



SANnet II 200 SATA Array Quick Installation Guide

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CHAPTER 1

Getting Started

This guide provides basic instructions on how to unpack and connect your SANnet II 200 SATA array, also referred to as the SATA array.



Figure 1-1 SANnet II 200 SATA Array (Front View)

This chapter includes the following topics:

- “Refer to Your Release Notes” on page 1-2
- “Site Planning” on page 1-2
- “Unpacking the Array” on page 1-2
- “Related Documentation” on page 1-3
- “Mounting the Array in Racks and Cabinets” on page 1-3
- “What to Do Next” on page 1-13

1.1 Refer to Your Release Notes

Refer to the *SANnet II 200 SATA and SATA SE Array Release Notes* to see late-breaking information including required patches and supported hardware and software. The release notes and other documentation for this product are available online at:

<http://www.dothill.com/manuals>

1.2 Site Planning

Refer to the *SANnet II 200 FC, SATA, and SATA SE Array Installation, Operation, and Service Manual* to see detailed information about preinstallation site planning. Fill out the preinstallation worksheet before you unpack and set up your array.

1.3 Unpacking the Array

Follow these guidelines for unpacking the equipment.



Caution – Always use two people to remove the unit from its container, to avoid personal injury or damage to the equipment during installation. This unit weighs approximately 60 pounds (27 kg).

1. Select a suitable area for unpacking.
2. Store all packing material and boxes for possible equipment returns.
3. Check the Contents Sheet in your product package.

The Contents Sheet summarizes the standard contents for your product.
4. Compare the packing slip and the list of parts with the items you received.

If the list of parts on your packing slip does not match the items you received, or any items appear damaged, immediately notify your carrier agent and the supplier who prepared your shipment.
5. Carefully examine the cables provided in the package.

If any cable appears to be damaged, contact the Technical Service department for an immediate replacement.
6. To complete the installation, you must provide a minimum of one fiber-optic cable per host to connect a host to a RAID array. Two fiber-optic cables are required for a redundant path configuration.

To obtain qualified cables, consult your Dot Hill sales representative.

1.4 Related Documentation

Your SANnet II 200 SATA array package contains the manuals listed below in PDF format. The book part number is used for the PDF filename assigned to each book.

Title	Part Number
<i>SANnet II 200 FC, SATA, and SATA SE Array Release Notes</i>	83-00003262
<i>SANnet II 200 FC and SATA Array Best Practices Manual</i>	83-00003263
<i>SANnet II 200 FC, SATA, and SATA SE Array Installation, Operation, and Service Manual</i>	83-00003261
<i>SANnet II Family RAID Firmware 4.1x User's Guide</i>	83-00003435
<i>SANnet II Family Safety, Regulatory, and Compliance Manual</i>	83-00002666
<i>SANnet II Family FRU Installation Guide</i>	83-00002708
<i>SANnet II Family Rack Installation Guide for 2U Arrays</i>	83-00002365

1.5 Mounting the Array in Racks and Cabinets

This section describes mounting SANnet II 200 family arrays in supported racks and cabinets. To physically mount your array, follow the instructions that came with the mounting kit or those found in the *SANnet II 200 Family Rack Installation Guide for 2U Arrays*, located on your CD and on the product web site.

Topics covered in this chapter include:

- “Overview of Rackmount Kits” on page 1-3
- “Required Site and Chassis Preparation” on page 1-4
- “One-Person Installation Requirements” on page 1-4
- “Reviewing the Tools” on page 1-4
- “What to Do Next” on page 1-13

1.5.1 Overview of Rackmount Kits

For late-breaking news about additional supported racks and cabinets, refer to the Release Notes for the model of the array that you are installing. You can find the Release Notes at:

<http://www.dothill.com/manuals/>

Tip – The instructions in this guide can save you a lot of time if you read them carefully. The entire assembly procedure should take less than 30 minutes if you follow all the instructions provided in this guide.

*SANnet II 200 family arrays support the following:

- Standard 19-inch EIA Rack Cabinets
- Standard 19-inch Telco Racks (flushmount and center of gravity)

1.5.2 Required Site and Chassis Preparation

Before mounting the arrays in a rack, be sure to check your site location and confirm that you have cables with adequate lengths to connect to servers and to power outlets.



Caution – We recommend that two people install each array. One person can install the array if the rail kit contains front and rear brackets with flanges that provide support.

1.5.3 One-Person Installation Requirements

Two people should install each array; however, one person can install the array:

- In a cabinet if the rail kit contains front and rear brackets with flanges that provide support
- In a Telco rack if the person has an appropriate equipment lift that can ensure safety and ease of installation

For a one-person installation, remove the power supplies and disk drives to reduce weight and to be safe. If possible, position the array on top of another device or shelf in the rack to hold the unit as you attach all the brackets.



Caution – If you have only one person to perform the installation in a cabinet and do not have rear brackets with flanges or special equipment lift, you must remove the power supplies and hard disk drives from the array before installing the array in a rack.

To reduce the weight of the array during the rackmounting procedure, refer to the *SANnet II Family FRU Installation Guide* for your array, and follow instructions on removing drives and power supplies. A fully populated array weighs over 50 pounds; an array without drives and power supplies weighs about 30 pounds.

1.6 Reviewing the Tools

The following tools are used to complete this procedure:

- Medium Phillips screwdriver
- Allen wrench (provided; used with 6-mm screws and #12-24 x 3/8-inch sockethead screws)



Caution – Do not use any power tools with any procedures. Power tools may strip or damage connections.

Note – It is possible for customer-supplied racks to have several different sizes of threaded holes. Rackmount kits have several different sizes of panhead screws and socket-head screws in order to fit these different racks. Sockethead screws are supplied for the front mounting ears when the diameter of the screw is too large for panhead screws to fit.

1.6.1 Cabinet Mounting

This section explains how to mount SANnet II 200 family arrays using adjustable mounting brackets for depth ranges between 22 to 36 inches (55.88 to 91.44 cm).

The topics covered are:

- “Reviewing the Components” on page 1-6
- “Installing the Array into a Cabinet” on page 1-9



Caution – If you only have one person to perform the installation and do not have rear brackets with flanges, you must remove the power supplies and hard disk drives from the array before installing the array in a rack, and if possible position the array on top of another device or shelf in the rack to hold the unit as you attach all the brackets.

To reduce the weight of the array during the rackmounting procedure, refer to the *SANnet II Family FRU Installation Guide*, and follow instructions on removing drives and power supplies. A fully populated array weighs over 50 pounds; an array without drives and power supplies weighs about 30 pounds.

