SpinServer® 3300
Field Service Guide

Network Appliance, Inc.
495 East Java Drive
Sunnyvale, CA 94089 USA
Telephone: +1 (408) 822-6000
Fax: +1 (408) 822-4501
Support telephone: +1 (888) 4-NETAPP
Documentation comments: doccomments@netapp.com
Information Web: http://www.netapp.com

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1.0 About This Guide

The *SpinServer® 3300 Field Service Guide* is written for qualified service personnel who are familiar with the SpinServer chassis and SpinStor® disk enclosures. It includes information that is needed to remove and replace field replaceable units (FRUs) and perform system-maintenance procedures.

The procedures in this guide describe replacement, upgrade, and maintenance tasks for personnel with the following skills and experience:

- Working familiarity with small computer system hardware and operation
- Basic understanding of common networking concepts and practices
- Working familiarity with accepted tools and procedures for installing and operating sensitive electronic equipment

Use this guide after you familiarize yourself with the Spinnaker Networks system hardware by reading the following documents:

- *SpinServer 3300 Installation Guide*
- *SpinFS Administration Guide*

1.1 Organization of the Guide

This guide provides information and examples for the specific tasks that you must accomplish to repair the SpinServer and the SpinStor, and to maintain the components in each. The steps to accomplish these tasks are presented in the order in which field service personnel typically perform them. The guide also provides information for replacing a failed uninterruptible power supply (UPS).

1.2 Statements of Warning

Statements of warning and caution are used in this guide. They have the following meanings and uses.

Warning: This statement indicates that failure to follow directions in the statement could result in bodily harm or loss of life.

Caution: This statement indicates that failure to follow directions in the statement could result in damage to equipment or loss of information and data.

Important: This statement presents clarifying information or specific instructions.

Note: A Note presents commentary, sidelights, or interesting points of information.

2.0 Safety Guidelines

This chapter provides safety guidelines for working with the SpinServer, SpinStor, UPS, and the FRUs.

2.1 Unpacking and Handling Equipment

To prevent damage to the components and avoid injury, carefully unpack and handle the SpinServer chassis and SpinStor enclosures.

Inspect the box the components were shipped in and note whether the components were damaged in any way. If the components show evidence of damage, file a damage claim with the carrier who delivered it and contact the Spinnaker Technical Assistance Center (TAC). See page 73 for additional information.

2.2 Product Safety Guidelines

Guidelines for safe handling and maintenance of the SpinServer, SpinStor, and FRUs are listed in this section.

Static Electrical Discharge Precautions

Static electricity is generated when two objects with different electrical charges come into contact with each other. An electrostatic discharge (ESD) is created to neutralize this difference. Electronic devices can be severely damaged by ESD.

To prevent damage to the equipment from ESD, follow these precautions:

- Do not unpack or install electronic equipment without using a properly grounded wrist or heel strap. Spinnaker Networks provides a disposable wrist strap with all new equipment purchases.
- Keep all electronic assemblies such as Printed Circuit Boards (PCBs) and disk drives in their original ESD protective packaging until you are ready to install them.
- Handle all electronic assemblies carefully. Do not touch connectors, contacts, or

component leads.

- Ensure that electronic assemblies do not come in contact with insulators such as clothing and plastics.

Laser Radiation Precautions

The SpinServer and the SpinStor emit invisible laser radiation.

Warning: CLASS 1 LASER PRODUCT

Warnung: LASER KLASSE 1 PRODUKT

Warning: Lasers emit invisible radiation from the aperture opening when no fiber-optic cable is connected. When removing cables, do not stare into the open apertures. In addition, install protective aperture covers to fiber ports with no cable connected.

Warnung: Laser strahlen unsichtbare Strahlung von der Blendonöffnung Öffnung aus, wenn kein Glasfaserkabel angeschlossen wird. Wenn Sie Kabel löschen, starren Sie nicht in die geöffneten Blendenöffnungen an. Zusätzlich installieren Sie schützende Blendenöffnung Abdeckungen zu den Faserkanälen ohne das angeschlossene Kabel.

Electrical Precautions

To prevent serious damage to yourself and your SpinServer components, always observe basic electrical precautions, including the following:

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which causes electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they touch.
- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- Call the Spinnaker Technical Assistance Center when the battery near the DIMM modules in the SpinServer chassis, which maintains clock settings during power failure, needs to be replaced. Improper installation causes damage to the equipment.

Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Electrical Warnings

To prevent serious injury to yourself and damage to your SpinServer components, always observe the following electrical warnings:

Warning: Be aware of the locations of the power-on/off switch on the chassis, as well as the room's emergency power-off switch, disconnection switch, or electrical outlet. If an electrical accident occurs, quickly remove power from the system.

Warnung: Personen, die mit dem System arbeiten, müssen wissen, wo sich der Netzschalter am Chassis, der Notausschalter im Raum, der Trennschalter und die Steckdose befinden. Bei einem Stromunfall muss das System sofort ausgesteckt werden.

Warning: When working with high-voltage components or exposed electrical circuits, do not work alone. Be sure to have another person nearby who is familiar with the power controls to switch off the power if necessary.

Warnung: Beim Arbeiten an Hochspannungskomponenten oder freigelegten Stromkreisen niemals alleine arbeiten. Es sollte stets eine zweite Person anwesend sein, die mit den Leistungsschaltern vertraut ist und das Gerät im Notfall ausschalten kann.

Warning: Use only power cords with a grounding plug. Always plug the cords into grounded electrical outlets.

Warnung: Nur Netzkabel mit Schukosteckern verwenden. Die Kabel müssen in eine vorschriftsmäßig geerdete Schukokosteckdose eingesteckt werden.

Warning: Spinnaker Networks SpinServer and SpinStor products have *Power-On/Standby* power switches. *Power-On/Standby* power switches, when in the *Standby* position, do not completely remove AC power from the equipment. For equipment with this type of power switch, the AC power cords serve as the main disconnect device. When performing maintenance that requires the equipment to be completely powered down, put the power switch in the *Standby* position, and remove all power cords from the equipment.

Warnung: Die Netzschalter der SpinServer- und SpinStor-Produkte von Spinnaker Networks verfügen über eine *Einschalt- und eine Bereitschaftsstellung*. Wenn dieser*Ein-/Bereitschaftsschalter* auf *Bereitschaft (Standby)* steht, darf die Netzstromversorgung nicht vollständig getrennt werden. Bei Geräten mit dieser Art von Netzschalter, wird die Stromversorgung durch Herausziehen des Netzkabels getrennt. Wenn Wartungsarbeiten durchgeführt werden, die ein komplettes Ausschalten des Geräts erfordern, den Schalter auf *Bereitschaft* stellen und dann alle Netzkabel herausziehen.

Warning: Some equipment is provided with multiple power cords. To disconnect all power from the equipment, remove all power cords.

Warnung: Einige Geräte verfügen über mehrere Stromkabel. Um die Stromversorgung vollständig zu trennen, müssen alle Stromkabel herausgezogen werden.

Warning: To avoid potential burns, remove all chains, rings, watches, and other metal jewelry when performing maintenance on powered-on equipment. Burns can be caused by the flow of current through a metallic object if the metallic object comes in contact with powered circuits.

Warnung: Um potentielle Verbrennungen bei Wartungsarbeiten an eingeschalteten Geräten zu vermeiden, müssen Kettchen, Ringe Armbanduhren und andere Metallobjekte vorher abgenommen werden. Derartige Verbrennungen können durch Stromfluss durch Metallobjekte entstehen, wenn diese mit den unter Strom stehenden Schaltkreisen in Kontakt kommen.

Warning: The power supply units for SpinStor products have detachable power cords. Disconnect the power cord at the power supply unit before removing the power supply unit from the enclosure. When installing a power supply unit, insert the power supply unit into the enclosure before connecting the power cord.

Warnung: Die Netzteile für SpinStor-Produkte sind mit abnehmbaren Stromkabeln ausgestattet. Das Stromkabel zuerst vom Netzteil herausziehen und dann das Netzteil aus dem Gehäuse entfernen. Beim Installieren eines Netzteils muss dieses zuerst in das Gehäuse eingesetzt und dann das Netzkabel angeschlossen werden.

SpinServer System Precautions

To ensure general safety, follow these guidelines.

- Keep the area around the SpinServer system clean and free of clutter.
- When servicing the SpinServer, place the server chassis top cover, and any system components that have been removed, in a safe location to avoid damaging them.
- Use a UPS to protect your SpinServer from power surges and voltage spikes and to keep your system operating in the event of a power failure.
- Do not wear jewelry or other metal objects that are excellent conductors. If such items come into contact with circuit boards or areas where power is present, a short circuit can be created.
- Before replacing any components that are not hot swappable, power down the SpinServer and disconnect all AC power cords. After accessing the interior of the SpinServer, close the top cover securely, slide the chassis back into position and fasten the screws on the front panel to the rack.
- When replacing failed components, ensure that the new unit is fully inserted and secure in the SpinServer chassis or the SpinStor enclosure.

Warning: During normal operations, the internal components of the SpinServer and SpinStor become hot. During service operations, avoid touching hot surfaces.

Warnung: Bei normalem Betrieb werden die internen SpinServer- und SpinStor-Komponenten heiß. Die heißen Oberflächen während der Reparaturarbeiten nicht berühren.

Warning: To prevent personal injury, always allow the blowers to spin down before removing the blower assembly.

Warnung: Um Verletzungen zu vermeiden, sollte vor dem Entfernen der Gebläsebaugruppe gewartet werden, bis das Gebläse zum Stillstand gekommen ist.

Warning: To prevent personal injury, always allow the fans to spin down before removing the fan assembly.

Warnung: Um Verletzungen zu vermeiden, sollte vor dem Entfernen der Ventilatorbaugruppe gewartet werden, bis die Ventilatoren zum Stillstand gekommen sind.

Warning: To prevent injury when performing maintenance on a powered-down SpinServer, disconnect the power cords from all AC inlets before opening the cover of a server chassis.

Warnung: Um Verletzungen bei Wartungsarbeiten an einem ausgeschalteten SpinServer zu vermeiden, die Netzkabel vor dem Öffnen der Server-Chassis-Abdeckung aus den Netzsteckdosen herausziehen.

3.0 SpinServer Overview

This chapter provides information about the SpinServer chassis units that are field replaceable, the tools and equipment you need to replace the units, and the front panel LEDs.

Note: A complete listing of the field replaceable units and their part numbers is provided in “Appendix A: Field Replaceable Units” on page 69.

Note: You must purchase all field replaceable units from Spinnaker Networks or an authorized reseller.

3.1 Field Replaceable Units

The SpinServer is designed for easy access to exterior and interior units so that you can remove and install units in the field. The units are accessible from the front panel of the SpinServer chassis or from inside the SpinServer chassis.

Replaceable Units

The following units can be individually replaced in the SpinServer chassis. The power supplies and the SCSI disk drives are accessible from the front panel of the SpinServer chassis. The others are accessible from the interior of the SpinServer chassis.

Note: There are no FRUs accessible from the rear panel of the SpinServer chassis.

- Power supplies
- Midchassis intake fan assemblies
- Rear chassis exhaust fan assembly
- Dual in-line memory modules (DIMMs)
- Peripheral component interconnect (PCI) adapters
- SCSI disk drives
- Dual Fibre Channel adapters for SpinStor disk shelves
- Gigabit Ethernet (GbE) network interface cards (NICs)

Nonreplaceable Units

The following units cannot be individually replaced in the SpinServer chassis.

Note: Failure of any of these parts requires the replacement of the entire SpinServer chassis.

- CPU cooler fans
- Motherboard
- CD-ROM drive
- Diskette drive
- Control/Status panel

3.2 Tools and Equipment

To replace FRUs, you need the following tools and equipment:

- Phillips screwdrivers (#0, #1, and #2)
- Flat-blade screwdriver
- Antistatic wrist strap and grounding leash

3.3 SpinServer Front Panel Switches and LEDs

The front panel of the SpinServer includes several LED indicators, audible alarms, and switches. The LEDs provide information about the operational status of specific components in the SpinServer chassis. The three push-button switches can be used to take appropriate action, if necessary, based on the LED and audible alarm information.

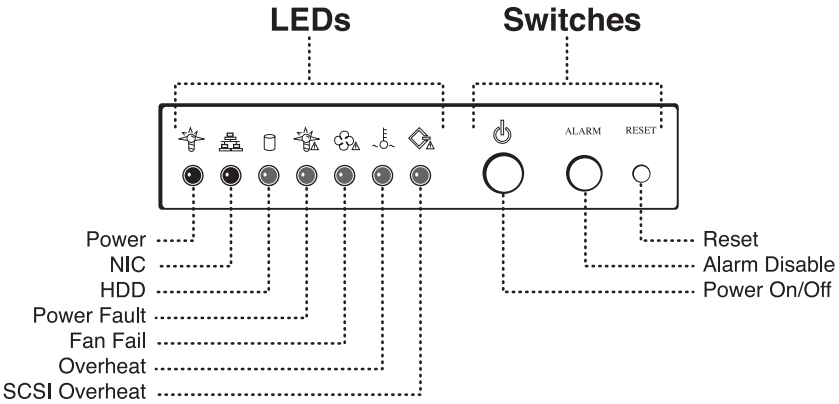


Figure 3-1. The LEDs and switches on the front panel of the SpinServer chassis

SpinServer Front Panel LEDs

The front control panel has the following seven LEDs:

Power: This LED indicates power is being supplied to the SpinServer power supply units. It is illuminated when the system is operating. If the power LED is not illuminated, verify that all power cords are properly connected and the UPS is plugged into a grounded wall outlet. Also, verify that the output of the UPS is turned on.

If the power cords are properly connected and the LED is red, a power unit needs to be replaced. Check the power supply LEDs at the front of the SpinServer to determine which one needs to be replaced.

NIC: When flashing green, the network interface card (NIC) connection LED indicates activity on the motherboard.

HDD: When flashing green, the hard disk drive (HDD) LED indicates IDE activity. The CD-ROM is the only drive connected to the IDE bus.

PWR Fault: When illuminated red, this LED indicates a power supply failure. It is accompanied by an audible alarm. The alarm can be disabled with the ALARM push-button switch on the front panel.

Fan Fail: When illuminated red, this LED indicates a system fan failure in one or more of the intake or exhaust fans. A fan failure is accompanied by an audible alarm. Pushing the ALARM button disables this alarm.

When a fan stops working, the other system fans increase their revolutions per minute (RPM) to compensate until the failed unit is replaced. In the event of a fan failure, check the fan LEDs in the interior control panel to determine which fan has failed.

Overheat: When illuminated red, this LED indicates an overheated condition in the chassis.

SCSI Overheat: The Single Connector Attachment (SCA) is a type of disk drive connector that includes connection pins for power cables and data wires. When the SCSI Overtemp LED is illuminated red, it indicates an overheated condition in the area of the SCSI drives and backplane.

SpinServer Front Panel Switches

There are three push-button switches on the front of the SpinServer: Power On/Off, Alarm Disable, and Reset. Their purposes are described below.

Power: This is the main power switch, used to turn on or off the power that is supplied to the power supply units in the SpinServer.

Alarm: An audible alarm is generated to alert you to an overheated chassis or a failure fan or power supply. Depressing the ALARM switch disables the alarm. The LED indicating the cause of the alarm remains illuminated after the audible alarm is disabled.

Reset: The RESET switch restarts the SpinServer.

Important: It is not recommended that the Reset button be used to restart the SpinServer during normal operations because this method does not provide the system with the time necessary to properly save all data.

3.4 Additional LEDs on the SpinServer

There are additional LED indicators on the SpinServer chassis: SCSI drives and power supply units.

