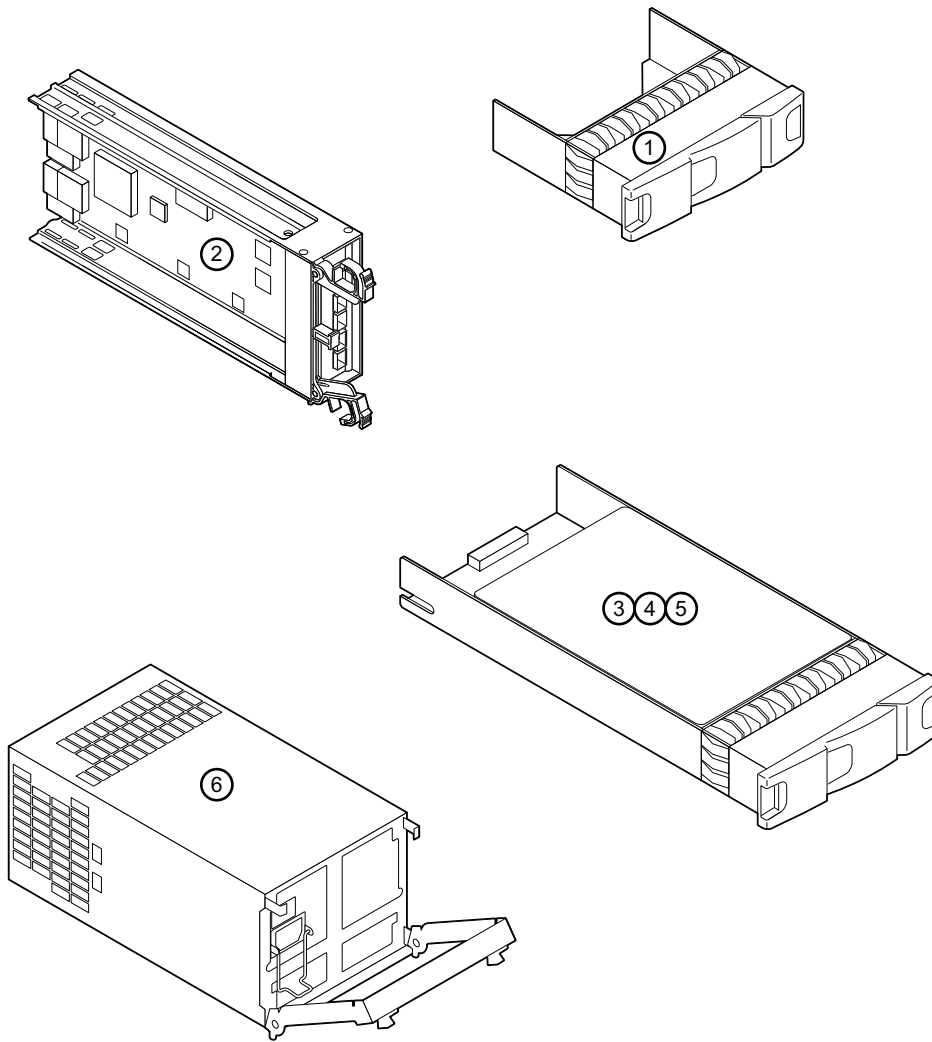


0527_L_R1

Figure D-3. Controller Node FRUs**Table D-3.** Controller Node FRUs

Ref. Number	Part Number	Description	Qty.
1	F800-0015	Power Supply, Node	Two for each node chassis
2	F800-0016	Battery Module	One for each power supply
3	F970-0111	Chassis, Node	1
4	F970-0112	Node, P4, 2.8 GHz	2