1.6.2 Reviewing the Components

The following figure displays a completed installation of an array in a cabinet.

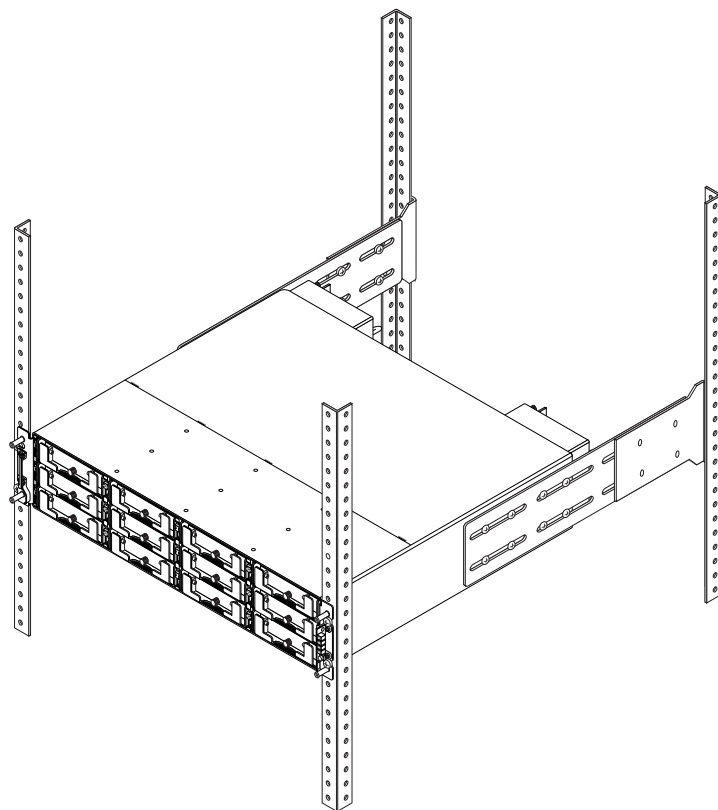


Figure 1-2 Rackmounted Cabinet Array With Chassis Ears and Bezels Removed, After Installation

Before mounting the SANnet II 200 family array into a cabinet, check the following parts lists and refer to Figure 1-3 during installation.

Table 1-1 FHDW001-R2 Rack Kit, 2U,19-inch Wide Cabinet, 22-28 Inches Deep

Major Components			Fasteners		
Qty.	Part Number	Description	Qty.	Part Number	Description
2	71-00000552	side brackets	16	01-00000142	#8-32.x 3/16-in. flathead screws
2	71-00000621	rear brackets with flanges ¹	10	01-00000186	#8-32 x 1/4-in. panhead screws
2	79-00000100	front support brackets ²	16 ³	01-00000483	#10-32 x 1/2-in. panhead screws and/or
				01-00000489	#10-32 x 1-in. panhead screws

Table 1-1 FHDW001-R2 Rack Kit, 2U,19-inch Wide Cabinet, 22-28 Inches Deep

	12	02-00000018	#10 flat washers
	5	01-00000151	6-mm socket cap screws
	9	01-00000152	6-mm panhead screws
	16	01-00000150	5-mm panhead screws
	15	01-00000148	#10-32 cage nut, UNF
1	09-00000064	5-mm Allen wrench for 6-mm socket cap screws	

1. The U-shaped flanges support the side brackets and eliminate the need for a second person to support the array while assembling and tightening screws.

2. Temporary support brackets to aide one-person-installs can be removed once front ears are secured.

3. Rackmount kits may contain 16 count #10-32 x 1/2-in. and/or 16 count #10-32 x 1-in. panhead screws.

Table 1-2 FHDW002-R2 Rack Kit, 2U,19-inch Wide Cabinet, 28-36 Inches Deep

Major Components			Fasteners		
Qty.	Part Number	Description	Qty.	Part Number	Description
2	71-00000553	side brackets	16	01-00000142	#8-32 x 3/16-in. flathead screws
2	71-00000622	rear brackets with flanges ¹	10	01-00000186	#8-32 x 1/4-in. panhead screws
2	79-00000100	front support brackets ²	16 ³	01-00000483	#10-32 x 1/2-in. panhead screws and/or
				01-00000489	#10-32 x 1-in. panhead screws
			12	02-00000018	#10 washers
			5	01-00000151	6-mm socket cap screws
			9	01-00000152	6-mm panhead screws
			16	01-00000150	5-mm panhead screws
			15	01-00000148	#10-32 cage nut, UNF
1	09-00000064	5-mm Allen wrench for 6-mm socket cap screws			

1. The U-shaped flanges support the side brackets and eliminate the need for a second person to support the array while assembling and tightening screws.

2. Temporary support brackets to aide one-person-installs can be removed once front ears are secured.

3. Rackmount kits may contain 16 count #10-32 x 1/2-in. and/or 16 count #10-32 x 1-in. panhead screws.

Note – It is possible for customer-supplied racks to have several sizes of threaded holes. Rackmount kits have several sizes of panhead screws and sockethead screws in order to fit these various racks. Sockethead screws are supplied for the front mounting ears when the diameter of the screw is too large for panhead screws to fit.

Note – When you finish the installation, you will have unused screws left in your rackmount kit. This does not indicate a problem with your installation. Several types of screws are included for different rack configurations, and extra screws are provided in case any are misplaced.