SpinServer SCSI Drive Carrier LEDs

Each SCSI drive has two LEDs on the front of the drive carrier; the top LED is green and the bottom one is red.

Note: The leftmost SCSI drive slot is labeled Slot 0. The drives in Slot 0 and Slot 1 are active drives. The drives in Slots 2 and 3 are empty disk carriers. The LEDs on the inactive drives are not illuminated.

When the green LED is illuminated, the drive is being accessed. When the red LED is illuminated, the SCSI drive has experienced a fault or has failed.

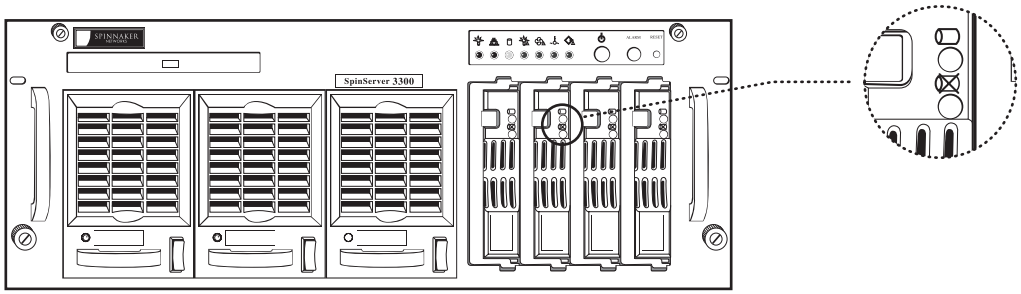


Figure 3-2. The SCSI drive carrier LEDs

SpinServer Power Supply LEDs

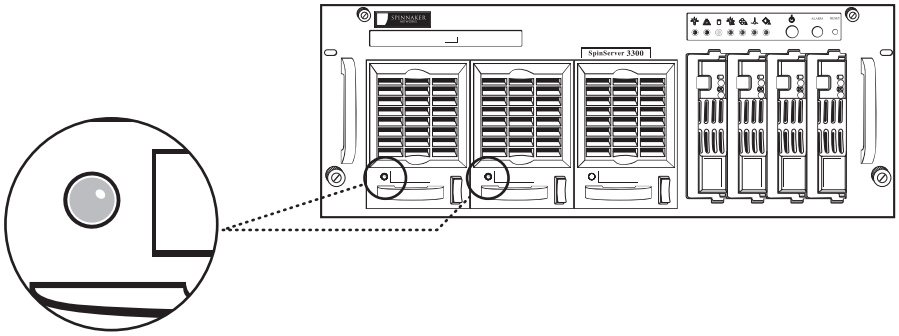


Figure 3-3. The power supply LED

Each power unit has a single LED that can be illuminated either red or green. When the power unit has AC power supplied to it and the SpinServer is powered on, the LED is green. This indicates that the unit is operating normally.

If there is AC power supplied to the system but the system power is turned off, the power supply unit LEDs are normally red. When the system power is on and the power supply unit LED is red, the power supply has failed and needs to be replaced.

There is an audible alarm when AC power is absent from one power supply unit but the other power supply unit is operating normally. The LED for the power supply unit without AC power is not illuminated.

3.5 SpinServer Interior Control Panel LEDs

The interior control panel of the SpinServer includes the LEDs for the five fans. The LEDs provide information about the operational status of each individual fan in the SpinServer chassis.

Under normal operating conditions, the fan LEDs are not illuminated. When a fan fails, the LED associated with the failed fan is illuminated red.

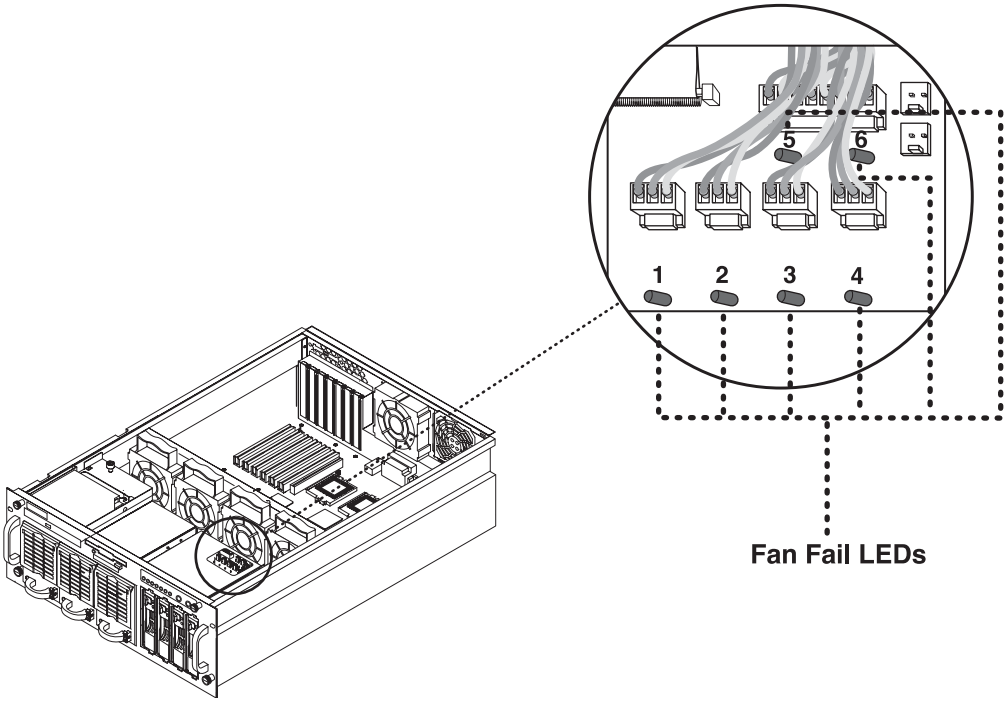


Figure 3-4. The fan LEDs on the interior control panel of the SpinServer chassis

3.6 SpinServer Management Tools

The SpinServer is configured and managed by using the Spinnaker SpinFS™ file management tool suite included in the software, which is installed on the SCSI disk drives in the SpinServer chassis.

The file management tool suite, Spinnaker SpinManager™, is available in a browser graphical user interface (GUI) and in a command line interface (CLI).

4.0 SpinServer Interior Access

This chapter provides information about accessing the interior of the SpinServer chassis. To service the FRUs inside the SpinServer chassis, extend the SpinServer from the equipment rack and remove the top cover of the chassis.

When working with the SpinServer, it is important to remember that the SpinServer emits invisible laser radiation.

Warning: CLASS 1 LASER PRODUCT

Warnung: LASER KLASSE 1 PRODUKT

Warning: Lasers emit invisible radiation from the aperture opening when no fiber-optic cable is connected. When removing cables, do not stare into the open apertures. In addition, install protective aperture covers to fiber ports with no cable connected.

Warnung: Laser strahlen unsichtbare Strahlung von der Blendonöffnung Öffnung aus, wenn kein Glasfaserkabel angeschlossen wird. Wenn Sie Kabel löschen, starren Sie nicht in die geöffneten Blendenöffnungen an. Zusätzlich installieren Sie schützende Blendenöffnung Abdeckungen zu den Faserkanälen ohne das angeschlossene Kabel.

4.1 Procedures Requiring Interior Chassis Access

To replace the following FRUs, you must have access to the interior of the SpinServer chassis:

- Midchassis intake fans
- Rear chassis exhaust fan
- DIMMs

4.2 Accessing the Interior of the SpinServer

When accessing the interior of the SpinServer chassis, follow all safety guidelines, including the following warning notices.

Warning: To prevent injury when performing maintenance on a powered-down SpinServer, disconnect the power cords from all AC inlets before opening the cover of a server chassis.

Warnung: Um Verletzungen bei Wartungsarbeiten an einem ausgeschalteten SpinServer zu vermeiden, die Netzkabel vor dem Öffnen der Server-Chassis-Abdeckung aus den Netzsteckdosen herausziehen.

Rack Precautions

Before extending the SpinServer from the rack, ensure that the rack is on a level surface and all safety precautions are observed.

Warning: Extend only one rack component at a time. Extending two or more rack components simultaneously can cause the rack to become unstable and tip over, causing serious injury and damage to equipment.

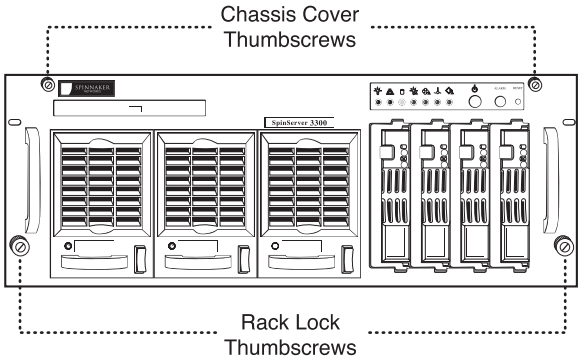
Warnung: Jeweils nur eine Rackkomponente herausziehen. Wenn zwei oder mehrere Rackkomponenten herausgezogen werden, kann das Rack umkippen und schwere Verletzungen sowie Schäden am Gerät verursachen.

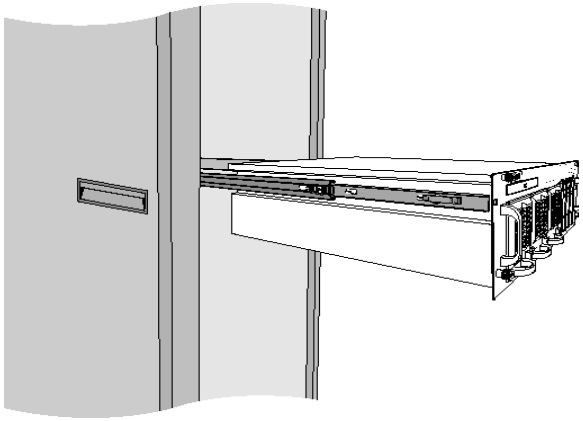
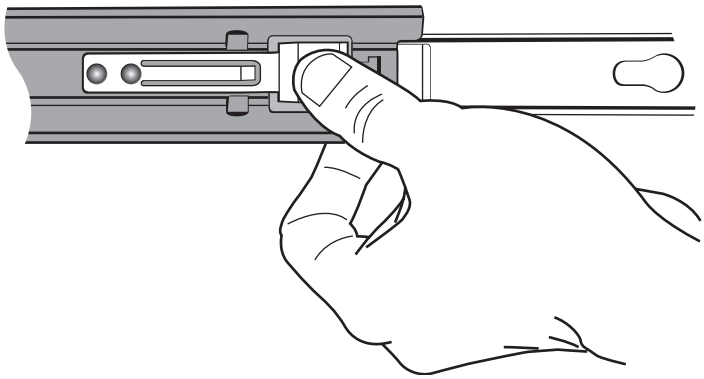
When accessing the interior of the SpinServer chassis, make sure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.

Figure 4-1. A single rack installation requires the attachment of the anti-tip plate.

Extending the SpinServer from the Rack

With the rack in a stable position, follow these steps to extend the SpinServer chassis from the rack:

Step	Action
1	Loosen both of the rack lock thumb screws on the front panel, located below the handles of the chassis.  Figure 4-2. SpinServer chassis thumbscrews
2	To allow the chassis to be fully extended from the rack, ensure that all cables connected to the SpinServer have a sufficient service loop of at least 3 feet (1 meter).

Step	Action
3	Grasping the handles on the front panel of the chassis, slowly extend the SpinServer until you hear a click as the slide assembly is locked in place. **Note:** Check all cables for tension.  Figure 4-3. Fully extended SpinServer
4	Remove the top cover of the chassis by loosening the top cover thumb screws.
5	Place your thumbs in the cover recesses on the chassis cover and push the cover towards the rear of the chassis.
6	Remove the cover from the chassis.
7	When the maintenance task is completed, replace the chassis cover and tighten the chassis cover thumb screws.
8	Depress the white tabs on both slide assemblies and with even pressure on both front corners of the SpinServer, push the SpinServer into the rack.  Figure 4-4. Depress the white tab.
9	Secure the SpinServer in the rack by tightening the rack lock thumb screws on the front panel of the SpinServer chassis.

5.0 SpinServer Shutdown

When powering down the system, it is important to do so properly to provide the system with the time necessary to properly save all data before the power is turned off.

Note: It is not recommended that the Reset button be used to restart the SpinServer because this method is a cold start and does not provide the system with the time necessary to save all data.

5.1 Procedures Requiring Shutdown

There are maintenance procedures that require the SpinServer to be shut down.

Important: If a maintenance procedure requires the SpinServer to be shut down, check with the system administrator before proceeding.

To replace the following FRUs, the SpinServer must be shut down:

- DIMMs
- SCSI disk drives
- UPS
- SpinServer chassis

Warning: To prevent injury when performing maintenance on a powered-down SpinServer, disconnect the power cords from all AC inlets before opening the cover of a server chassis.

Warnung: Um Verletzungen bei Wartungsarbeiten an einem ausgeschalteten SpinServer zu vermeiden, die Netzkabel vor dem Öffnen der Server-Chassis-Abdeckung aus den Netzsteckdosen herausziehen.

5.2 Shutting Down the SpinServer

To power down the SpinServer, use Method 1 or Method 2.

- **Method 1:** Log onto the system as root and run the UNIX **`poweroff`** command. After the **`poweroff`** command is completed, it is safe to turn off the SpinServer by pressing the power button on the front panel.
- **Method 2:** Press the power button on the front panel of the SpinServer. The SpinServer runs the **`shutdown`** command. When the button is pressed, the power LED flashes green once per second while the shutdown routine is performed. The shutdown routine takes about 18 seconds to complete.

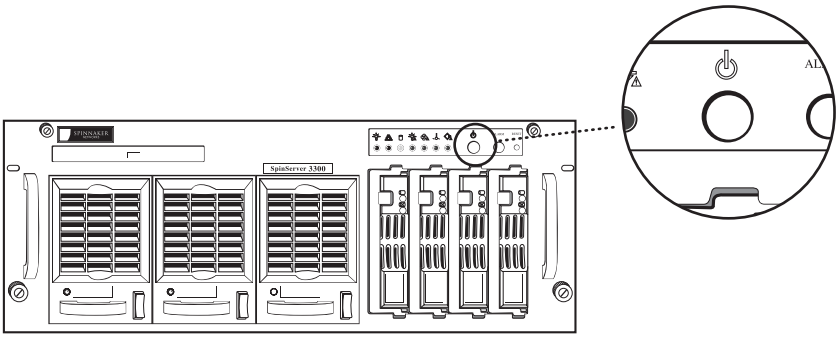


Figure 5-1. Press the power button on the front panel of the SpinServer.

Caution: This shutdown routine can be overridden by holding the power button down for more than five seconds. However, this can cause loss of data because the file system logs have not been previously saved. Overriding the shutdown routine is safe only if the file system logs have been written to disk.

After the shutdown process is finished, the power LED for the SpinServer is no longer illuminated, and the LEDs for the power supplies display red.

5.3 Restarting the SpinServer

When maintenance tasks are completed, press the power button to restart the SpinServer.

6.0 SpinServer Chassis

This chapter provides information about replacing the SpinServer chassis. When a chassis component that is not an FRU fails, the entire SpinServer chassis must be replaced.

To replace the SpinServer chassis, remove the working FRUs from the chassis. These FRUs are reused in the replacement chassis. To replace the chassis, you must completely remove it from the rack.

Note: The rear exhaust fan in the SpinServer chassis is installed in the replacement chassis. Do not remove and reuse the rear exhaust fan.