D.2 Drive Chassis Components

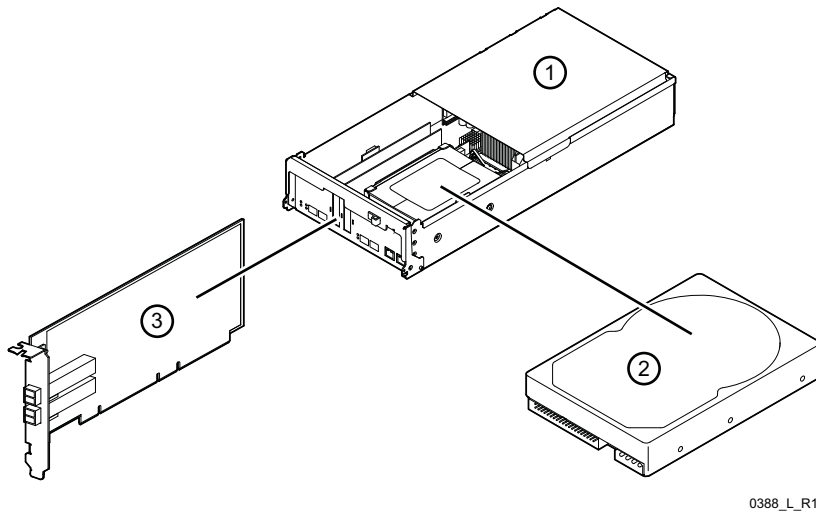


0389_L_R1

Figure D-4. Drive Chassis Component FRUs

Table D-4. Drive Chassis Component FRUs

Ref. Number	Part Number	Description	Qty for Each Chassis
1	N/A	E-Class Drive Filler Plate	Up to 12
2	F975-0002	FCAL Module, DC3, 2Gbit	2
3	F975-0004	Disk, FC, 147GB 10K RPM, DC3	Up to 16
4	F975-0005 F975-200015	Disk, FC, 300GB 10K RPM, DC3 Disk, FC, 300GB 15K RPM, DC3	Up to 16
5	F975-0006 F975-2000000	Disk, NL, 500GB, 7200 RPM, DC3 Disk, NL, SATA, 750 GB, 7200 RPM	Up to 16
6	F975-0008	Power Supply, Drive Chassis, DC3	2 per drive chassis
Not shown	F850-0047	Power Cord, IEC-320-C13/C14, 6 ft	2
Not shown	F850-0048	Power Cord, NEMA 5-15P to IEC-320-C13, 6ft	2
Not shown	F975-0007	Chassis, Drive Chassis, DC3	1
Not shown	F180-0091	SFP Transceiver, LC, 2Gbit (Finisar)	2 or 3

**Figure D-5.** Internal Node FRUs**Table D-5.** Internal Node FRUs

Ref. Number	Part Number	Description	Qty.
1	F970-0112	Node with Node Disk	1
2	F810-0019	Node Disk, Node, 160GB	1
3	F925-0020	FC Adapter, 2-port, PCI-X, LP (LSI Logic)	Up to 2
	F925-0025	Ethernet Adapter, 1Gbit, PCI-X, LP (Intel)	Up to 2
	F925-0027	iSCSI Adapter, 2 Port, PCI-X, LP (QLogic)	Up to 2
	F925-0030	Emulex Adapter, 2-Port, PCI-X, LP (Emulex)	Up to 2

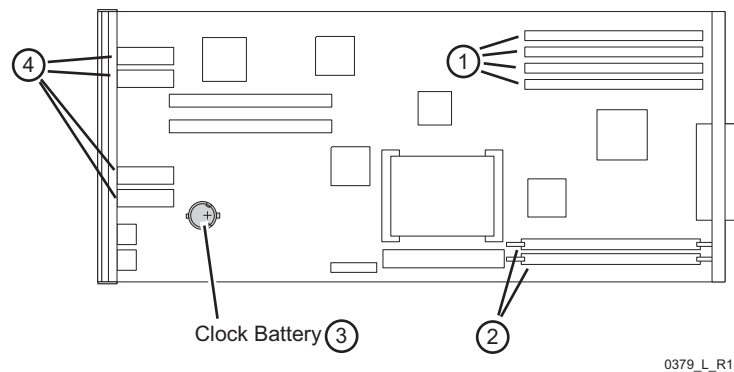
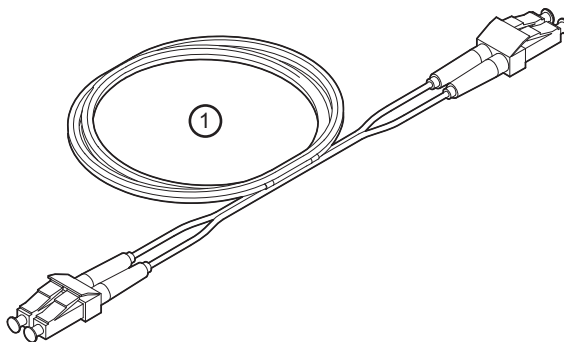