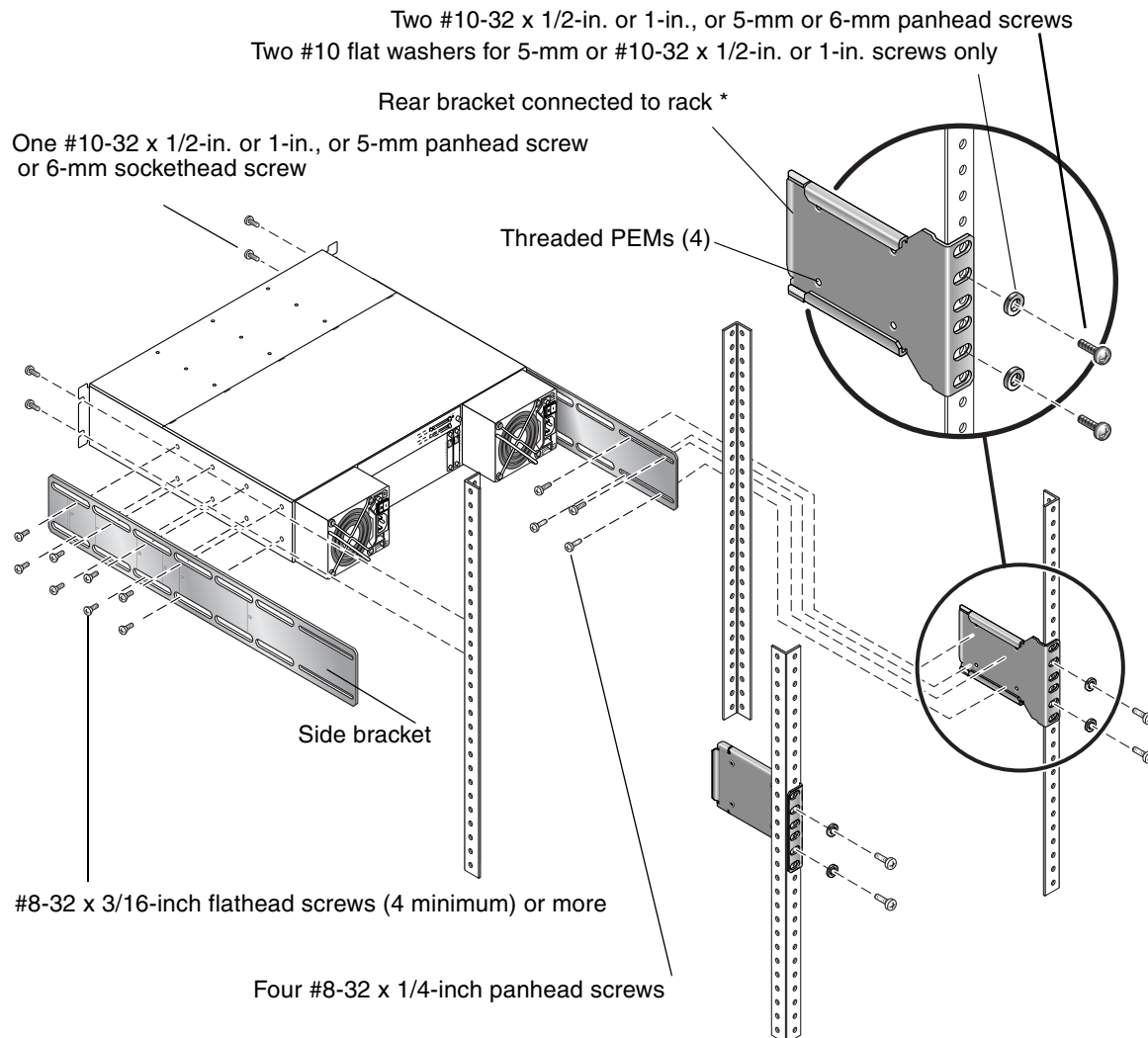


Figure 1-3 Cabinet Rackmount (22- to 28-Inch Deep Rack in a 19-Inch Wide Cabinet)

* Flanged rear brackets support the side brackets and enable a easy one-person installation.

Note – Alternate screws can be used with the appropriate racks: 5-mm panhead screws (front and back), or 6-mm sockethead screws (front) and 6-mm panhead screws (back).



Caution – Do not use any power tools with any procedures. Power tools can strip or damage connections.

1.6.3 Installing the Array into a Cabinet

Be sure to review “One-Person Installation Requirements” on page 1-4 and “Reviewing the Tools” on page 1-4 before rackmounting the array.

Refer to the parts list in Table 1-1 and Table 1-2 and the illustration in Figure 1-3 during installation. The tables list the major components and fasteners required to install an array into the cabinet.

Note – While the number of screws and bracket types differ based on the depth of the rack and the kit that you purchase, the procedure to install the racks is the same.

1. Determine the position at which the array will be installed.

Install the first array at the *bottom* of the rack, and install each subsequent chassis above the previous one unless otherwise indicated in the RPM manual.

Note – Keep all hardware items in plastic bags until you are ready to use them. This will enable you to correctly identify the screws and avoid confusion.

2. Before rackmounting, be sure to check your site location and confirm that you have cables with adequate lengths to connect to servers and to power outlets.
3. **(Square-cut European-style racks only).** Insert the cage nuts in the corresponding holes on the front and rear of the rack.
4. **(Optional).** Before you mount the unit, screw the front support brackets into position on the rack face. The front support brackets enable one person to easily position and support the front of the unit in the rack.
 - a. Attach each front bracket to the rack face (See Figure 1-4):

To connect the front brackets, use a minimum of two screws per front bracket.
Use the appropriate screws for the rack:

 - #10-32 x 1/2-inch panhead screws
or
 - #10-32 x 1-inch panhead screws
or
 - 5-mm panhead screws
or
 - 6-mm panhead screws