Warning: The SpinServer chassis requires at least two people to lift and handle the chassis. When lifting the chassis, handle it in such a way that the weight is evenly distributed and stabilized. Follow national or regional safety standards when lifting or repositioning any SpinServer system components.

Warnung: Zum Anheben und Handhaben des SpinServer Chassis sind mindestens zwei Personen erforderlich. Das Gewicht des Chassis sollte beim Anheben gleichmäßig verteilt und stabilisiert werden. Beim Anheben oder Neupositionieren aller SpinServer-Systemkomponenten sind die anwendbaren Sicherheitsstandards zu beachten.

Warning: To prevent injury when performing maintenance on a powered-down SpinServer, disconnect the power cords from all AC inlets before opening the cover of a server chassis.

Warnung: Um Verletzungen bei Wartungsarbeiten an einem ausgeschalteten SpinServer zu vermeiden, die Netzkabel vor dem Öffnen der Server-Chassis-Abdeckung aus den Netzsteckdosen herausziehen.

Important: On the server chassis, the removable power supplies have handles to help facilitate their removal. Never use these handles to lift or carry the chassis.

Caution: Do not unpack, install, or remove electronic equipment without using a properly grounded wrist or heel strap. Spinnaker Networks provides a disposable wrist strap with all new equipment purchases.

6.1 Identifying a Failed SpinServer Chassis

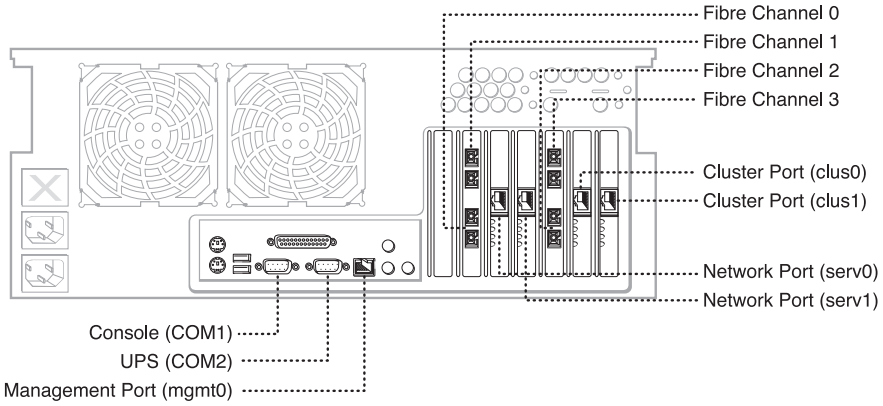
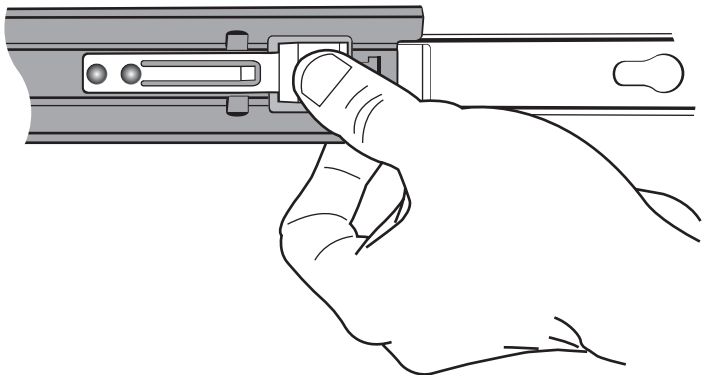
A SpinServer chassis fails because any one of the following units fails. These units cannot be individually replaced in the SpinServer chassis and failure of any of these units requires the replacement of the entire SpinServer chassis.

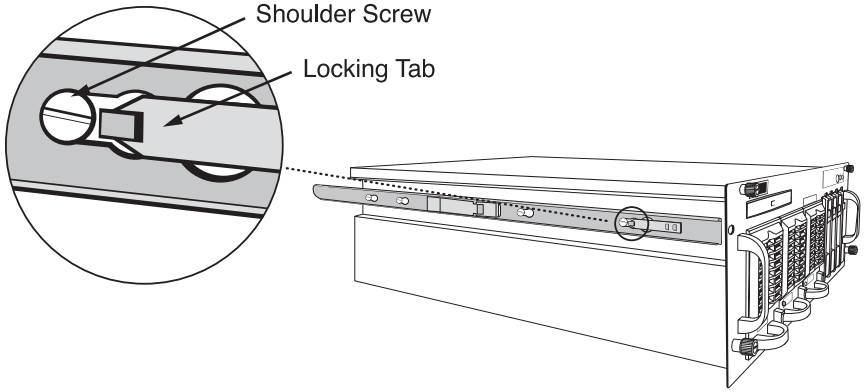
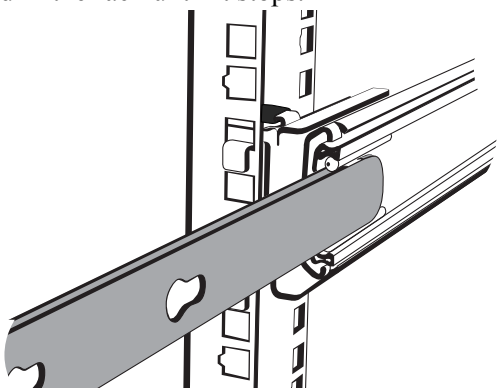
- CPU cooler fans
- Motherboard
- CD-ROM drive
- Diskette drive
- Control/Status panel

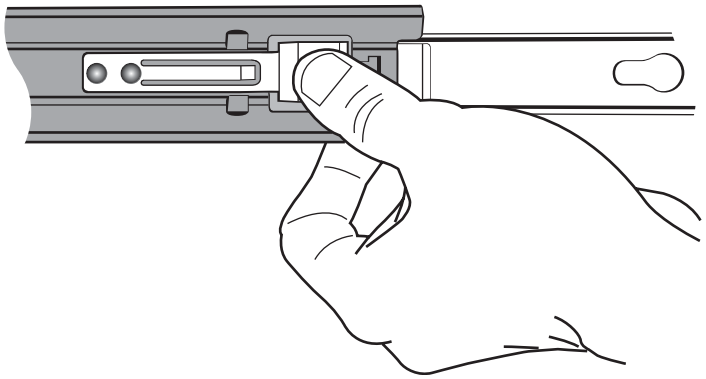
6.2 Replacing the SpinServer Chassis

To replace the SpinServer chassis, follow these steps:

Step	Action
1	Shut down the SpinServer. See the “SpinServer Shutdown” chapter on page 19 for the proper procedures for shutting down the SpinServer.
2	Extend the SpinServer chassis from the rack. See the “SpinServer Interior Access” chapter on page 15 for the proper procedures for extending the SpinServer from the rack. Remove the chassis cover.

Step	Action
3	Disconnect all cables from the rear panel of the SpinServer chassis. The following illustration indicate these cable connection points: • Power • Console (COM1) • UPS serial (COM2) • Fibre Channel • Network • Cluster  Figure 6-1. SpinServer cable connections
4	Remove both power supplies, PS1 and PS2, by following directions in the “SpinServer Power Supplies” chapter on page 37.
5	Remove both active SCSI disk drives, slot 0 and slot 1, by following directions in the “SpinServer SCSI Disk Drives” chapter on page 41.
6	Depress the white tabs on both slide assemblies and with even pressure on both front corners of the SpinServer, slowly pull the SpinServer out of the slide assemblies.  Figure 6-2. Depress the white tab.

Step	Action
7	Remove the inner slides from the SpinServer by flexing the locking tab away from the chassis and pushing the inner slide toward the rear of the chassis. Set the SpinServer chassis aside.
8	Reuse the inner slides for the replacement chassis. Place the inner slide section over the shoulder screws on the SpinServer and push it toward the front of the SpinServer to lock it in place.  Figure 6-3. The inner slide is locked in place on the SpinServer with the locking tab.
9	With two people lifting the SpinServer, guide the inner slide into the slide assembly mounted in the rack until it stops.  Figure 6-4. The inner slide is inserted into the slide assembly in the rack.

Step	Action
10	Depress the white tabs and with even pressure on both front corners of the SpinServer, push the SpinServer the remainder of the way into the rack until it is locked in place.  Figure 6-5. Depress the white tab. **Note:** The first time the SpinServer is pushed in, it requires some additional pressure to seat the ball bearings.
11	Extend the replacement chassis from the rack and remove the cover from the chassis.
12	Remove the four midchassis intake fans by following directions in the “SpinServer Fans” chapter on page 27.
13	From the failed chassis, remove the PCI adapter from slot 1 and install it into slot 1 in the replacement chassis. Continue this process until you have installed the PCI adapters 1 through 7 into the replacement chassis. See the chapter “SpinServer PCI Adapters” on page 35 for additional information about the PCI adapters.
14	From the failed chassis, remove all DIMMs and install the DIMMs into the DIMM banks in the replacement chassis.
15	Into the replacement chassis, insert the four midchassis intake fans that were removed from the failed chassis. Follow the instructions given in the “SpinServer Fans” chapter. See page 27.
16	Into the replacement chassis, insert both SCSI disk drives that were removed from the failed chassis. Follow the instructions given in the “SpinServer SCSI Disk Drives” chapter. See page 41.
17	Into the replacement chassis, insert both power supplies that were removed from the failed chassis. Follow the instructions given in the “SpinServer Power Supplies” chapter. See page 37.
18	Replace the cover of the SpinServer chassis and push the chassis into the rack.

Step	Action
19	Secure the chassis to the rack with the rack lock thumb screws.

7.0 SpinServer Fans

This chapter provides information about replacing the SpinServer fans: the four midchassis intake fans and the single rear chassis exhaust fan.

All of the fans are accessible from the interior of the SpinServer chassis, and all of the fans are hot swappable. You do not need to power down the SpinServer to replace a chassis fan.

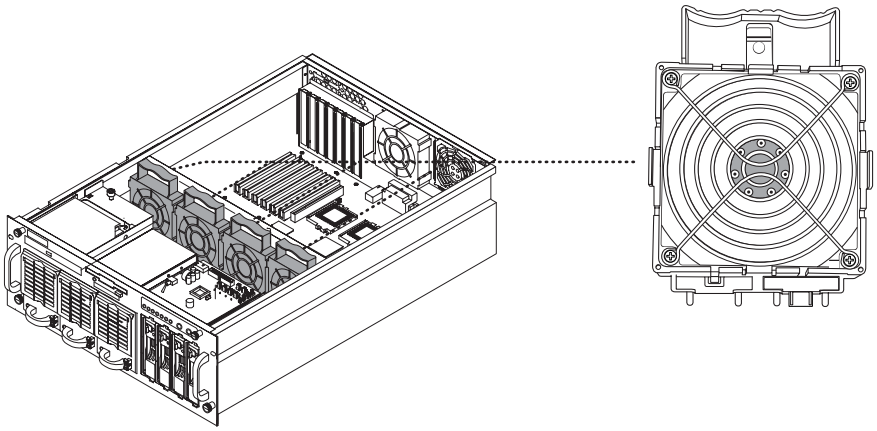


Figure 7-1. SpinServer chassis fans

Note: Before accessing the interior of the SpinServer chassis, see the chapter “SpinServer Interior Access” on page 15 for the procedures to extend the chassis from the rack and remove the chassis cover.

Warning: To prevent personal injury, always allow the fans to spin down before removing the fan assembly.

Warnung: Um Verletzungen zu vermeiden, sollte vor dem Entfernen der Ventilatorbaugruppe gewartet werden, bis die Ventilatoren zum Stillstand gekommen sind.

7.1 Identifying Failed Fans

When a SpinServer chassis fan fails, there are two ways that the SpinServer identifies a fan failure:

- The Fan Fail LED on the front panel of the SpinServer
- The fan LEDs on the control panel in the interior of the SpinServer chassis

Front Panel LEDs on the SpinServer

The Fan Fail LED on the front panel of the SpinServer is illuminated red when a chassis fan fails. The Fan Fail LED flashes red when any one of the intake or exhaust fans fails. A fan failure is accompanied by an audible alarm. Pushing the ALARM button disables this alarm.

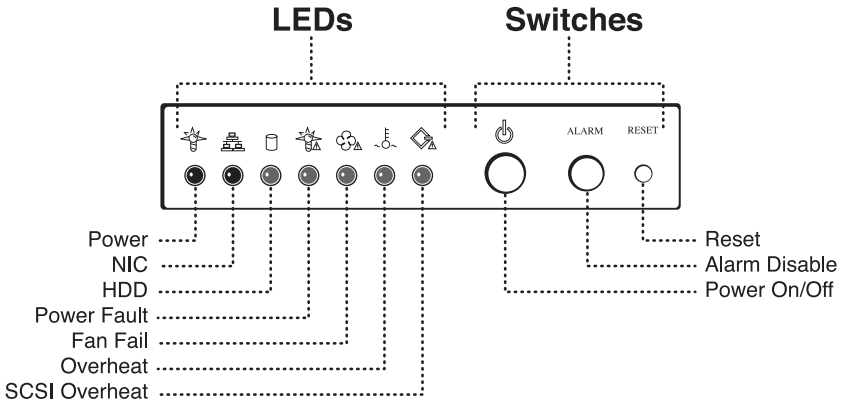


Figure 7-2. The LEDs and switches on the front panel of the SpinServer

Fan LEDs on Interior Control Panel

With the chassis cover removed, you can identify which fan has failed by checking the red LEDs on the interior control panel.

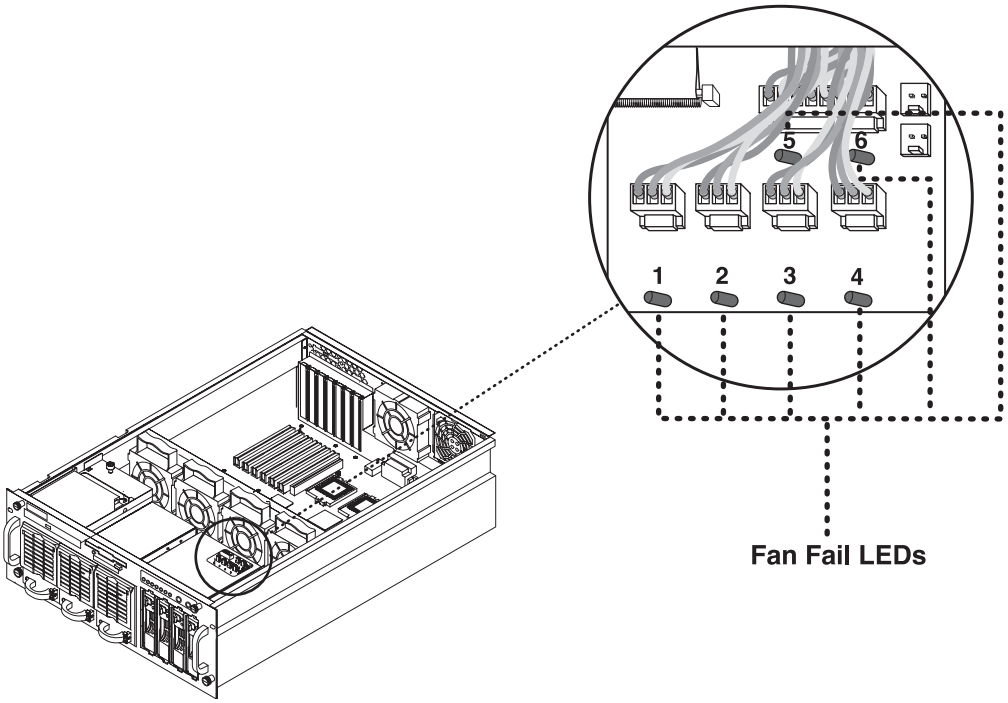


Figure 7-3. Fan LEDs on the interior control panel

There are four LEDs for the midchassis intake fans (Positions 1 - 4) and one LED for the rear exhaust fan (Position 5). The position of the LEDs corresponds to the position of the fans in the chassis, making it easy to identify the failed fan. The failed fan's LED is illuminated red.