Figure D-6. Node FRUs

Table D-6. Node FRUs

Ref. Number	Part Number	Description	Qty.
1	F922-0009	SDRAM PC133, 1GB DIMM	4
2	F922-0017	DDR, 1GB DIMM	2
3	F170-0012	TOD Battery, BR2032	1 per node
4	F180-0091	SFP Transceiver, LC, 2Gbit (Finisar)	4

D.3 Miscellaneous Components



0528_L_R1

Figure D-7. Storage Server Cables

Table D-7. Storage Server Cables

Ref. Number	Part Number	Description	Qty.
1	F850-0018	FC Cable, 50m, LC-LC, 62.5 micron	Configuration Dependent
	F850-0019	FC Cable, 100m, LC-LC, 62.5 micron	
	F850-0022	FC Cable, 2m, LC-LC, 62.5 micron	
	F850-0076	FC Cable, 4m, LC-LC, 62.5 micron	
	F850-0077	FC Cable, 10m, LC-LC, 62.5 micron	
Not shown	F180-0055	RJ45 to DB9 Adapter, crossover	Configuration Dependent
Not shown	F180-0059	RJ45 to DB9 Adapter, straight	Configuration Dependent

E

Agency Compliance Statements

In this appendix

E.1	Safety Precautions	E.1
E.2	Safety Agency Compliance Notices	E.2
E.2.1	System Placement and Security	E.2
E.2.2	Battery Replacement and Disposal	E.4
E.2.3	Controller Nodes	E.7
E.2.4	Drive Chassis	E.13
E.3	Energy Consumption Efficiency	E.15

This appendix contains safety precautions and agency compliance notices for InServ Storage Servers and their components.

E.1 Safety Precautions

To be safe and to protect system data and equipment, always follow the instructions in this manual when installing, maintaining, troubleshooting, and upgrading InServ Storage Servers and their components.

In addition, use the following precautions:

- Follow all instructions, warnings, and cautions printed on individual storage server components. Those instructions take precedence over statements made in this guide.
- Before installing a storage server, verify that the voltage and frequency of the power sources at the operating sites match the voltage and frequency indicated on the system's electrical rating label.

E.2 Safety Agency Compliance Notices

InServ Storage Servers comply with UL® 1950 and IEC 60950 safety standards for ITE equipment. For your safety, observe the notices that follow.

E.2.1 System Placement and Security

Install and maintain storage servers and their components in a restricted access location, limiting access to storage server equipment, software, and documentation. Each power supply cord is to be connected to separate 30A branch circuits.



WARNING: Install this unit in a restricted access location.



ACHTUNG: Diese Einheit darf nicht frei zugänglich installiert werden.



AVERTISSEMENT: Installer cette unité dans un endroit restreint d'accès.



WAARSCHUWING: Deze eenheid dient te worden geïnstalleerd op een beperkt toegankelijke locatie.



ADVERTENCIA: Esta unidad deberá ser instalada en una área de acceso restringido.



UPOZORNĚNÍ: Jednotku nainstalujte na místě s omezeným přístupem.



OSTRZEŻENIE: To urządzenie powinno zostać zainstalowane w miejscu o ograniczonym dostępie.



UPOZORNENIE: Jednotku nainštalujte na mieste s obmedzeným prístupom.



FIGYELEM: Ezt az egységet csak az arra jogosultak számára hozzáférhető helyen szabad felállítani.

For storage servers with 3PAR cabinets, secure the system by locking the rear doors on all cabinets.



WARNING: Hazardous energy is located behind the rear access door of the storage server cabinet.



ACHTUNG: Hinter der rückwärtigen Zugangstür des Storage-Server-Schranks liegen gefährliche Spannungen an.



AVERTISSEMENT: Énergie dangereuse située derrière la porte d'accès arrière du coffret de serveur de stockage.