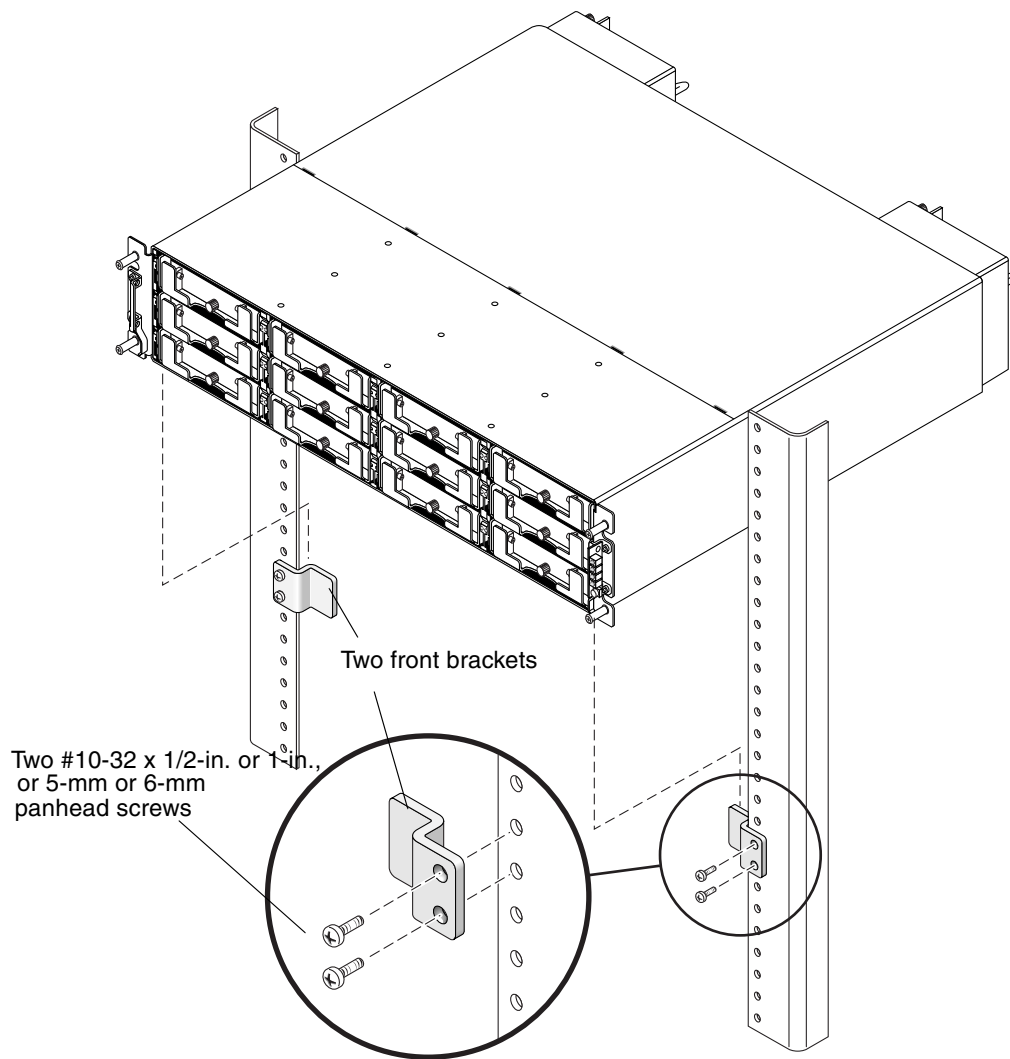


Figure 1-4 Front Bracket Position on the Rack Face

5. Remove the bezel (front faceplate) and the two plastic ear caps from the front of the chassis.



Caution – The plastic ear caps are snap-on parts that require some care when you remove them. Remove the right plastic ear caps carefully to avoid breaking the push button reset switch that is directly below the ear cap.

To remove a plastic ear cap (both caps are removed the same way):

- a. Squeeze both sides of the cap at the top and the bottom.
- b. Turn the cap toward the center of the array until it disengages and pull it free.

6. Attach the side brackets to the left and right sides of the chassis.

Attach up to eight #8-32 x 3/16-inch flathead screws on each side to allow some adjustment to the placement. Make sure you use at least four screws on each side. (Torque to 18 inch-pounds.)

- a. Use the alignment marks (depth in inches) stamped into the side brackets to position the brackets and screws.

Determine the depth you require and align the last (rearmost) alignment mark on the side bracket with the last mounting holes on the chassis.

Make sure the alignment mark corresponding to the depth you want lines up with the top and bottom threaded holes on the side of the chassis closest to the rear.

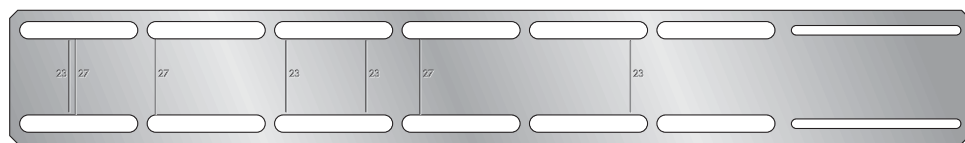


Figure 1-5 Side Bracket With Alignment Marks

- b. Insert the first two screws on each side through the side bracket slots above and below the alignment mark and into the last pair of rear threaded holes in the chassis.

In Figure 1-6 the 27-inch alignment mark is positioned above and below the last pair of rear threaded holes. This positions the array for a 27-inch deep rack.

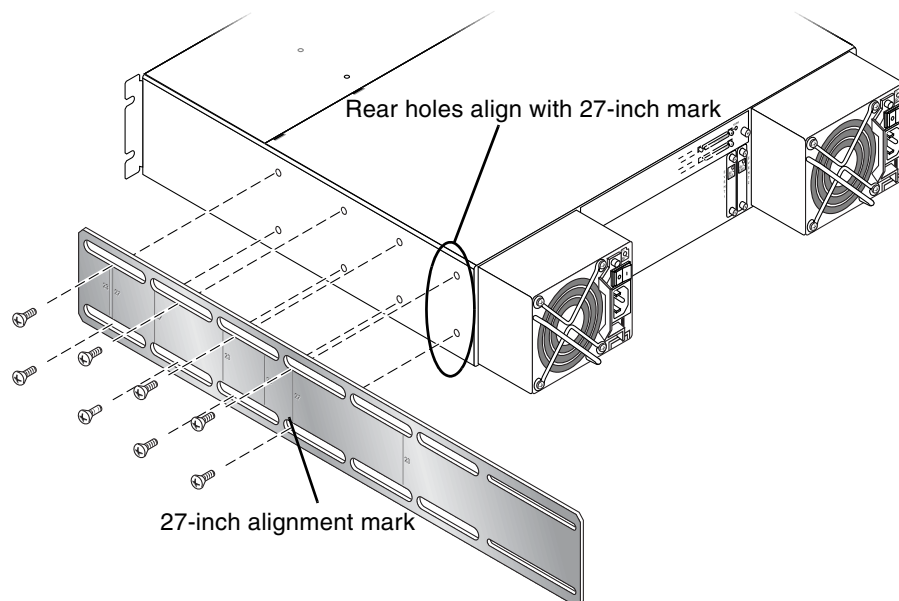


Figure 1-6 Aligning a Side Bracket With the Rear Threaded Holes on the Side of the Array

- c. Insert up to six other screws through the side bracket slots into the other threaded holes in the chassis. (Torque to 18 inch-pounds.)

7. Use a total of four screws and four washers to attach the rear brackets to the rear vertical posts (two screws to attach each bracket to a post).

- a. Attach each rear bracket with two screws.