Note: The rear exhaust fan housing in Position 6 is empty.

7.2 Replacing the SpinServer Midchassis Fans

To replace a failed midchassis intake fan, follow these steps:

Step	Action
1	Extend the SpinServer chassis from the rack. See the "SpinServer Interior Access" chapter on page 15 for the proper procedures for extending the SpinServer from the rack. Remove the chassis cover.
2	Remove the fan unit from the chassis by depressing the locking tab on the fan housing.

Step	Action
3	Pull the fan unit straight up to remove it from the SpinServer chassis.
4	Insert the new fan into the housing and push down until you hear it click into place.
5	Verify that the fan is working properly.
6	Verify that all LEDs on the control panel in the interior of the SpinServer chassis are no longer illuminated.
7	Replace the cover of the SpinServer chassis and push the chassis into the rack.
8	Secure the chassis to the rack with the rack lock thumb screws.

7.3 Replacing the SpinServer Rear Chassis Fans

To replace a failed rear chassis exhaust fan, follow these steps:

Step	Action
1	Extend the SpinServer chassis from the rack. See the “SpinServer Interior Access” chapter on page 15 for the proper procedures for extending the SpinServer from the rack. Remove the chassis cover.
2	With the SpinServer chassis cover removed, unplug the fan power cable for the failed fan from the interior control panel of the chassis.
3	Remove the fan unit from the chassis by depressing the locking tabs at the top and bottom of the fan housing, which protrude through the rear of the SpinServer chassis. This detaches the fan housing from the chassis. **Note:** The second rear chassis exhaust fan housing is empty.
4	Reach inside the chassis and pull the housing out of its slot.
5	Unscrew the four screws that hold the fan in the housing.
6	Pull the fan unit straight out to remove it from the fan housing.
7	Insert the new fan into the housing and push down until you hear it click into place. Push the locking tab down to ensure that the unit is fully inserted and secure in the chassis.
8	Plug the fan cable into the new fan unit and receptacle on the rear panel of the chassis.

Step	Action
9	Verify that the fan is working properly.
10	Verify that all LEDs on the control panel in the interior of the SpinServer chassis are no longer illuminated.
11	Replace the cover of the SpinServer chassis and push the chassis into the rack.
12	Secure the chassis to the rack with the rack lock thumb screws.

8.0 SpinServer Memory Modules

This chapter provides information about replacing the SpinServer DIMMs.

The DIMMs are accessible from the interior of the SpinServer chassis.

Note: Before accessing the interior of the SpinServer chassis, see the chapter "SpinServer Interior Access" for the procedures to extend the chassis from the rack and remove the chassis cover. See page 15.

Caution: The DIMMs are not hot swappable. The SpinServer must be shut down prior to replacing the DIMMs.

Warning: Always disconnect all power cords from all AC inlets of the system when installing memory modules in the SpinServer.

Warnung: Beim Installieren von Speichermodulen in den SpinServer stets alle Stromkabel des Systems ausstecken.

Note: DIMMs in the same bank are matched and must be replaced as a pair.

8.1 Replacing the SpinServer Memory Modules

To replace the DIMMs, follow these steps.

Caution: Do not unpack, install, or remove electronic equipment without using a properly grounded wrist or heel strap. Spinnaker Networks provides a disposable wrist strap with all new equipment purchases.

Step	Action
1	Shut down the SpinServer. See the "SpinServer Shutdown" chapter on page 19 for the proper procedures for shutting down the SpinServer.

Step	Action
2	When the SpinServer has been shut down, extend the chassis from the rack. See the “SpinServer Interior Access” chapter on page 15 for the proper procedures for extending the SpinServer from the rack.
3	Disconnect the power cables from both AC inlets and remove the SpinServer chassis cover.
4	Remove the pair of DIMMs from bank0 or bank1. The positions of bank0 and bank1 are marked on the motherboard.
5	Insert each replacement DIMM vertically into the DIMM slot. Align the notches along the bottom of the module with the slot.
6	Gently press down on the replacement DIMM until it is firmly in place in the slot.
7	Replace the cover of the SpinServer chassis and fasten the chassis cover thumb screws.
8	Push the chassis into the rack and secure the chassis to the rack with the rack lock thumb screws.

9.0 SpinServer PCI Adapters

This chapter provides information about replacing the SpinServer PCI adapters.

The PCI adapters are accessible from the interior of the SpinServer chassis.

Note: Before accessing the interior of the SpinServer chassis, see the chapter "SpinServer Interior Access" on page 15 for the procedures to extend the chassis from the rack and remove the chassis cover.

Caution: The PCI adapters are not hot swappable. The SpinServer must be shut down prior to replacing the PCI adapters.

Warning: Always disconnect all power cords from all AC inlets of the system before removing or installing PCI adapters in the SpinServer.

9.1 Identifying the PCI Adapters

The PCI adapters are installed in numbered slots in the interior of the SpinServer chassis. The slots are numbered from the left to the right on the rear panel of the SpinServer chassis, with Slot 1 on the left as viewed from the rear of the chassis. The numbered slots have the following functions:

- **Slot 1:** Video card for the advanced graphics port (AGP)
- **Slot 2:** Fibre Channels 0 and 1
- **Slot 3:** Network port (serv0)
- **Slot 4:** Network port (serv1)
- **Slot 5:** Fibre Channels 2 and 3
- **Slot 6:** Cluster port (clus0)
- **Slot 7:** Cluster port (clus1)

9.2 Replacing the SpinServer PCI Adapters

To replace the PCI adapters, follow these steps.

Caution: Do not unpack, install, or remove electronic equipment without using a properly grounded wrist or heel strap. Spinnaker Networks provides a disposable wrist strap with all new equipment purchases.

Step	Action
1	Shut down the SpinServer. See the “SpinServer Shutdown” chapter on page 19 for the proper procedures for shutting down the SpinServer.
2	When the SpinServer has been shut down, extend the chassis from the rack. See the “SpinServer Interior Access” chapter on page 15 for the proper procedures for extending the SpinServer from the rack.
3	Disconnect the power cables from both AC inlets and remove the SpinServer chassis cover.
4	Remove the screw that fastens the PCI adapter to the rear panel of the chassis and vertically pull the failed PCI adapter from its slot.
5	Insert the replacement PCI adapter into the correct slot.
6	Gently press down on the replacement PCI adapter until it is firmly in place in the slot.
7	Replace the screw that fastens the PCI adapter to the rear panel of the chassis.
8	Replace the cover of the SpinServer chassis and push the chassis into the rack. Fasten the chassis cover thumb screws.
9	Secure the chassis to the rack with the rack lock thumb screws.

10.0 SpinServer Power Supplies

This chapter provides information about replacing the SpinServer power supplies. The power supplies are accessible from the front panel of the SpinServer chassis.

The SpinServer chassis has two active power supplies, PS1 and PS2. The third unit, PS3, is nonfunctional.

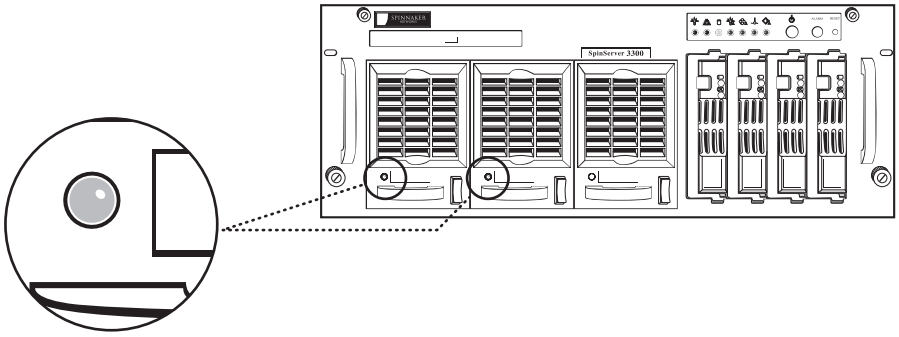


Figure 10-1. PS1 and PS2 are active power supplies.

10.1 Identifying Failed Power Supplies

Failed power supply units can be identified by checking the LEDs on the front panel on the SpinServer chassis and the LEDs on the individual power supply units. See the chapter “SpinServer Overview” on page 9 for additional information about the LEDs.

Front Panel LEDs on the SpinServer

The Power Fault LED on the front panel of the SpinServer is illuminated when a power supply unit fails.

Also, there is an audible alarm when AC power is absent from one power supply unit but the other power supply unit is operating normally. To suppress the audible alarm, press the ALARM button on the front panel.

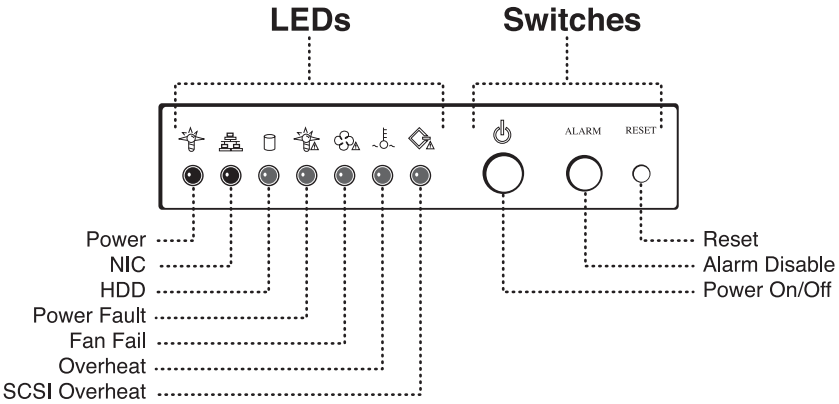


Figure 10-2. The LEDs and switches on the front panel of the SpinServer

Power Supply LEDs

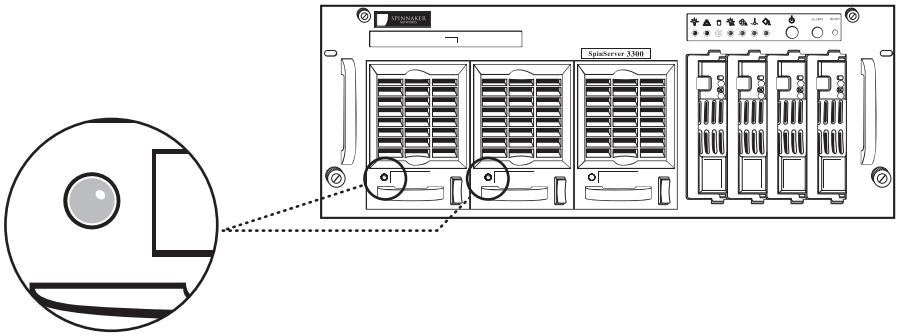


Figure 10-3. Power supply LEDs

Each power unit has a single LED that can be illuminated either red or green or not be illuminated.

LED Green

When the power unit has AC power supplied to it and the SpinServer is powered on, the LED is green. This indicates that the unit is operating normally.

LED Red

A red LED is normal only when the system has been turned off and is not operating.

If the system is operating and the LED is red, it indicates one of the following problems:

- No power is being applied to that particular power supply unit. Before replacing the power supply unit, check to make sure that the power cord for that unit is plugged into both the power unit and a grounded wall outlet or power distribution unit (PDU).
- That particular power unit has failed.

LED Off

If both AC power cords are disconnected, the LEDs on both power supply units are not illuminated.

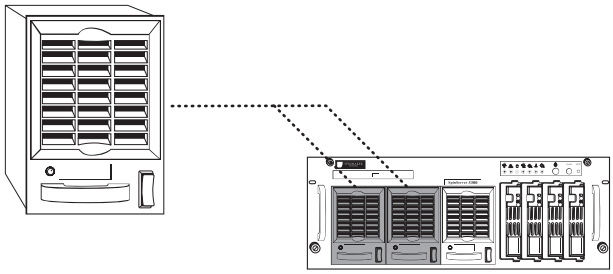
Note: If the AC power cord for one of the power supply units is disconnected, the LED is red for that power supply unit.

10.2 Replacing the SpinServer Power Supply Units

Note: The power supply units on the SpinServer chassis can be hot swapped. You do not need to power down the system to replace a failed power supply unit.

Important: Only one power supply unit can be replaced at a time.

When a power supply fails, replace the unit quickly to maintain system operations. To replace a power supply unit, follow these steps:

Step	Action
1	Slide the locking tab up on the power supply unit.  Figure 10-4. Replace a power supply unit. **Note:** The third power supply unit, PS3, is nonfunctional.
2	Using the power supply unit handle, pull the power supply unit out of the chassis.
3	Insert the new unit and push the locking tab down to ensure that the unit is fully inserted and secure in the chassis. The power supply LED is illuminated green when the power supply is fully operational.

11.0 SpinServer SCSI Disk Drives

This chapter provides information about replacing the SpinServer SCSI disk drives. The SpinServer has two active SCSI disk drives that contain the SpinFS system management software. The disk drives are configured as RAID 1 (mirrored).

The SCSI disk drives are accessible from the front panel of the SpinServer chassis. Each SCSI drive has two LEDs on the front of the drive carrier; the top LED is green and the bottom one is red.

Note: The leftmost SCSI drive slot is labeled Slot 0. The drives in Slot 0 and Slot 1 are active drives. The disk carriers in Slots 2 and 3 do not contain disk drives. The LEDs on the inactive drives are not illuminated.

11.1 Identifying Failed SCSI Disk Drives

When the green LED is illuminated, the drive is being accessed. When the red LED is illuminated, the SCSI drive has experienced a fault or has failed and must be replaced.

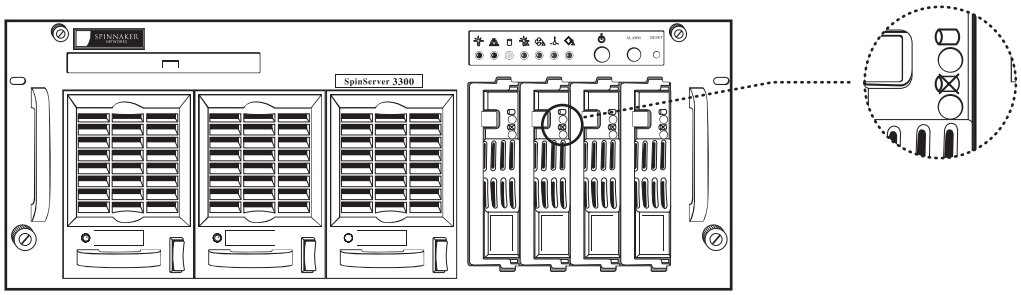


Figure 11-1. The SCSI drive carrier LEDs

Caution: The SCSI disk drives are not hot swappable. The SCSI disk drives can be removed while SpinServer power is on; however, the SpinServer must be offline and shut down prior to replacing the SCSI disk drives.