WAARSCHUWING: Achter de toegangsdeur van de opslagserverkast aan de achterzijde ontstaat gevaarlijke energie.



ADVERTENCIA: Energía peligrosa esta localizada detrás de la puerta de acceso trasera del gabinete del servidor de almacenamiento.



UPOZORNĚNÍ: Za zadními dveřmi skříně, v níž je umístěn server, hrozí nebezpečí úrazu elektrickým proudem.



OSTRZEŻENIE: Za tylnymi drzwiczkami szafki serwera pamięci masowej występuje niebezpieczne napięcie.



FIGYELEM: A tároló szerver szekrényének hátsó ajtaja mögötti terület feszültség alatt áll.



UPOZORNENIE: Nebezpečie potrasenia elektrickým prúdom hrozí za zadnými dverami skrine, v ktorej je umiestnený server.

E.2.2 Battery Replacement and Disposal

Storage server controller nodes contain 3-V lithium coin batteries. These batteries require periodic replacement.



WARNING: There is a danger of explosion if the lithium coin battery inside the controller node is incorrectly replaced. Replace the coin battery only with the same or equivalent type recommended by the manufacturer.



ACHTUNG: Bei unsachgemäßem Austausch der Lithium-Knopfbatterie im Steuerknoten besteht Explosionsgefahr. Die Knopfbatterie darf nur durch eine gleiche bzw. vom Hersteller empfohlene gleichwertige Batterie ersetzt werden.



AVERTISSEMENT: Il y a un danger d'explosion si la batterie de lithium à l'intérieur du contrôleur est incorrectement positionnée. Remplacez la batterie seulement avec le même type ou équivalent recommandé par le fabricant.



WAARSCHUWING: Er bestaat kans op explosies als de lithium muntbatterij in de controller node niet op de juiste wijze wordt vervangen. Vervang de muntbatterij alleen door een type dat equivalent is aan het type dat door de fabrikant wordt aanbevolen.



ADVERTENCIA: Existe el peligro de explosión si la batería de litio dentro del controlador del nodo es reemplazada incorrectamente. Reemplacela solamente con una batería del mismo tipo o con una de tipo equivalente recomendado por el fabricante.



UPOZORNĚNÍ: Při nesprávné výměně lithiové mincové baterie v uzlu řídicího obvodu hrozí nebezpečí výbuchu. Použitou baterii nahraďte pouze baterií stejného nebo ekvivalentního typu doporučeného výrobcem.



OSTRZEŻENIE: Niewłaściwe zainstalowanie nowej litowej baterii pastylkowej w węzle kontrolującym grozi jej wybuchem. Baterię należy wymieniać tylko na baterie tego samego lub odpowiadającego mu typu, zalecanego przez producenta.



FIGYELEM: A vezérlőegységben található lítium gombakkumulátor helytelenül végzett cseréje robbanást okozhat. A gombakkumulátort csakis a gyártó által javasolt típusú, vagy azzal egyenértékű akkumulátorral szabad lecserélni.



UPOZORNENIE: Ak je lítiová mincová baterka v uzle riadiaceho obvodu nesprávne vymenená, hrozí nebezpečenstvo výbuchu. Použitú baterku nahraďte iba baterkou toho istého typu alebo ekvivalentom odporučeným



CAUTION: Dispose of used batteries according to the manufacturer's instructions.



VORSICHT: Gebrauchte Batterien nur gemäß Herstelleranweisung entsorgen.



ATTENTION: Débarrassez-vous des batteries use selon les instructions de fabricant.



WAARSCHUWING: Verwijder gebruikte batterijen volgens de instructies van de fabrikant.



PRECAUCION: Deseche baterías usadas de acuerdo a las instrucciones del fabricante.



VÝSTRAHA: S použitými bateriemi naložte podle návodu výrobce.



UWAGA: Zużytych baterii należy pozbyć się zgodnie z zaleceniami ich producenta.



VIGYÁZAT: A használt akkumulátorokat a gyártó útmutatása szerint kell megsemmisíteni!



VÝSTRAHA: S použitými baterkami naložte podľa návodu výrobcu.