Use the appropriate type of screws for the posts:

- Four #10-32 x 1/2-inch or 1-inch panhead screws with #10 washers
or
- Four 5-mm panhead screws with #10 washers
or
- Four 6-mm panhead screws (no washers required)

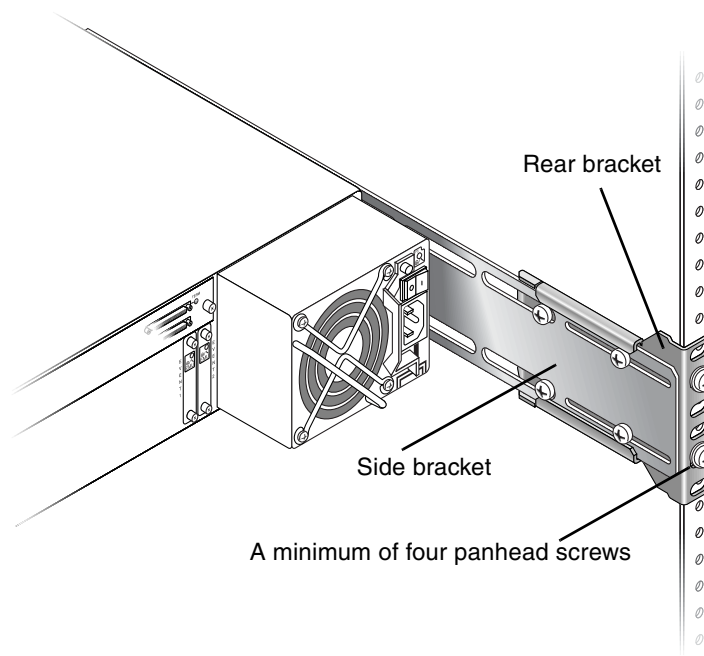


Figure 1-7 Rear and Side Brackets Assembled

8. Lift the chassis and slide the side brackets into the rear brackets, which are attached to the rear posts.

Adjust the depth of these brackets so that the rear slotted cutouts on the *side brackets* align with the four PEM nuts in the *rear brackets*.

9. Attach each side bracket to a rear bracket (see Figure 1-7):

To connect the rear brackets and side brackets of a 22- to 36-inch deep rack, use a minimum of four screws each and up to a total of four #8-32 x 1/4-inch panhead screws per bracket. (Torque to 18 inch-pounds.)

10. Attach and secure the array's front mounting ears with four appropriate screws (two screws into each ear):
 - Four #10-32 x 1/2-inch or 1-inch panhead screws
or
 - Four 5-mm panhead screws
or
 - Four 6-mm socket cap screws
11. Remount all drives and power/fan modules into the array.
12. If you mounted the unit using the optional front support brackets, remove them from the rack face using a standard screwdriver.
13. Reattach the two plastic ear caps and the bezel onto the front of the chassis.

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

 - a. Align the inside round notches of the cap with the round cylindrical posts (ball studs) on the ear.
 - b. Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array first.
 - c. Continue pushing the top and bottom of the ear cap onto the ear, pressing on the side toward the outside of the array.

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



Caution – Be careful to avoid “wedging” the reset button below the LEDs on the right ear when you replace the plastic cap over it.

- d. Insert the bezel arms into the chassis holes.
 - e. Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.
 - f. Use the key to lock both bezel locks.
14. Connect power cables to the chassis, power on, and check for proper operation of the LEDs.

See “Powering Up and Checking LEDs” on page 2-11.

1.7 What to Do Next

1. For cabling with standard configurations, see “Connecting Your SATA Array” on page 2-1.

For alternate configurations, refer to the *SANnet II 200 FC and SATA Array Best Practices Manual*.

2. After cabling is complete, print and use the *SANnet II 200 FC, SATA, and SATA SE Array Installation, Operation, and Service Manual* for first-time configuration and basic troubleshooting.

CHAPTER 2

Connecting Your SATA Array

This chapter describes procedures for cabling the SANnet II 200 SATA array and for connecting an array to power and to network devices.

The following topics are covered in this chapter:

- “SANnet II 200 SATA Array Connections” on page 2-2
- “Connecting the Chassis to AC Power Outlets” on page 2-3
- “Connecting the Chassis to DC Power Outlets” on page 2-5
- “Cabling to Expansion Units” on page 2-6
- “Setting Loop IDs on Expansion Units” on page 2-8
- “Powering Up and Checking LEDs” on page 2-11
- “Reviewing Channels, Ports, and SFPs” on page 2-11
 - “Drive Port Connectivity in a Dual-Controller Array” on page 2-12
 - “Host Port Connectivity in a Dual-Controller Array” on page 2-13
 - “Default SFP Placement” on page 2-14
 - “Changing Your SFP Configuration” on page 2-16
- “Establishing Communications With An Array” on page 2-16
 - “Determining the Default IP Address” on page 2-18
 - “Configuring the RS-232 Serial Port Connection” on page 2-19
 - “Manually Setting a Static IP Address” on page 2-20
- “Setting Up Out-of-Band Management Over Ethernet” on page 2-21
- “Adding an Expansion Unit to an Existing RAID Array” on page 2-22
- “Connecting Ports to Hosts” on page 2-23
- “Power-On Sequence” on page 2-24
- “Powering Off the Array” on page 2-25

Before you connect the array to the network, position the array in the rack, cabinet, or other location where it will be used.



Caution – When positioning the array, do not block the air vents at the front or back of the unit. Follow all safety precautions specified in the *SANnet II Family Safety, Regulatory, and Compliance Manual*.



Caution – When you power off an array, wait five seconds before you power it back on. If you power the array off and on too quickly, unexpected results can occur. For more information, refer to the *SANnet II 200 FC, SATA, and SATA SE Installation, Operation, and Service Manual*.

2.1 SANnet II 200 SATA Array Connections

Figure 2-1 identifies the hardware connections on the back of a dual-controller SANnet II 200 SATA array.