11.2 Replacing the SpinServer SCSI Disk Drives

To replace a SCSI disk drive, follow these steps:

Step	Action
1	From the front panel of the SpinServer, determine which of the two SCSI disk drives has failed.
2	Follow the proper SpinServer shutdown procedures to allow the file system logs to be written to the disk drives. See the “SpinServer Shutdown” chapter on page 19 for the proper procedures.
3	After the SpinServer has been properly shut down, push the release button located beside the disk drive LEDs and swing the handle fully out.
4	Using the handle of the SCSI disk drive, slide the disk drive carrier out of the slot.
5	Using the handle, slide the replacement SCSI disk drive into the empty slot and insert it into the backplane.
6	Lock the disk drive in place by pushing the handle in until you hear a click.
7	Ensure that the replacement SCSI disk drive is fully inserted and secure in the chassis before powering on the SpinServer. The SCSI disk drive LEDs are illuminated green when the SCSI disk drives are fully operational.

12.0 SpinStor Overview

This chapter provides information about the SpinStor disk enclosure components that are field replaceable and the tools and equipment you need to replace the components.

The SpinStor disk subsystem consists of, at a minimum, one 15-disk Fibre Channel RAID enclosure. Additional 15-disk Fibre Channel JBOD enclosures can be daisy chained to the RAID enclosure.

Note: You must purchase all field replaceable units from Spinnaker Networks or an authorized reseller.

12.1 Field Replaceable Units

The SpinStor is designed for easy access to FRUs so that you can remove and install units in the field. The units are accessible from the front and back panels of the SpinStor disk enclosures.

Replaceable Units

The SpinStor FRUs are identical for the RAID and JBOD enclosures, with the exception of I/O modules. The RAID enclosure includes two RAID I/O modules, and the JBOD enclosure includes two JBOD I/O modules.

RAID Enclosure FRUs

The following units can be individually replaced in the SpinStor RAID disk enclosures. The disk drives are accessible from the front panel of the SpinStor enclosure. The others are accessible from the rear panel of the SpinStor enclosure.

- Disk drives
- Power supplies
- Left and right blowers
- Primary and secondary RAID I/O modules
- Fiber SC GBIC
- Copper GBIC
- SC optical cables

JBOD Enclosure FRUs

The following units can be individually replaced in the SpinStor JBOD disk enclosures. The disk drives are accessible from the front panel of the SpinStor enclosure. The others are accessible from the rear panel of the SpinStor enclosure.

- Disk drives
- Power supplies
- Left and right blowers
- JBOD I/O modules
- Copper GBIC
- Copper cables

12.2 Tools and Equipment

To replace FRUs, you need the following tools and equipment:

- Phillips screwdrivers
- Antistatic wrist strap and grounding leash

12.3 SpinStor LEDs and Fault Indicators

The LEDs and fault indicators provide information about the operational status of specific components in the SpinStor RAID and JBOD enclosures.

SpinStor RAID and JBOD Front Panel LEDs

The following illustration shows the location of the status indicators on the front panel of each disk carrier for the RAID and JBOD disk enclosures.

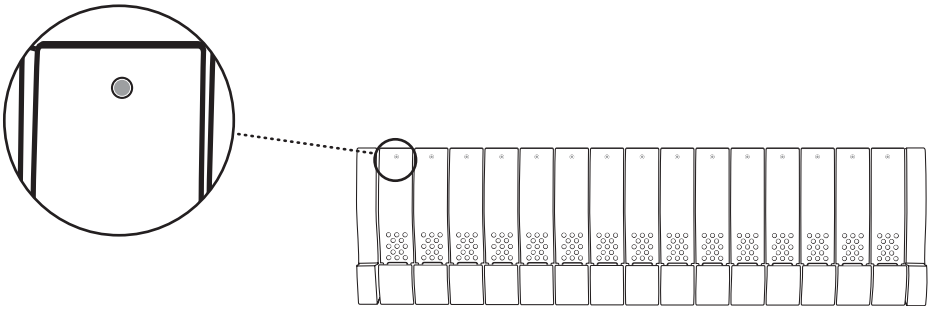


Figure 12-1. The front panel LEDs on the SpinStor RAID or JBOD

SpinStor RAID Back Panel LEDs

The SpinStor RAID back panel LEDs are detailed in the following illustration.

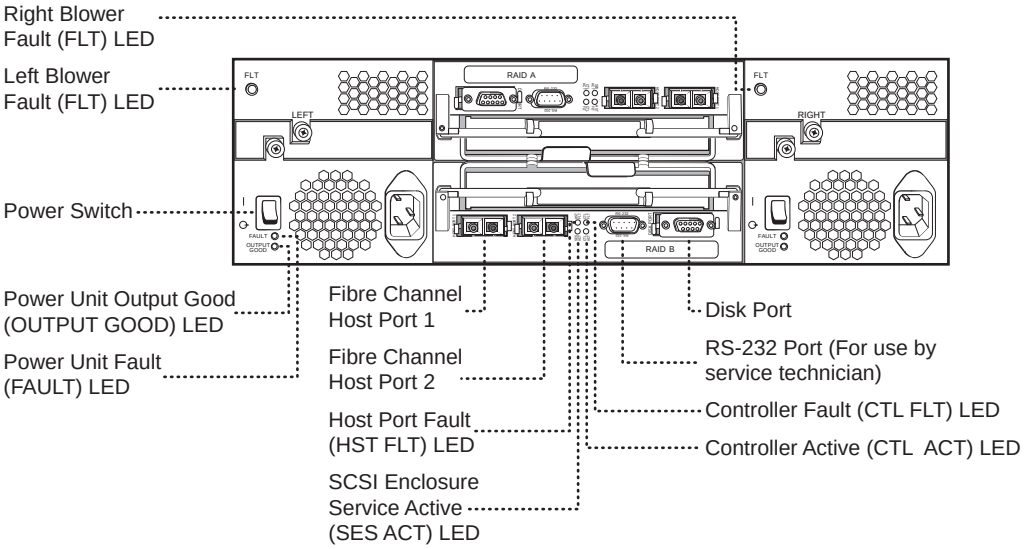


Figure 12-2. RAID back panel LEDs

SpinStor JBOD Back Panel LEDs

The SpinStor JBOD back panel LEDs are detailed in the following illustration.

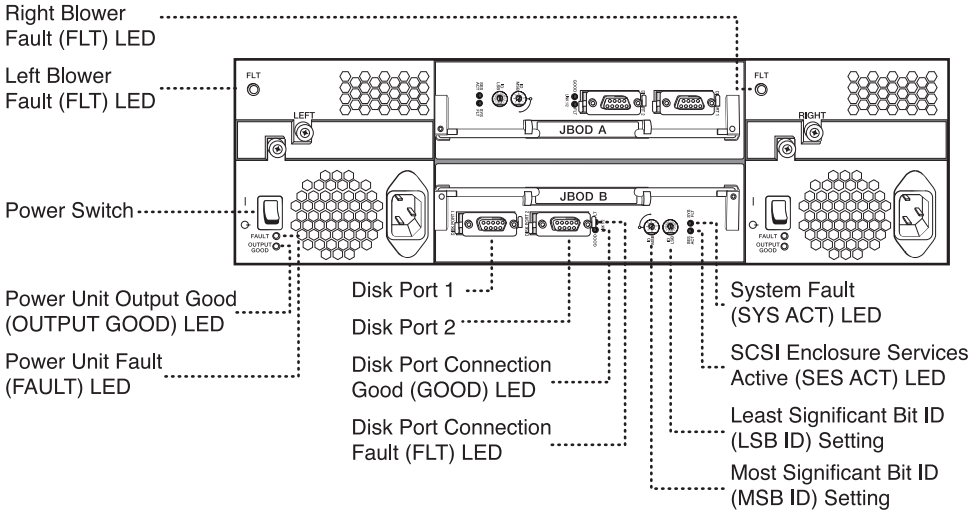


Figure 12-3. SpinStor JBOD back panel LEDs

SpinStor RAID Back Panel Fault Indicators

The SpinStor RAID back panel fault indicators are detailed in the following illustration.

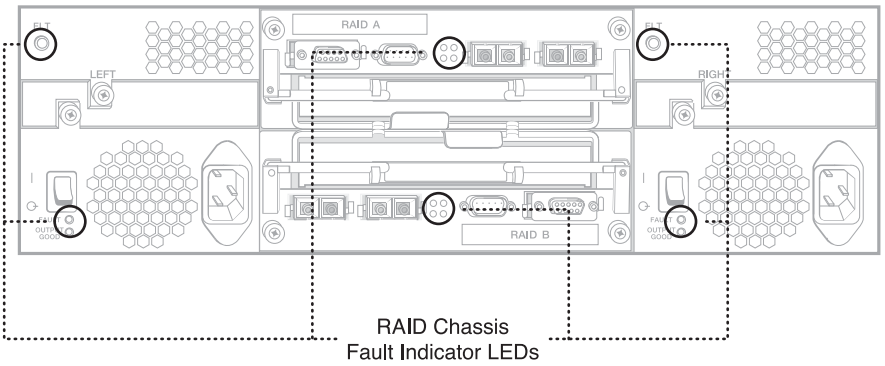


Figure 12-4. The Fault Indicator LEDs on the back of the SpinStor RAID

SpinStor JBOD Back Panel Fault Indicators

The SpinStor JBOD back panel fault indicators are detailed in the following illustration

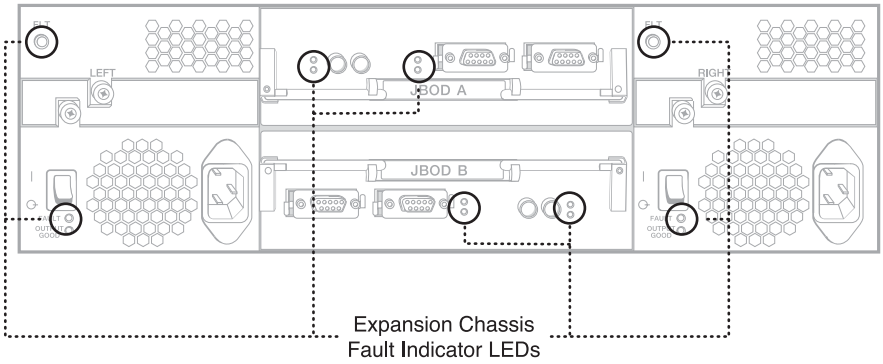


Figure 12-5. The Fault Indicator LEDs on the back of the SpinStor JBOD

13.0 SpinStor Blowers

This chapter provides information about replacing the SpinStor RAID and JBOD disk enclosure blowers. The blowers are accessible from the rear panel of the SpinStor enclosures.

13.1 Identifying Failed Blowers

When the blower LED on either the right or left blower on the rear panel of the SpinStor RAID or JBOD enclosure is illuminated red, that blower has failed and needs to be replaced.

Important: Blowers are a critical system component. Replace nonoperating blowers as soon as possible to avoid data loss or device failure.

13.2 Replacing the SpinStor Blowers

When a blower fails in a RAID or JBOD disk enclosure, replace the unit quickly.

Note: The blowers can be hot swapped. You do not need to power down the system to replace a blower in the RAID or JBOD disk enclosures.

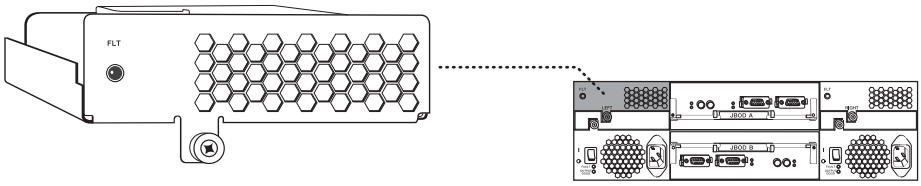
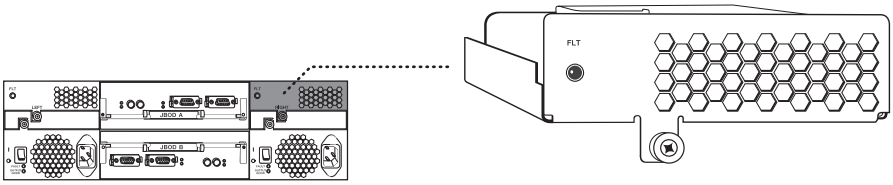
Important: Only one blower can be replaced at a time in a RAID or JBOD disk enclosure.

Note: The blowers are right- and left- specific. You must replace a failed left blower with a new left blower.

Warning: To prevent personal injury, always allow the blowers to spin down before removing the blower assembly.

Warnung: Um Verletzungen zu vermeiden, sollte vor dem Entfernen der Gebläsebaugruppe gewartet werden, bis das Gebläse zum Stillstand gekommen ist.

To replace either a right or a left blower in either a RAID or JBOD disk enclosure, follow these steps:

Step	Action
1	Loosen the thumb screw that secures the blower to the RAID or JBOD enclosure.
2	Using the thumb screw, disengage the blower from the RAID or JBOD enclosure housing.
3	Wait for the blower to stop completely before pulling the blower out of the RAID or JBOD enclosure.
4	Slide the new blower into the RAID or JBOD enclosure and secure it by tightening the thumb screw.  Figure 13-1. Replace a left RAID or JBOD blower.  Figure 13-2. Replace a right RAID or JBOD blower.

14.0 SpinStor Disk Drives

This chapter provides information about replacing the SpinStor RAID and JBOD disk drives. The disk drives are accessible from the front panel of the SpinStor RAID and JBOD enclosures.

14.1 Identifying Failed Disk Drives

A blue LED on an individual disk drive indicates normal disk operation. A red LED on an individual disk drive indicates failure of that disk. The disk drive needs to be replaced.

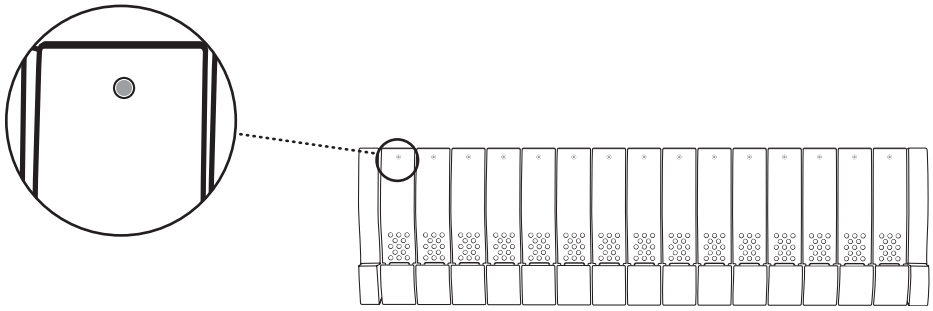


Figure 14-1. JBOD disk drive LED

14.2 Replacing the SpinStor Disk Drives

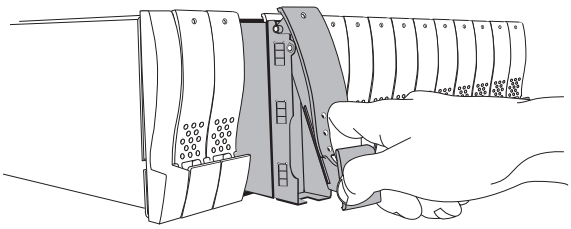
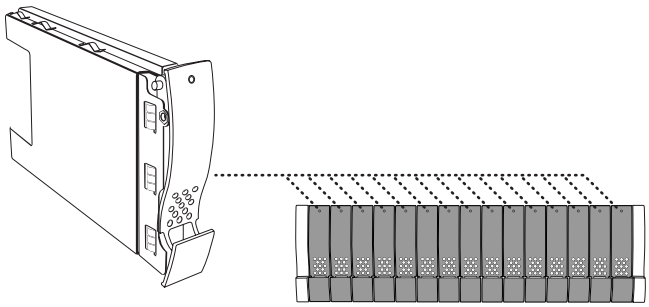
Before physically removing a SpinStor RAID or JBOD disk drive, you must alert the RAID subsystem that you are removing the disk by using one of the following methods:

- Use the SpinManager CLI **`raid diskdrives prepareforremoval`** command
- In the SpinManager GUI, navigate to **RAID → Disk Drives**. A table listing all the disk drives in your RAID subsystem is displayed. Select the failed disk from the listing and select **Prepare For Removal**. Click **Submit**.