E.2.3 Controller Nodes

For controller nodes installed in cabinets not provided by 3PAR, observe the following precautions:



WARNING: Install this unit in a restricted access location.



ACHTUNG: Diese Einheit darf nicht frei zugänglich installiert werden.



AVERTISSEMENT: Installer cette unité dans un endroit restreint d'accès.



WAARSCHUWING: Deze eenheid dient te worden geïnstalleerd op een beperkt toegankelijke locatie.



ADVERTENCIA: Está unidad deberá ser instalada en una área de acceso restringido.



UPOZORNĚNÍ: Jednotku nainstalujte na místě s omezeným přístupem.



OSTRZEŻENIE: To urządzenie powinno zostać zainstalowane w miejscu o ograniczonym dostępie.



FIGYELEM: Ezt az egységet csak az arra jogosultak számára hozzáférhető helyen szabad felállítani.



UPOZORNENIE: Jednotku nainštalujte na mieste s obmedzeným prístupom.



WARNING: Hazardous energy located on rear connectors.



ACHTUNG: An den rückwärtigen Anschlüssen liegen gefährliche Spannungen an.



AVERTISSEMENT: Énergie dangereuse située sur les connecteurs arrière.



WAARSCHUWING: Gevaarlijke energievelden achter de aansluitingen aan de achterzijde.



ADVERTENCIA: Energía peligrosa localizada en los conectores traseros.



UPOZORNĚNÍ: Na zadních konektorech hrozí nebezpečí úrazu elektrickým proudem.



OSTRZEŻENIE: Na tylnych złączach występuje niebezpieczne napięcie.



FIGYELEM: A hátsó csatlakozások veszélyes feszültség alatt állnak.



UPOZORNENIE: Nebezpečie potrasenia elektrickým prúdom hrozí na zadných konektoroch.



WARNING: There is a danger of explosion if the lithium coin battery inside the controller node is incorrectly replaced. Replace the coin battery only with the same or equivalent type recommended by the manufacturer.



ACHTUNG: Bei unsachgemäßem Austausch der Lithium-Knopfbatterie im Steuerknoten besteht Explosionsgefahr. Die Knopfbatterie darf nur durch eine gleiche bzw. vom Hersteller empfohlene gleichwertige Batterie ersetzt werden.



AVERTISSEMENT: Il y a un danger d'explosion si la batterie de lithium à l'intérieur du contrôleur est incorrectement positionnée. Remplacez la batterie seulement avec le même type ou équivalent recommandé par le fabricant.



WAARSCHUWING: Er bestaat kans op explosies als de lithium muntbatterij in de controller node niet op de juiste wijze wordt vervangen. Vervang de muntbatterij alleen door een type dat equivalent is aan het type dat door de fabrikant wordt aanbevolen.



ADVERTENCIA: Existe el peligro de explosión si la batería de litio dentro del controlador del nodo es reemplazada incorrectamente. Reemplacela solamente con una batería del mismo tipo o con una de tipo equivalente recomendado por el fabricante.



UPOZORNĚNÍ: Při nesprávné výměně lithiové mincové baterie v uzlu řídicího obvodu hrozí nebezpečí výbuchu. Použitou baterii nahraďte pouze baterií stejného nebo ekvivalentního typu doporučeného výrobcem.



OSTRZEŻENIE: Niewłaściwe zainstalowanie nowej litowej baterii pastylkowej w węźle kontrolującym grozi jej wybuchem. Baterię należy wymieniać tylko na baterie tego samego lub odpowiadającego mu typu, zalecanego przez producenta.



FIGYELEM: A vezérlőegységben található lítium gombakkumulátor helytelenül végzett cseréje robbanást okozhat. A gombakkumulátort csakis a gyártó által javasolt típusú, vagy azzal egyenértékű akkumulátorral szabad lecserélni.



UPOZORNENIE: Ak je lítiová mincová baterka v uzle riadiaceho obvodu nesprávne vymenená, hrozí nebezpečenstvo výbuchu. Použitú baterku nahraďte iba baterkou toho istého typu alebo ekvivalentom odporúčeným výrobcom.



CAUTION: Dispose of used batteries according to the manufacturer's instructions.