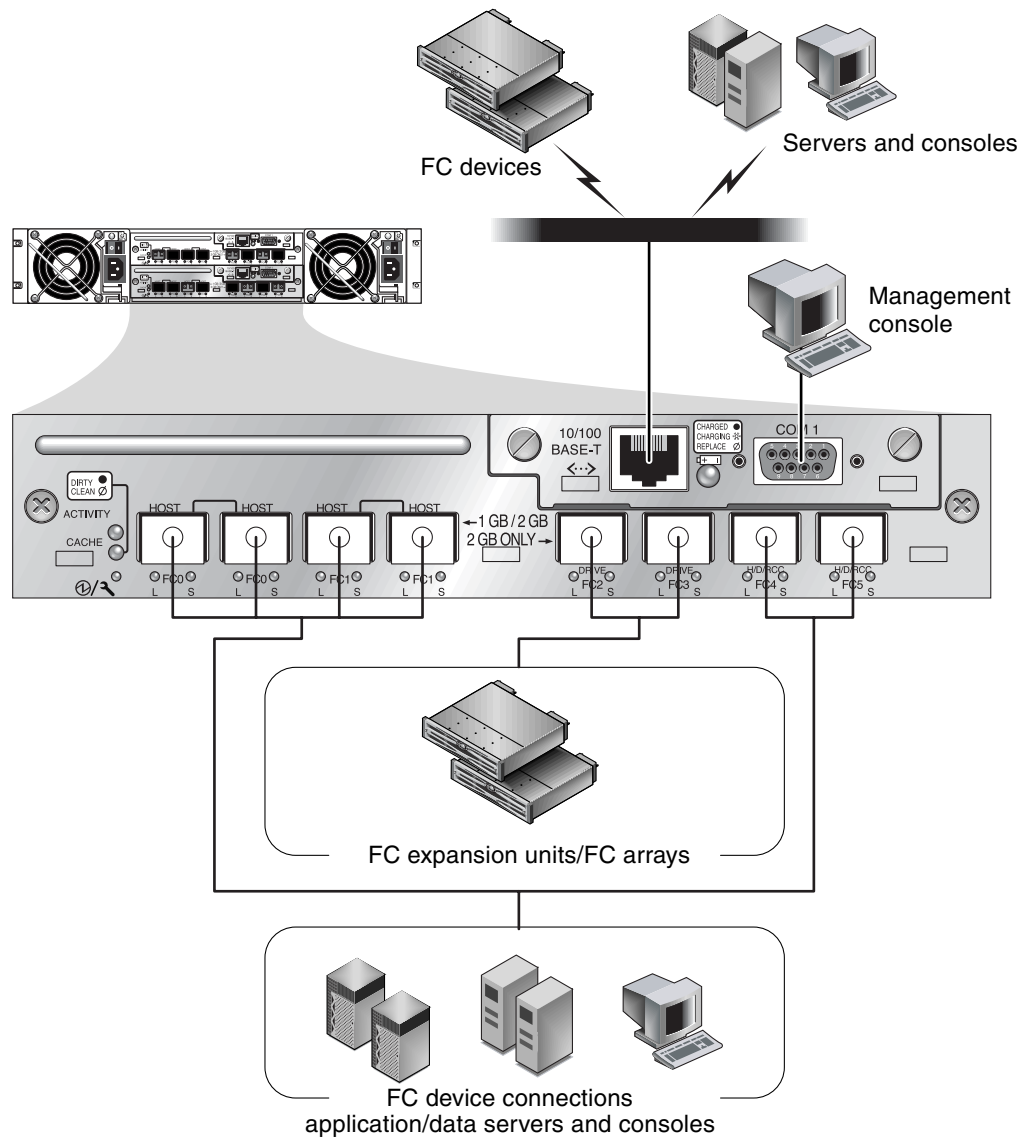


Figure 2-1 Hardware Connections on the Back of a Dual-Controller SANnet II 200 SATA Array

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

2.2 Connecting the Chassis to AC Power Outlets

When you connect the AC power cords, install the two provided cord locks at the same time. The AC cord locks are used to securely fasten the AC cable connectors.



Caution – If the array is connected to AC power sources not within the designated 90–135 or 180–264 VAC range, the unit might be damaged.

Note – To ensure power redundancy, be sure to connect the two power supply modules to two separate circuits (for example, one commercial circuit and one UPS).

To connect the AC power cords, perform the following procedure.

1. Use a Phillips screwdriver to remove the screw and cylindrical standoff from one of the two provided cord locks.
Set them aside for reassembly later.
2. Slide the cord lock over the AC power connector.
3. Hold the cylindrical standoff between the two screw holes on the flanges of the cord lock.
4. Insert the screw into the first screw hole, through the standoff, and then into the threaded screw hole on the other flange.
5. Tighten the screw with a screwdriver until the flanges bottom out on the cylindrical standoff.
6. Push the power cord into the power supply receptacle until it is firmly seated.
7. Push the green ejector handle forward until it is seated against the power supply.
8. Turn the thumbscrew of the green ejector handle clockwise until it is finger-tight to secure the handle and the cord lock.

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

9. Repeat Step 1 through Step 8 for the second cord lock and second power cable.

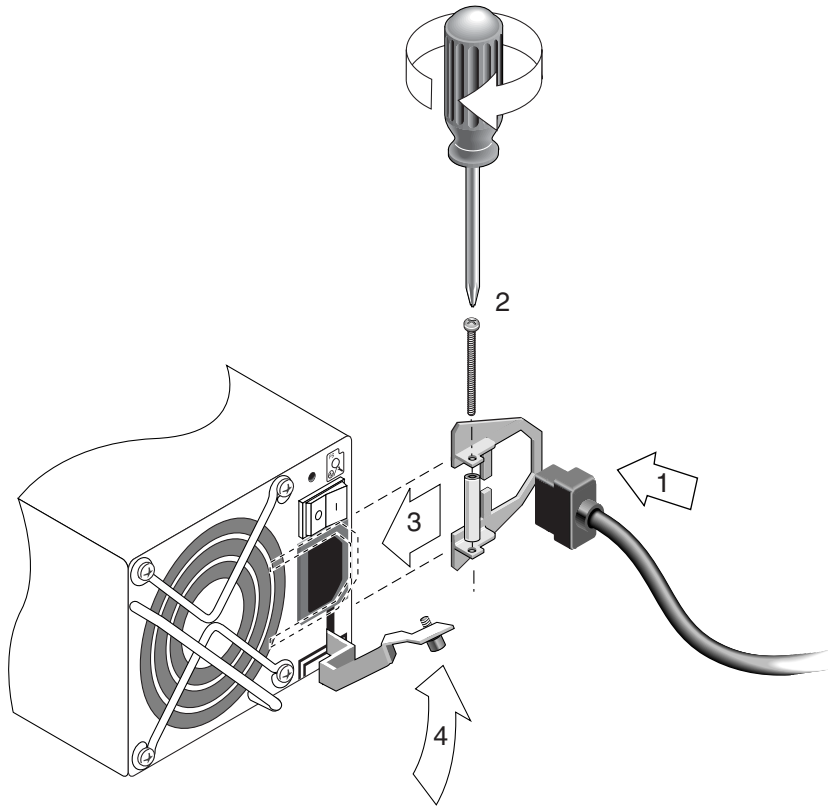


Figure 2-2 Installing a Cord Lock

2.3 Connecting the Chassis to DC Power Outlets

Two DC power cords are packaged with each DC array. To connect the DC power cords, perform the following procedure.

1. Check the DC cable part number and wire labels carefully before connecting the cable to the source.

Table 2-1 DC Cable Wiring for Cable 35-00000148 or 35-00000191

Pin Number	Voltage	Color
A3	Return	Red
A2	GND (Chassis Ground)	Green/Yellow
A1	-48 VDC	Black

2. Connect a DC power cable to the first power supply and to a power outlet.

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



Caution – If the array is connected to DC power sources not within the designated –48V DC (–36 VDC to –72 VDC) range, the unit might be damaged.