Caution: Do not unpack or install disk drives without using a properly grounded wrist or heel strap. Failure to do so can result in ESD damage that causes equipment failure.

Note: The disk drives can be hot swapped. You do not need to power down the system to replace a disk drive in the RAID or JBOD disk enclosures.

To replace a disk drive in either a RAID or JBOD disk enclosure, follow these steps:

Step	Action
1	Remove the disk drive canister from the enclosure by pulling the canister handle out, as shown below.  Figure 14-2. Removal of disk drive canister from RAID or JBOD enclosure.
2	Insert the new disk drive canister by sliding it into the enclosure slot.
3	Ensure that the canister is properly seated and fully secure in the slot by placing the handle in the closed position.  Figure 14-3. Replace a disk drive canister.

15.0 SpinStor GBICs

This chapter provides information about replacing the SpinStor RAID and JBOD Gigabit Interface Converters (GBICs). The GBICs are accessible from the rear panel of the SpinStor enclosures.

The SpinStor RAID and JBOD disk chassis contain fibre and copper GBICs for cable connectivity. The RAID enclosure contains fibre GBICs in the HostA and HostB ports and a copper GBIC in the Channel A/B Disk port.

15.1 Identifying Failed GBICs

GBICs do not have any visual indicators for failure. If you suspect that a GBIC is not properly functioning, replace the GBIC.

15.2 Replacing the SpinStor GBICs

When a GBIC fails in a RAID or JBOD disk enclosure, replace the unit quickly.

Note: The GBICs can be hot swapped. You do not need to power down the system to replace GBICs in the RAID or JBOD disk enclosures.

Note: Before removing and replacing a GBIC, if the attached storage pool is not configured for high availability (HA), it must be taken offline by using one of the following methods:

- Use the SpinManager CLI **`storage pools setoffline`** command.
- Use the SpinManager GUI to navigate to **Storage Pools → Storage Pools**. A table listing all storage pools is displayed. Select the storage pool to be taken offline from the listing and select **Take Offline** from the drop down menu. Click **Submit**.

Note: You must check with the system administrator to verify that the attached storage pools are offline before removing and replacing the GBIC.

Replacing a Fibre GBIC

To replace a fibre GBIC, follow these steps:

Step	Action
1	Disconnect the Fibre Channel cable that is connected to the GBIC. Fiber SC Duplex GBIC (1.0625 GB/S, 850 NM MULTI-MODE)
2	Grasp and squeeze the molded GBIC housing and pull it out of the slot.
3	The GBICs are keyed for insertion into the I/O module. Do not force the GBIC into the slot.
4	Insert the GBIC into the slot until it locks in place.

Replacing a Copper GBIC

To replace copper GBIC, follow these steps:

Step	Action
1	Disconnect the copper cable that is connected to the GBIC. Copper DB-9 GBIC (1.0625 GBITS/SEC)
2	Grasp and squeeze the molded GBIC housing and pull it out of the slot.
3	The GBICs are keyed for insertion into the I/O module. Do not force the GBIC into the slot.
4	Insert the GBIC into the slot until it locks in place.

16.0 SpinStor I/O Modules

This chapter provides information about replacing the SpinStor RAID and JBOD I/O modules. The I/O modules are accessible from the rear panel of the SpinStor RAID and JBOD enclosures.

16.1 Identifying Failed I/O Modules

During normal system operations, the red Controller Fault LED is illuminated if the controller has failed and needs to be replaced.

Note: During the initial setup process of the SpinServer system components, it is recommended that you wait for the CTL FLT LED to go off before powering on the SpinServer. This assures that the RAID controllers are properly initialized and are ready to communicate with the SpinServer. After the SpinStor RAID is powered on, it takes several minutes for the RAID controllers to be initialized. The CTL FLT LED remains red during this process.

If the CTL FLT LED remains on during the setup process, you must check the I/O modules or RAID controllers to ensure that they are secure and properly seated in the SpinStor.

If the problem persists after the RAID controllers or JBOD I/O modules are properly seated in the enclosure, the module must be replaced.

16.2 Replacing the SpinStor I/O Modules

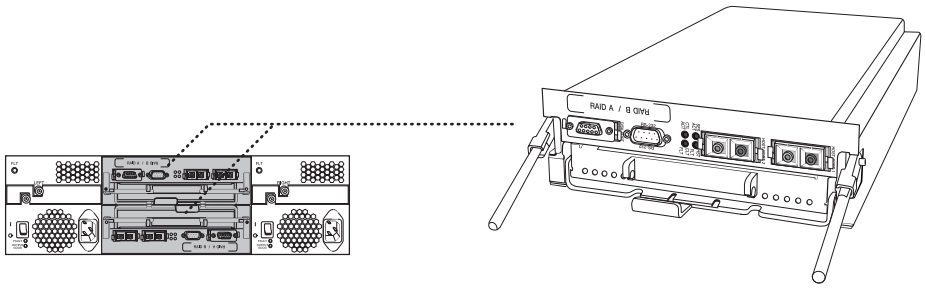
When an I/O module fails, replace it quickly.

Important: Only one I/O module can be replaced at a time in a RAID or JBOD disk enclosure.

Note: The I/O modules of the SpinStor RAID and JBOD enclosures can be hot swapped. You do not need to power down the system to replace an I/O module in the RAID or JBOD disk enclosures.

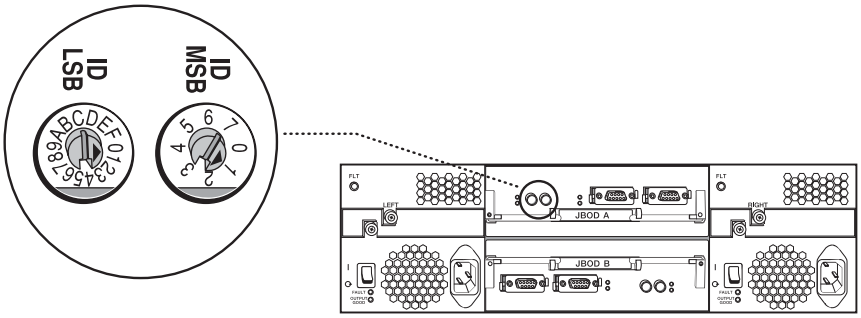
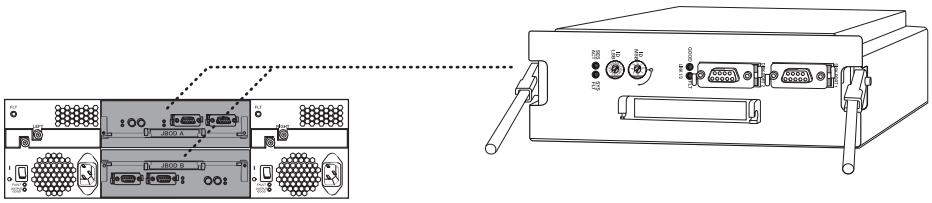
Replacing the RAID I/O Modules

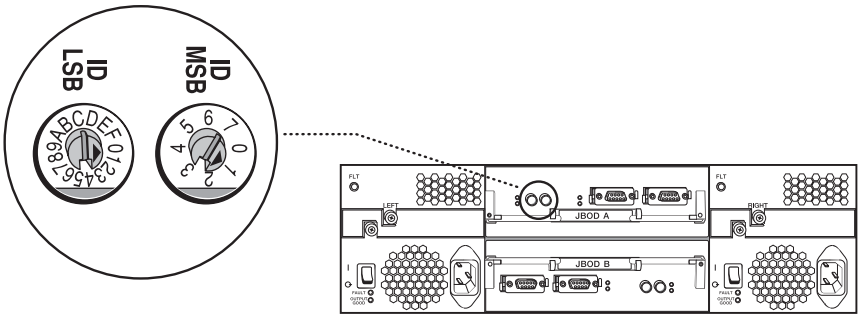
To replace an I/O module in a RAID disk enclosure, follow these steps:

Step	Action
1	Remove all GBICs and cables from the module.
2	Loosen the two thumbscrews that secure the I/O modules to the disk enclosure.
3	Remove the bars on the handles from their clips.
4	Swing the handles to the side and lift up (top module) or push down (bottom module) the handles until the module disengages.
5	Use the handles to pull the module from the SpinStor RAID enclosure.  Figure 16-1. Replace a RAID I/O module.
6	Slide the new module into the slot and push down (top module) or lift up (bottom module) the handles until the module engages. Ensure that it is properly seated.
7	Tighten the two thumbscrews to secure the I/O modules to the disk enclosure.
8	Fold the handles and place the ends in the clips to keep them secure and out of the way.

Replacing the JBOD I/O Modules

To replace an I/O module in a JBOD disk enclosure, follow these steps:

Step	Action
1	Record the settings on the MSB and the LSB switches on the failed I/O JBOD module. The settings on the replacement module must be the same as the settings on the failed I/O JBOD module.  Figure 16-2. The MSB and LSB switches on the SpinStor JBOD
2	Remove all GBICs and cables from the module.
3	Loosen the two thumbscrews that secure the I/O modules to the disk enclosure.
4	Remove the bars on the handles from their clips.
5	Swing the handles to the side and lift up (top module) or push down (bottom module) the handles until the module disengages.
6	Use the handles to pull the module from the SpinStor JBOD enclosure.  Figure 16-3. Replace a JBOD I/O module.
7	Slide the new module into the slot and push down (top module) or lift up (bottom module) the handles until the module engages. Ensure that it is properly seated.
8	Tighten the two thumbscrews to secure the I/O modules to the disk enclosure.
9	Fold the handles and place the ends in the clips to keep them secure and out of the way.

Step	Action
10	Set the disk ID for the replacement I/O JBOD module to the same setting as the failed JBOD I/O module. The settings on the MSB and the LSB switches must be the same as the failed I/O JBOD module.  Figure 16-4. The MSB and LSB switches on the SpinStor JBOD

17.0 SpinStor Power Supplies

This chapter provides information about replacing the power supplies for the SpinStor RAID and JBOD disk enclosures. The power supplies are accessible from the rear panel of the SpinStor enclosures.

17.1 Identifying Failed Power Supplies

The green OUTPUT GOOD LED is illuminated when the power supply is functioning properly. The yellow FAULT LED is illuminated when:

- Power is not being supplied by the power supply unit.
- The power supply unit is turned off with the switch in an operating chassis.
- The AC power is removed from a power supply unit in an operating chassis.

If the FAULT LED on the power supply is illuminated, verify the following:

- All power supply power cords are properly plugged into the power distribution unit (PDU).
- The PDU is plugged into a grounded wall outlet and switched on.
- The power supply unit is switched on.
- The circuit breaker on the PDU is not tripped.

If these conditions are met and FAULT LED on the power supply is still illuminated, replace the power supply.

17.2 Replacing the SpinStor Power Supplies

When a power supply fails in a RAID or JBOD disk enclosure, replace the unit quickly.

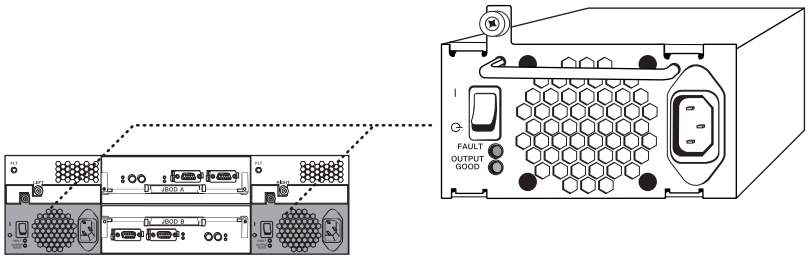
Note: The power supplies can be hot swapped. You do not need to power down the system to replace a power supply in the RAID or JBOD disk enclosures.

Important: Only one power supply unit can be replaced at a time in a RAID or JBOD disk enclosure.

Warning: The power supply units for SpinStor products have detachable power cords. Disconnect the power cord at the power supply unit before removing the power supply unit from the enclosure. When installing a power supply unit, insert the power supply unit into the enclosure before connecting the power cord.

Warnung: Die Netzteile für SpinStor-Produkte sind mit abnehmbaren Stromkabeln ausgestattet. Das Stromkabel zuerst vom Netzteil herausziehen und dann das Netzteil aus dem Gehäuse entfernen. Beim Installieren eines Netzteils muss dieses zuerst in das Gehäuse eingesetzt und dann das Netzkabel angeschlossen werden.

To replace a power supply unit in either a RAID or JBOD disk enclosure, follow these steps:

Step	Action
1	Remove the power cord that is attached to the failed power supply unit.
2	Loosen the thumb screw that secures the unit to the enclosure.  Figure 17-1. Replace a power supply unit.
3	Using the power supply unit handle, pull the power supply out of the enclosure.
4	Slide the new power supply unit into the enclosure and secure it by tightening the thumb screw.
5	Attach the power cord to the replacement power supply unit and turn it on with the switch.

18.0 UPS

This chapter provides information about replacing the UPS. The SpinServer can be connected to a 120-volt UPS or a 208-volt UPS.

You must connect the SpinServer to a UPS to protect the NVRAM. Each SpinServer in the system must be connected to an individual UPS. Do not plug any other system equipment into the UPS that is connected to a SpinServer.

18.1 Identifying the Failed UPS

When the UPS is supplying utility power to the connected SpinServer, the on-line LED is illuminated. During on-battery operation, the on-battery LED is illuminated. If neither the on-line LED or the on-battery LED is illuminated, one of the following has occurred:

- The battery needs to be replaced.
- The battery need to be recharged.
- The input voltage from your electrical utility is extremely low.
- The UPS has failed.

If the battery is functioning normally and the utility input voltage is in the normal and adequate range, the UPS has failed and must be replaced.

Note: If the UPS battery has failed, the UPS must be replaced. The UPS battery is not an FRU.

To check the battery and the utility input voltage, follow the procedures described in this section.

Checking the UPS Battery

The 120-volt and the 208-volt UPS perform a self-test of the battery when initially powered on. The self-test is automatically performed every two weeks thereafter. During the self-test, the UPS briefly operates the system equipment that is connected to it on battery power. If the UPS passes its self-test, the system equipment is returned to online operation.

If the UPS battery fails the self-test, the UPS emits an alarm of short beeps for one minute, and the Replace Battery LED is illuminated. (The UPS repeats the alarm every five hours.) The UPS immediately returns the system equipment to online operation. The connected equipment is not affected by a failed self-test by the UPS.

Note: If the Replace Battery LED flashes, the battery is disconnected.

Note: To manually perform a self-test, press and hold the **On** button on the front panel of the UPS for a few seconds.

Recharging the Battery

The battery needs to be recharged if it fails a self-test or if battery exhaustion occurs because of continuous use.

Failed Self-Test

When the UPS fails a self-test, recharge the battery for 24 hours and perform another self-test. If it fails the self-test again, the battery must be replaced.

Continuous Use

When the UPS operates for an extended length of time on battery power and the energy reserve of the battery runs low, the UPS beeps continuously (by default) until the UPS shuts down from battery exhaustion or returns the system equipment to normal online operation.

Recharge the battery for 24 hours and perform a self-test. If it fails the self-test, the battery must be replaced.

Assessing Low Voltage

To determine if the UPS has failed because of extremely low voltage from your electrical utility, follow these steps:

1. Ensure that the UPS is plugged into AC inlets.

2. Press and hold the **On** button to view the **Utility Voltage** bar graph on the right side of the front panel of the UPS.