VORSICHT: Gebrauchte Batterien nur gemäß Herstelleranweisung entsorgen.



ATTENTION: Débarrassez-vous des batteries use selon les instructions de fabricant.



WAARSCHUWING: Verwijder gebruikte batterijen volgens de instructies van de fabrikant.



PRECAUCION: Deseche baterías usadas de acuerdo a las instrucciones del fabricante.



VÝSTRAHA: S použitými bateriemi naložte podle návodu výrobce.



UWAGA: Zużytych baterii należy pozbyć się zgodnie z zaleceniami ich producenta.



VIGYÁZAT: A használt akkumulátorokat a gyártó útmutatása szerint kell megsemmisíteni!



VÝSTRAHA: S použitými baterkami naložte podľa návodu výrobcu.

E.2.4 Drive Chassis

For drive chassis installed in cabinets not provided by 3PAR, observe the following precautions:



WARNING: Install this unit in a restricted access location.



ACHTUNG: Diese Einheit darf nicht frei zugänglich installiert werden.



AVERTISSEMENT: Installer cette unité dans un endroit restreint d'accès.



WAARSCHUWING: Deze eenheid dient te worden geïnstalleerd op een beperkt toegankelijke locatie.



ADVERTENCIA: Está unidad deberá ser instalada en una área de acceso restringido.



UPOZORNĚNÍ: Jednotku nainstalujte na místě s omezeným přístupem.



OSTRZEŻENIE: To urządzenie powinno zostać zainstalowane w miejscu o ograniczonym dostępie.



FIGYELEM: Ezt az egységet csak az arra jogosultak számára hozzáférhető helyen szabad felállítani.



UPOZORNENIE: Jednotku nainštalujte na mieste s obmedzeným prístupom.



WARNING: There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.



ACHTUNG: Bei unsachgemäßem Austausch der Batterie besteht Explosionsgefahr. Sie darf nur durch eine gleiche bzw. vom Hersteller empfohlene gleichwertige Batterie ersetzt werden.



AVERTISSEMENT: Il y a un danger d'explosion si la batterie est incorrectement positionnée. Remplacez la batterie seulement avec le même type ou équivalent recommandé par le fabricant.



WAARSCHUWING: Er bestaat kans op een explosie als de batterij niet op de juiste wijze wordt vervangen. Alleen te vervangen door een type dat equivalent is aan het type dat door de fabrikant wordt aanbevolen.



ADVERTENCIA: Existe el peligro de explosión si la batería es reemplazada incorrectamente. Reemplácela solamente con una batería del mismo tipo o un tipo equivalente recomendado por el fabricante.



UPOZORNĚNÍ: Při nesprávné výměně baterie hrozí nebezpečí výbuchu. Použitou baterii nahradte pouze baterií stejného nebo ekvivalentního typu doporučeného výrobcem.



OSTRZEŻENIE: Niewłaściwe zainstalowanie nowej baterii grozi jej wybuchem. Baterię należy wymieniać tylko na baterie tego samego lub odpowiadającego mu typu, zalecanego przez producenta.



FIGYELEM: Az akkumulátor helytelenül végzett cseréje robbanást okozhat. Az akkumulátort csakis a gyártó által javasolt típusú, vagy azzal egyenértékű akkumulátorral szabad lecserélni.



UPOZORNENIE: Ak je baterka nesprávne vymenená, hrozí nebezpečenstvo výbuchu. Použitú baterku nahradte iba baterkou toho istého typu alebo ekvivalentom odporučeným výrobcem.

E.3 Energy Consumption Efficiency

Energy consumption efficiency* = 0.146

* Japan Green Law statement of compliance: The energy consumption efficiency value has been calculated per requirements for Category-G Magnetic Disk Drive Units by dividing the power consumption, measured according to the definition in the Law Concerning the Rational Use of Energy, by the storage capacity defined in the Energy Conservation Law. The efficiency value is based on a host-maximized E-Class configuration using 750GB drives.

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Revision History

Release Level	Revision Summary
325-200094 Rev A October 2009	First release of this manual to support the release of 3PAR InForm OS 2.3.1.
325-200094 Rev B December 2010	Second release of this manual to update the node replacement procedures and add a new hard drive.