Note – To ensure power redundancy, be sure to connect the two power supply modules to two separate circuits (for example, one commercial circuit and one UPS).

Note – To extend the length of the DC power cable as needed, strip the last 1/4 inch of the cable, insert the stripped end into a provided Panduit tube, and crimp the tube.

3. Tighten the cable-locking screws to attach the cable securely to the power supply power outlet.
4. Connect the second power cable to the second power supply and to a second power outlet. Tighten the cable-locking screws.

If one power supply fails, the second power supply automatically takes the full load.

2.4 Cabling to Expansion Units



Caution – When connecting expansion units to a RAID array, always connect channel 2 of the RAID array to the A channel of the expansion units, and connect channel 3 of the RAID array to the B channel of the expansion units. Otherwise, unexpected behavior might occur.

Several cabling configurations are possible, each with its own advantages and disadvantages. Refer to the *SANnet II 200 FC and SATA Array Best Practices Manual* for more information about the suitability of various configurations for various application requirements, as well as for information about high-capacity configurations.

The maximum number of expansion units attached to a RAID array are:

- up to five SANnet II 200 SATA expansion units attached to a SANnet II 200 SATA array
- up to five SANnet II 200 FC expansion units and SANnet II 200 SATA expansion units, in any combination, attached to a SANnet II 200 FC array

These configurations are described in the *SANnet II 200 FC and SATA Array Best Practices Manual*.

The example in Figure 2-3 shows a RAID array connected to two expansion units. Connections to expansion units are designed to keep all A drive ports on the same loop and all B drive ports on the same loop.



Caution – To avoid drive assignment conflicts, make sure that each connected array and expansion unit uses a different loop ID, as described in “Setting Loop IDs on Expansion Units” on page 2-8.

In the RAID array, two of the unused SFP host ports can be used to provide redundant pathing to the two servers, and the remaining unused SFP host ports can be connected to two more servers in a redundant configuration.

Similarly, you can connect expansion units to other channels (which are separate from channels 2 and 3) if you configure them as drive channels. For details, refer to the *SANnet II Family RAID Firmware User's Guide*.

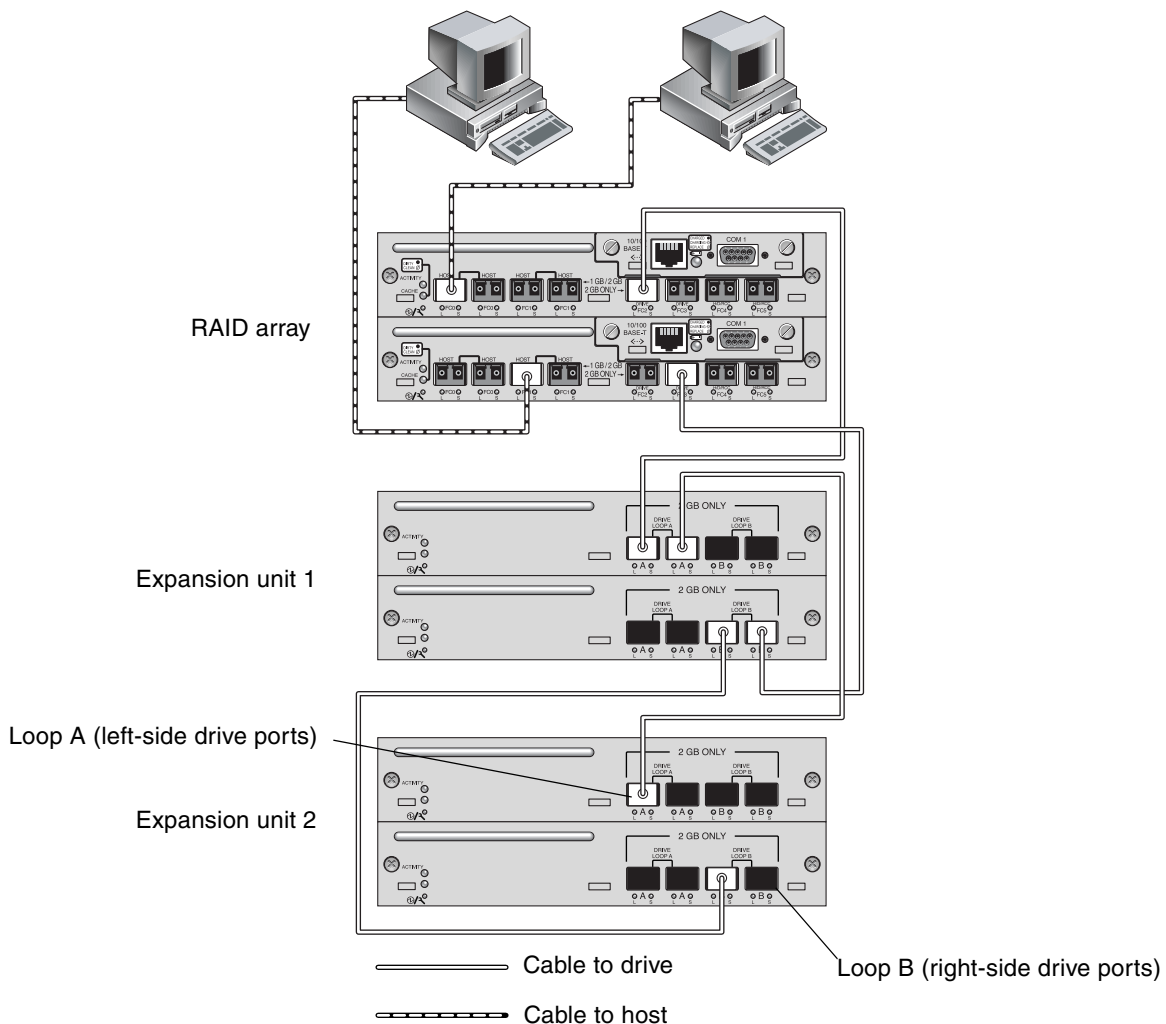


Figure 2-3 SANnet II 200 SATA Array Attached to Two Hosts and Two Expansion Units

2.5 Setting Loop IDs on Expansion Units

When an expansion unit is attached to a RAID array, unique, hard-assigned loop IDs are assigned to each expansion unit drive. A loop ID is the decimal version of an arbitrated loop physical address (AL_PA). The lowest number loop ID is the lowest priority address on the loop.