After a few seconds, the **Utility Voltage** bar graph LEDs display the input voltage. If no LEDs are illuminated when the UPS is plugged into AC inlets, the line voltage is extremely low.

Important: If all five of the **Utility Voltage** bar graph LEDs are illuminated, the input voltage is extremely high and must be checked by an electrician.

18.2 Tools and Equipment

To replace a UPS, you need the following tools and equipment:

- Flat-blade screwdriver
- Antistatic wrist strap and grounding leash
- Mechanical assistance is required to remove the 208-volt UPS from the equipment rack.

18.3 Replacing the 120-Volt UPS

When replacing the 120-volt UPS, follow this safety guideline.

Warning: The 120-volt UPS chassis requires at least two people to lift and handle the chassis. When lifting the chassis, handle it in such a way that the weight is evenly distributed and stabilized. Follow national or regional safety standards when lifting or repositioning any SpinServer system components.

Warnung: Zum Anheben und Handhaben des 120 Volt USV-Chassis sind mindestens zwei Personen erforderlich. Das Gewicht des Chassis sollte beim Anheben gleichmäßig verteilt und stabilisiert werden. Beim Anheben oder Neupositionieren aller SpinServer-Systemkomponenten sind die anwendbaren Sicherheitsstandards zu beachten.

Note: If the UPS battery is functioning normally, it can be reused in the replacement UPS.

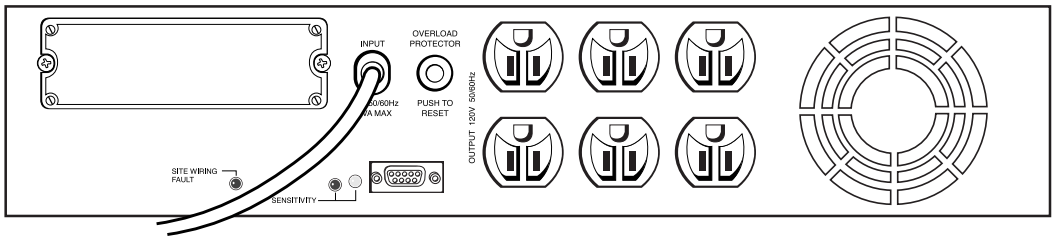
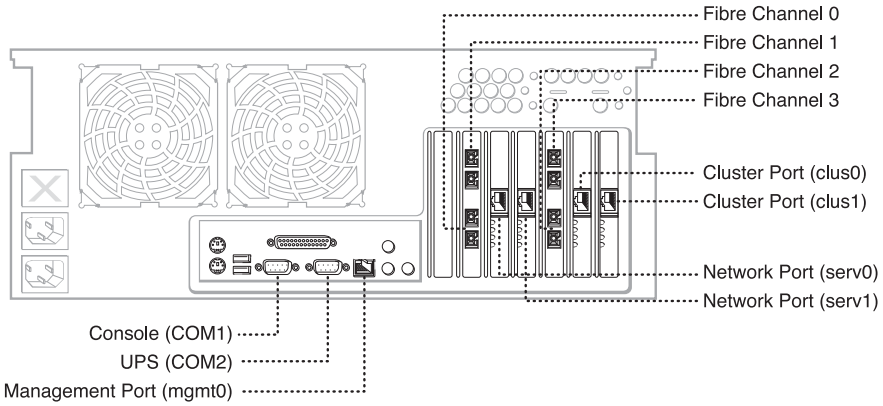
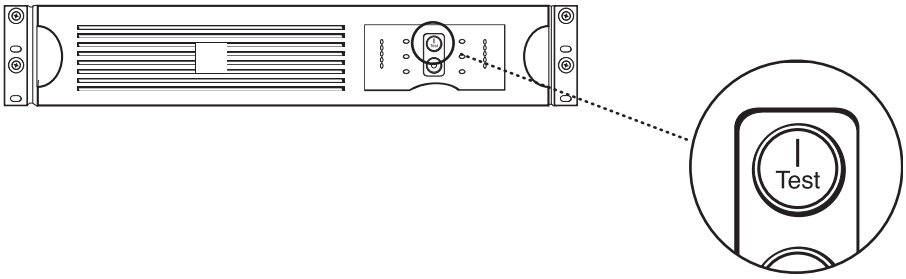


Figure 18-1. Rear view of the 120-volt UPS:

Note: Before beginning the procedure to replace the UPS, disconnect the SpinServer power cords from the rear panel of the UPS.

To replace 120-volt UPS, follow these steps:

Step	Action
1	Shut down the SpinServer. See the “SpinServer Shutdown” chapter on page 19 for the proper procedures for shutting down the SpinServer.
2	Disconnect the serial cable from the SpinServer COM2 port.  Figure 18-2. SpinServer serial cable is disconnected from the COM2 port.
3	Disconnect the power cord from the SpinServer.
4	Turn off the power for the UPS by pressing and releasing the lower **O** button.
5	Unplug the power cord to the UPS.
6	Remove the UPS front bezel by grasping the curved section on each side of the bezel and pulling the bezel toward you.
7	With the front bezel removed, disconnect the UPS battery by grasping the white cord attached to the battery leads and firmly pulling the cord toward you.
8	With two people working together, remove the UPS from the equipment rack. Set the failed UPS aside.
9	With two people working together, install the replacement UPS into the equipment rack.
10	Connect the battery leads to the battery pack, which is to the right of the battery door and slightly recessed. Connect the red wire to the positive (+) terminal and the black wire to the negative (-) terminal.
11	Push firmly until the connector snaps together. **Important:** Small sparks at the battery connectors are normal during reconnection of the wires.
12	Plug the UPS power cord back into the power source.

Step	Action
13	Replace the front bezel onto the front panel.
14	Reconnect the UPS serial cable to the SpinServer COM2 port and connect the SpinServer power cord.
15	Turn on the UPS by pressing and releasing the **| Test** button. The UPS performs a self-test when powering up.  Figure 18-3. Press the **|Test** power button on the 120 volt UPS.

18.4 Replacing the 208 Volt UPS

When replacing the 208-volt UPS, follow this safety guideline.

Warning: The 208-volt UPS chassis requires mechanical assistance to lift and handle the chassis. When lifting the chassis with mechanical assistance, handle it in such a way that the weight is evenly distributed and stabilized. Follow national or regional safety standards when lifting or repositioning any SpinServer system components.

Warnung: Das 208 Volt USV-Chassis muss mit mechanischen Hilfsmitteln angehoben und gehandhabt werden. Das Gewicht des Chassis sollte beim Anheben mit mechanischer Unterstützung gleichmäßig verteilt und stabilisiert werden. Beim Anheben oder Neupositionieren aller SpinServer-Systemkomponenten sind die anwendbaren Sicherheitsstandards zu beachten.

Note: If the UPS battery is functioning normally, it can be reused in the replacement UPS.

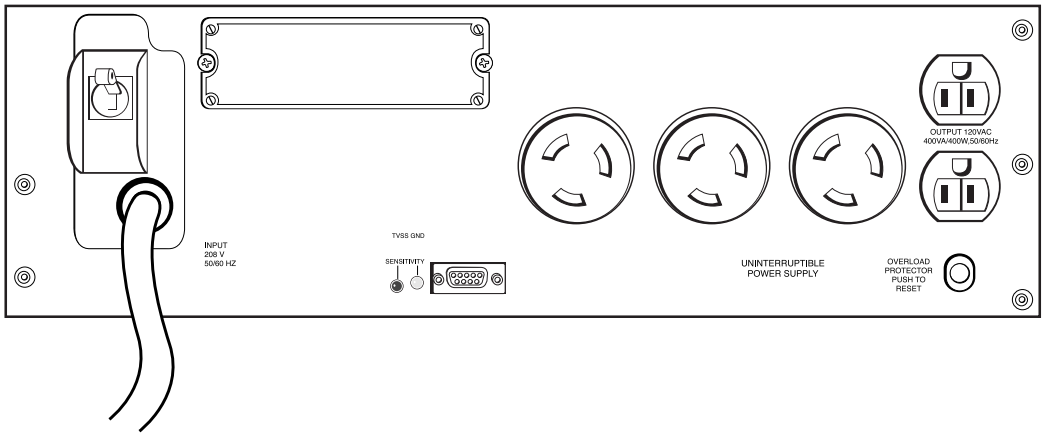
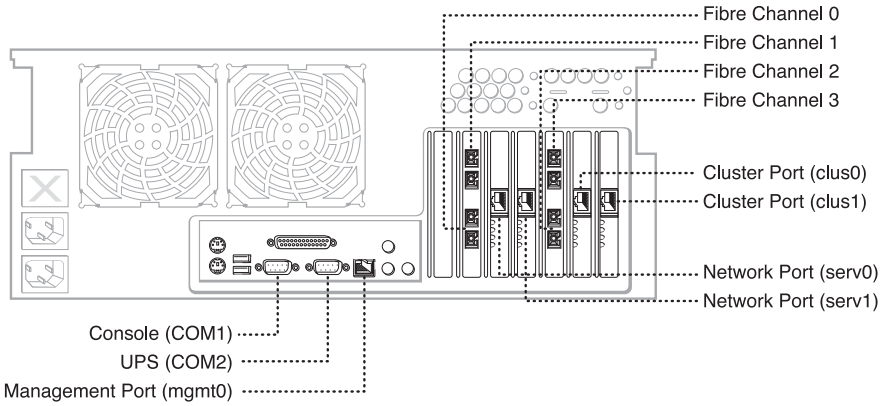


Figure 18-4. Rear view of the 208-volt UPS

Note: Before beginning the procedure to replace the UPS, disconnect the SpinServer power cords from the rear panel of the UPS.

To replace the 208-volt UPS, follow these steps:

Step	Action
1	Shut down the SpinServer. See the “SpinServer Shutdown” chapter on page 19 for the proper procedures for shutting down the SpinServer.
2	Disconnect the serial cable from the SpinServer COM2 port.  Figure 18-5. SpinServer serial cable is disconnected from the COM2 port.
3	Disconnect the power cord from the SpinServer.
4	Turn off the power for the UPS by pressing and releasing the lower **O** button.
5	Unplug the power cord to the UPS.
6	Remove the UPS front bezel by grasping the curved section on each side of the bezel and pulling the bezel toward you.
7	With front bezel removed, use a flat blade screwdriver to remove the two battery door screws. Open the battery door.

Step	Action
8	Disconnect the battery leads by grasping the battery connector and firmly pulling the battery connector toward you.
9	Close and secure the battery door by replacing the screws.
10	Remove the UPS from the equipment rack. Set the failed UPS aside.
11	Install the replacement UPS into the equipment rack.
12	Remove the front bezel and open the battery door. Refer to Steps 5 and 6.
13	Connect the battery leads to the battery pack. Connect the red wire to the positive (+) terminal and the black wire to the negative (-) terminal.
14	Push firmly until the connector snaps together. **Important:** Small sparks at the battery connectors are normal during reconnection of the wires.
15	Close and secure the battery door by replacing the screws.
16	Plug the UPS power cord into the power source.
17	Replace the front bezel.
18	Reconnect the UPS serial cable to the SpinServer COM2 port and connect the SpinServer power cord.
19	Turn on the UPS. Press and release then the **`| Test`** button. The UPS performs a self-test when powering up.

19.0 Appendix A: Field Replaceable Units

This appendix provides descriptions and part numbers for the FRUs.

19.1 SpinServer FRUs

The following table lists the SpinServer FRUs and the part number for each FRU.

Table 19-1. SpinServer FRU Part Numbers

Part Number	Description
1300-0006-01	1GB DIMM Memory Module (128MX72, CL2, PC133)
2030-0003-01	Null Modem Serial Cable (DB9F TO DB9F, 10FT, Shielded)
2060-0018-01	10/100/1000 Network Interface Adapter (Copper Interface) **Note:** This part number must be used for replacement in SpinServer part number 2106-0005-01. The SpinServer part number can be found on the product identification label located on the rear of the chassis.
2060-0018-02	10/100/1000 Network Interface Adapter (Copper Interface) **Note:** This part number must be used for replacement in SpinServer part number 2106-0005-02. The SpinServer part number can be found on the product identification label located on the rear of the chassis.
2062-0019-01	Fibre Channel Adapter (1.0625 Gbs/s, DUAL ISP2200A, Duplex SC 850NM)
2080-0013-01	Rear Exhaust Fan Assembly for SS3300 (Hot Swappable)
2080-0014-01	Front Intake Fan Assembly for SS3300 (Hot Swappable)
2082-0012-01	SpinServer AC Power Supply (Hot Swappable)
2082-0015-01	18.3 GB/10k RPM SS3300 Integral ULTRA SCSI Disk Drive Assembly with carrier

Table 19-1. SpinServer FRU Part Numbers

Part Number	Description
2104-0005-02	Spare SpinServer 3300 Chassis w/ Motherboard/2X 1.26GHZ P3 only

19.2 SpinStor FRUs

The following table lists the SpinStor FRUs and the part number for each FRU.

Table 19-2. SpinStor FRU Part Numbers

Part Number	Description
0661-0001-01	1 Meter, DB-9 TO DB-9 Copper FC Cable
0661-0001-02	10 Meter, DB-9 TO DB-9 Copper FC Cable
0661-0002-01	3 Meter, Duplex SC Plug (850NM, MM, 50/125)
0661-0002-02	15 Meter, Duplex SC Plug (850NM, MM, 50/125)
1306-0001-01	Copper DB-9 GBIC (1.0625 GBITS/SEC)
1306-0003-01	Fiber SC Duplex GBIC (1.0625 GB/S, 850 NM Multimode)
2082-0006-01	SpinStor AC Power Supply (12V/30A OUTPUTS 645W 30SEC, Hot Swappable)
2082-0004-03	146 GB/10k RPM SpinStor Fibre Channel Disk Drive w/Carrier
2082-0007-01	SpinStor Left Blower Assembly JBOD/RAID (Hot swappable)
2082-0008-01	SpinStor Right Blower Assembly JBOD/RAID (Hot swappable)
2082-0009-01	JBOD I/O SpinStor Module Assembly
2082-0010-01	RAID B SpinStor Module Assembly
2082-0011-01	RAID A SpinStor Module Assembly
2101-0003-02	Spare SpinStor JBOD/RAID Chassis with Backplane only

19.3 UPS FRUs

The following table lists the UPS FRUs and the part number for each FRU.

Table 19-3. UPS FRU Part Numbers

Part Number	Description
1334-0001-01	120 VAC UPS - 1000VA/670W OUT, 1X 6 FT Input Cord W/NEMA 5-15P, Nonlocking Plug
1334-0002-01	208 VAC UPS - 3000VA/2250W OUT, 1X 6 FT Input Cord W/NEMA L6-20P Locking Plug

20.0 Appendix B: Technical Assistance Center

20.1 Contacting Technical Support

You can contact Spinnaker's Technical Assistance Center (TAC) 24 hours a day and seven days a week. Use the three methods listed here.

Internet

Access TAC from the home page at www.spinnakernet.com

Email

Send email queries to Spinnaker TAC at:

support@spinnakernet.com

Phone

In North America, call Spinnaker TAC toll free at:

1-866-SPINNET or 1-866-774-6638

After you are connected, press 1 through the automated attendant to reach TAC.

Outside North America, call:

+1-412-968-SPIN or +1-412-968-7746

20.2 SpinServer Information

When calling Spinnaker's TAC, it is important to have available the information in the following table.

For future reference, record the information from your customer order form. This information is also available from the GUI on your SpinServer.

Support contract ID (if applicable)	
SpinServer chassis serial number	
Software version	
File system access protocol used	
Description of hardware setup	
Hardware interfaces	
Number of disk arrays attached	
Number of SpinStor RAID	
Number of SpinStor JBOD	

21.0 EMC Statements

The following statements of electromagnetic compatibility (EMC) are given for the SpinServer and the SpinStor.

21.1 FCC Class A

The SpinServer and SpinStor comply with the Class A Federal Communications Commission (FCC) rule stated below:

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.

21.2 ICES-003 Class A

The SpinServer and SpinStor comply with the Class A Interference-Causing Equipment Standard (ICES-003) rule stated below:

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

22.0 Regulatory Compliance Review

This chapter provides information about the regulatory compliance reviews for the SpinServer, SpinStor RAID, and SpinStor JBOD.

22.1 Regulatory Summary for the SpinServer

The regulatory summary for the SpinServer is listed in the following table:

Table 22-1. Regulatory Summary for the SpinServer

Safety	
USA	UL Listed UL60950
Canada	C-UL Listed CAN/CSA-C22.2 No. 60950
EU	CE Marking 73/23/EEC EN60950
Emissions	
USA	FCC CFR47 Part 15 Class A
Canada	ICES-003 Class A
EU	CE Marking 89/336/EEC EN55022 Class A EN61000-3-2 EN61000-3-3

Table 22-1. Regulatory Summary for the SpinServer

Immunity	
EU	CE Marking 89/336/EEC EN55024 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-8 EN61000-4-11

22.2 Regulatory Summary for the SpinStor RAID and SpinStor JBOD

The regulatory summary for the SpinStor RAID and SpinStor JBOD is listed in following table:

Table 22-2. Regulatory Summary for the SpinStor

Safety	
USA	TUV-US Certified UL1950
Canada	C-TUV Certified CAN/CSA-C22.2 No. 950
EU	CE Marking 73/23/EEC EN60950
Emissions	
USA	FCC CFR47 Part 15 Class A
Canada	ICES-003 Class A
EU	CE Marking 89/336/EEC EN55022 Class A EN61000-3-2 EN61000-3-3

Table 22-2. Regulatory Summary for the SpinStor

Immunity	
EU	CE Marking 89/336/EEC EN55024 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-11

22.3 EU Declarations of Conformity

Declarations of conformity are given below for the SpinServer and the SpinStor.

SpinServer EU Declaration of Conformity

The SpinServer EU declaration of conformity is listed in the following table.

Table 22-3. SpinServer EU Declaration of Conformity

Declaration of Conformity	
Application of Council Directives	73/23/EEC Low Voltage Directive 89/336/EEC Electromagnetic Compatibility Directive
Standards to Which Conformity is Declared	EN60950 EN55022 Class A EN61000-3-2 EN61000-3-3 EN55024 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-8 EN61000-4-11
Manufacturer's Name and Address	Spinnaker Networks, LLC 301 Alpha Drive Pittsburgh, PA, USA 15238-2907
Type of Equipment	Server (Information Technology Equipment)

Table 22-3. SpinServer EU Declaration of Conformity

Declaration of Conformity	
Model Information	SpinServer 3300 Model 200 Part Number 2106-0005-01
Year Of Manufacture	2002 and later
The undersigned hereby declares that the above named equipment conforms to the above Directives and Standards.	
Date	August 16, 2002
Location	Pittsburgh, PA, USA
Name	Ben Speiser
Signature	Signature on file
Title	Vice President of Hardware Engineering

SpinStor EU Declarations of Conformity

The SpinStor EU declarations of conformity are listed in the following tables. Information is given about the following:

- SpinStor RAID-36 and JBOD-36
- SpinStor RAID-146 and JBOD-146
- SpinStor RAID-73 and JBOD-73

Table 22-4. SpinStor RAID-36 and JBOD-36 EU Declaration of Conformity

Declaration of Conformity	
Application of Council Directives	73/23/EEC Low Voltage Directive 89/336/EEC Electromagnetic Compatibility Directive
Standards to Which Conformity is Declared	EN60950 EN55022 Class A EN61000-3-2 EN61000-3-3 EN55024 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-11

Table 22-4. SpinStor RAID-36 and JBOD-36 EU Declaration of Conformity

Declaration of Conformity	
Manufacturer's Name and Address	Spinnaker Networks, LLC 301 Alpha Drive Pittsburgh, PA, USA 15238-2907
Type of Equipment	Storage System (Information Technology Equipment)
Model Information **(36 GB Disk Drives)**	SpinStor JBOD-36: Part Number 2104-0003-01 SpinStor RAID-36: Part Number 2104-0004-01
Year Of Manufacture	2002 and later
The undersigned hereby declares that the above named equipment conforms to the above Directives and Standards.	
Date	August 16, 2002
Location	Pittsburgh, PA, USA
Name	Ben Speiser
Signature	Signature on file
Title	Vice President of Hardware Engineering

Table 22-5. SpinStor RAID-146 and JBOD-146 EU Declaration of Conformity

Declaration of Conformity	
Application of Council Directives	73/23/EEC Low Voltage Directive 89/336/EEC Electromagnetic Compatibility Directive
Standards to Which Conformity is Declared	EN60950 EN55022 Class A EN61000-3-2 EN61000-3-3 EN55024 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-11
Manufacturer's Name and Address	Spinnaker Networks, LLC 301 Alpha Drive Pittsburgh, PA, USA 15238-2907

Table 22-5. SpinStor RAID-146 and JBOD-146 EU Declaration of Conformity

Declaration of Conformity	
Type of Equipment	Storage System (Information Technology Equipment)
Model Information **(146 GB Disk Drives)**	SpinStor JBOD-146: Part Number 2104-0003-04 SpinStor RAID-146: Part Number 2104-0004-04
Year Of Manufacture	2002 and later
The undersigned hereby declares that the above named equipment conforms to the above Directives and Standards.	
Date	November 6, 2002
Location	Pittsburgh, PA, USA
Name	Ben Speiser
Signature	Signature on file
Title	Vice President of Hardware Engineering

Table 22-6. SpinStor RAID-73 and JBOD-73 EU Declaration of Conformity

Declaration of Conformity	
Application of Council Directives	73/23/EEC Low Voltage Directive 89/336/EEC Electromagnetic Compatibility Directive
Standards to Which Conformity is Declared	EN60950 EN55022 Class A EN61000-3-2 EN61000-3-3 EN55024 EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-5 EN61000-4-6 EN61000-4-11
Manufacturer's Name and Address	Spinnaker Networks, LLC 301 Alpha Drive Pittsburgh, PA, USA 15238-2907
Type of Equipment	Storage System (Information Technology Equipment)

Table 22-6. SpinStor RAID-73 and JBOD-73 EU Declaration of Conformity

Declaration of Conformity	
Model Information **(73 GB Disk Drives)**	SpinStor JBOD-73: Part Number 2104-0003-03 SpinStor RAID-73: Part Number 2104-0004-03
Year Of Manufacture	2002 and later
The undersigned hereby declares that the above named equipment conforms to the above Directives and Standards.	
Date	January 17, 2003
Location	Pittsburgh, PA, USA
Name	Ben Speiser
Signature	Signature on file
Title	Vice President of Hardware Engineering

22.4 Emissions Statements for the SpinServer and the SpinStor

The FCC Class A and the ICES-003 Class A emissions statements are given below.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

Note: 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.

Note: Any changes or modifications to this equipment not expressly approved by Spinnaker Networks, LLC, may void the user's FCC granted authority to operate the equipment.

ICES-003 Class A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

22.5 Class 1 Laser Statement for the SpinServer and the SpinStor

Warning: CLASS 1 LASER PRODUCT

Warnung: LASER KLASSE 1 PRODUKT

Warning: Lasers emit invisible radiation from the aperture opening when no fiber-optic cable is connected. When removing cables do not stare into the open apertures. In addition, install protective aperture covers to fiber ports with no cable connected.

Warnung: Laser strahlen unsichtbare Strahlung von der Blendonöffnung Öffnung aus, wenn kein Glasfaserkabel angeschlossen wird. Wenn Sie Kabel löschen, starren Sie nicht in die geöffneten Blendenöffnungen an. Zusätzlich installieren Sie schützende Blendenöffnung Abdeckungen zu den Faserkanälen ohne das angeschlossene Kabel.

23.0 Glossary

CIFS - The Common Internet File System is a protocol that defines a standard for client systems to request file services from server systems over a network. CIFS is based on the Standard Server Message Block (SMB) protocol, which is widely used by personal computers and workstations running a vast variety of operating systems.

CIM - The Common Information Model is an object-oriented model that provides a conceptual framework for describing management data.

COM 1 - COM 1 is the name of the leftmost serial communications port on the SpinServer, which is used to access the command line interface of the SpinServer.

COM 2 - COM 2 is the name of the rightmost serial communications port on the SpinServer and is used to attach the SpinServer to the UPS.

DIMM - A Dual In-line Memory Module is a small circuit board that holds memory chips.

CLI - The command line interface is the command version of the SpinServer management interface software.

FC - Fibre Channel is a set of standards, completely developed through industry cooperation, for a serial I/O bus capable of transferring data between two ports at up to 100 MB/second. Fibre Channel supports point-to-point, arbitrated loop, and switched topologies.

Gb - Gigabit is used describe data transfer rates between two entities on a network. In this context, it refers to one billion bits. Network data transfer rates are often measured in gigabits per second (Gbps).

GB - Gigabyte is a unit of measure for data storage on computer systems. One gigabyte (GB) is equal to 1,024 megabytes (MB).

GBICs - Gigabit Interface Converters are transceivers that convert between electrical signals used by host bus adapters (and similar Fibre Channel and Ethernet devices) and either electrical or optical signals suitable for transmission.

GbE - Gigabit Ethernet: A group of Ethernet standards in which data is transmitted at 1 Gb per second.

GUI - The Graphical User Interface is the graphical browser version of the SpinServer management interface software.

HBA - Host Bus Adapter is an I/O adapter that connects a host I/O bus to a computer's memory system.

HTML - Hypertext Markup Language is the authoring language used to create documents that can be displayed on a web browser page.

ICMP - Internet Control Message Protocol is an extension to the Internet Protocol (IP). ICMP supports packets containing error, control, and informational messages.

inode - Inodes are data structures that contain information about files in UNIX file systems. In the file system where each file resides, each file has an inode and is identified by an inode number (i-number). Inodes provide information on files, including user and group ownership, access mode (read, write, or execute permissions) and type. Inodes are created when a file system is created. There are a set number of inodes, which indicates the maximum number of files the system can hold. A file's inode number can be found using the **`ls -i`** command. The **`ls -l`** command retrieves inode information.

I/O - Input/Output is used to describe any program, operation or device that transfers data between a computer and a peripheral device.

IP - Internet Protocol specifies the format of packets (datagrams) and the addressing scheme. Most networks combine IP with a higher-level protocol, such as TCP or UDP, which establishes a virtual connection between a destination and a source.

JBOD - Just a Bunch of Disks. A storage subsystem using multiple independent disk drives that are not configured according to the RAID system. The expansion disk enclosure in a SpinServer system is a JBOD enclosure.

Kerberos - A network authentication protocol developed at the Massachusetts Institute of Technology. Kerberos uses encryption keys to provide authentication for client/server applications. Authentication provides verification of a user's or process's identity to a server. See also **principal**, **SPN (Service Principal Name)**.

LED - Light emitting diode is an electronic device that lights up when electricity is passed through it.

LSB - Least Significant Bit is the second rotary switch, located at the back of the expansion JBOD, that is used to set disk drive IDs. It has settings of 0 - F.

Mb - Megabit is used to describe a volume of data storage. 1 Mb = 1,024 kilobits (Kb). It is also used to describe data transfer rates on a network. In this context, it refers to one million bits. Networks are often measured in megabits per second (Mbps).

MB - Megabyte is a unit of measure for data storage on computer systems. One megabyte is equal to 1,048,576 (2 to the 20th power) bytes of data.

MHz - Megahertz is the unit of measurement of the speed of microprocessors, called the clock speed. One MHz represents one million cycles per second.

MSB - Most Significant Bit is the first rotary switch, located at the back of the expansion JBOD, that is used to set the base address for the disk drive IDs. It has settings of 0 - 7.

NDMP - Network Data Management Protocol defines a common architecture for the way heterogeneous file servers on a network are backed up. The protocol allows the creation of a common agent used by the central back-up application to back up different file servers running different platforms and platform versions.

NICs - Network Interface Cards are expansion boards that enable network connections for a PC or server.

NIS - Network Information Service provides a simple network lookup service consisting of databases and processes. Its purpose is to provide information that needs to be available to the entire network, such as login names, passwords, home directories and group information.

NIS+ - Network Information Service Plus was designed to address security problems that NIS cannot address. (There is no relation between NIS+ and NIS. The commands and the overall structure of NIS+ are different from NIS.) NIS+ increases security by using an additional authentication method. Users have a standard login password, which gives them access to the system, and an additional secure or network password.

NFS - Network File System is a client/server application that allows all network users to access shared files stored on computers of different types.

NVRAM - Non-Volatile Random Access Memory, a type of memory that retains its contents when the power is turned off.

PDF - Portable Document Format is a file format developed by Adobe Systems that provides an electronic photocopy of a document. PDF captures formatting information from a variety of desktop publishing applications, making it possible to send documents electronically and have them appear on the recipient's monitor, or in printed form, as the writer intended the documents to appear. To view a file in PDF format, you need Adobe Acrobat Reader, a free application distributed by Adobe Systems.

PDU - Power Distribution Units are appliances that provide power connections to system components with high voltage requirements.

Principal - In Kerberos, a principal is a unique identity to which Kerberos can assign tickets. An example Kerberos principal is **susan/admin@SECURITY.EXAMPLE.COM**.

RAID - Redundant Array of Independent Disks is a disk enclosure with RAID controllers. The SpinServer supports RAID levels 0, 1, 3, 5, and 0+1. A RAID set is a group of disks in which the disks independently operate, the data strip size is no smaller than the exported block size, and parity check data is distributed across the array's disks.

SCSI - Small Computer System Interface is a parallel interface standard used by computer systems for attaching peripheral devices, such as disk drives and printers.

SES - The SCSI Enclosure Services manager reports the operational status of disk drives to the RAID controllers.

SP - A Storage Pool is the logical view, as it appears to users, of the compartmentalization of physical storage disks.

SPN - In Kerberos, a Service Principal Name is the name by which a client uniquely identifies an instance of a service.

SSH - Secure Shell is a program used to log into another computer over a network to securely execute commands from a remote machine, and to move files from one machine to another. It was developed by SSH Communications Security Ltd.

TCP - Transmission Control Protocol is a transport protocol. Where the UDP protocol handles only packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP is more reliable than UDP, but slower.

U - One Unit of height in an equipment rack. 1 U = 1.75 inches = 4.45 cm.

UDP - User Datagram Protocol is a connectionless protocol that runs on top of IP networks like TCP. Unlike TCP, UDP provides very few error recovery services, offering instead a direct way to send and receive datagrams over an IP network. It is used primarily for broadcasting messages over a network. UDP is faster than TCP, but less reliable.

UPS - Uninterruptible Power Supply is an appliance that provides power security, with battery power, in the event of a power failure.

VFS - A Virtual File System is the primary unit of data storage in the SpinServer system.

WINS - The Windows Internet Naming Service supports network clients and servers running Windows. WINS uses a distributed database that is automatically updated with the names of computers currently available on a Windows Network and the IP address assigned to each one. The SpinServer has the ability to register its CIFS servers with the WINS servers that are defined in the SpinServer system.