On the left front side of an expansion unit, an ID switch is used to set the loop IDs for the disk drives to a different range of values so that the same IDs are not repeated by RAID units and expansion units on the same loop.

Setting the loop ID on an array or expansion unit requires dropping the front bezel out of the way and removing the small vertical plastic cap on the left side of the bezel that covers the left rackmount tab. Rackmount tabs are also referred to as “ears.”

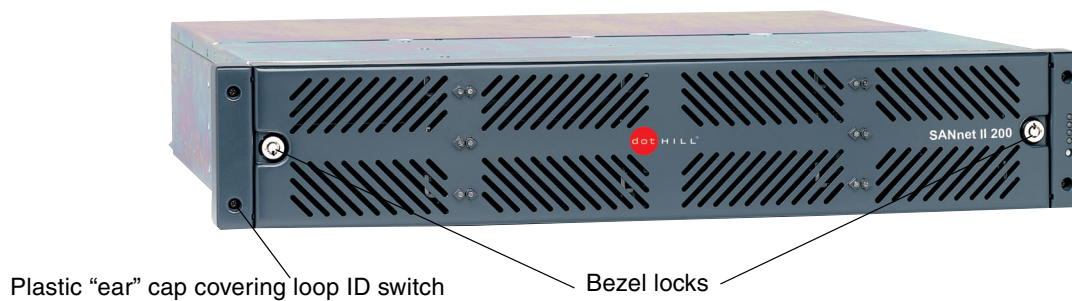


Figure 2-4 Front Bezel and Front Bezel Locks of an Array

1. Use the provided key to unlock both bezel locks.
2. Grasp the front bezel cover on both sides and pull it forward and then down.
3. Remove the plastic cap from the left ear of the array.
 - a. Squeeze both sides of the cap at the top and the bottom.
 - b. Turn the cap toward the center of the array until it disengages and pull it free.



Caution – To avoid damage to the cap, do not pull the cap forward directly or pull from only its top or bottom.

The ID switch is exposed when you remove the plastic cap.

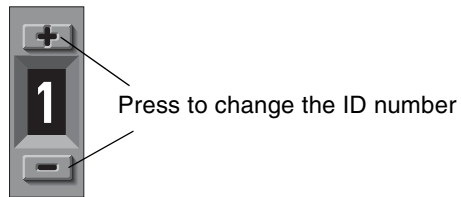


Figure 2-5 ID Switch Located on the Left Front Side of Arrays and Expansion Units

4. Press the upper or lower switch button to change the ID number so that each connected RAID array and expansion unit uses a different loop ID.



Caution – The loop ID should only be changed while the expansion unit is powered off or not in use. After changing the loop ID, a power cycle is required to make the ID switch change take effect. Failure to cycle the power following a loop ID change can lead to unexpected results.

The default ID switch setting for RAID arrays is 0. The default range of available drive IDs for RAID arrays is 0 to 11 for 12 drives (the IDs 12–15 are ignored). The default ID switch setting for expansion units and JBODs is 1.

Ensure that the loop IDs of expansion units do not duplicate the loop IDs of other connected expansion units or RAID arrays.

The ID switch offers eight ID ranges. Each range contains 16 IDs (the last four IDs in each range are ignored). These ranges are shown in Table 2-2.

Table 2-2 ID Switch Settings for Expansion Units

ID Switch Setting	Range of IDs
0	0–15
1	16–31
2	32–47
3	48–63
4	64–79
5	80–95
6	96–111
7	112–125

For an example of properly configured loop IDs, consider the configurations shown in Figure 2-3. You must make sure the RAID array and each of the two expansion units have been assigned different loop IDs. Set the loop ID switches so that the RAID array is assigned loop ID 0, expansion unit 1 has loop ID 1, and expansion unit 2 has loop ID 2. The range of IDs assigned to the drives is shown in Table 2-3.

Table 2-3 Sample Array and Expansion Units with Different Loop and Drive IDs

Fibre Channel Device	Loop ID Switch Setting	Range of Drive IDs
RAID array	0	0–15
Expansion unit 1	1	16–31
Expansion unit 2	2	32–47

5. Prepare the plastic left ear cap for replacement by aligning the inside round notches of the cap with the round cylindrical posts (ball studs) on the ear.
6. Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array first.
7. Continue pushing the top and bottom of the ear cap onto the ear, pressing on the side toward the outside of the array.
Do not use force when placing a cap on an ear.
8. Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.
9. Use the key to lock both bezel locks.

2.6 Powering Up and Checking LEDs

Perform the initial check of the array according to the following procedure.

1. Connect two AC or DC power cables to the power and fan modules on the back of the array.
2. Power on the array by turning on each power switch.
3. Check for the following LED activity:
All front-panel LEDs turn solid green to indicate good operation.

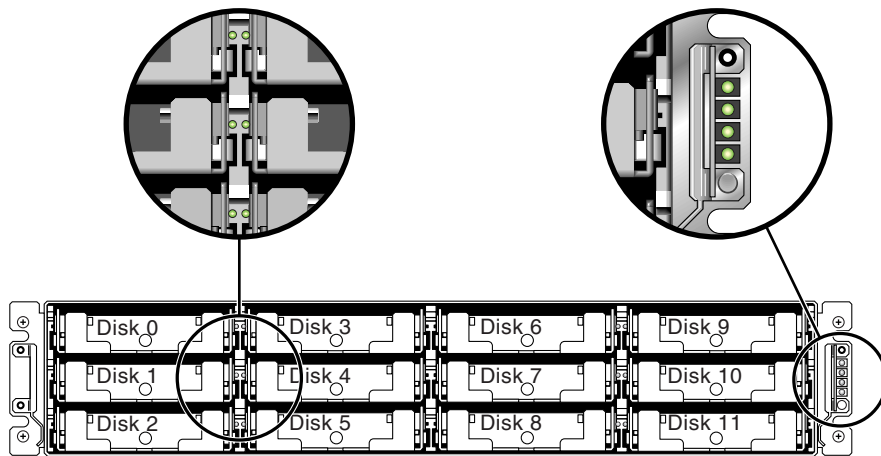


Figure 2-6 Front Panel of the SANnet II 200 FC Array With LEDs Displayed

For further information about your array's LEDs, refer to the *SANnet II 200 FC, SATA, and SATA SE Array Installation, Operation, and Service Manual*.

2.7 Reviewing Channels, Ports, and SFPs

I/O controller modules have ports that accept small form-factor pluggable (SFP) transceivers. These ports are labeled FC0 through FC5, to indicate channels 0 through 5. Default configurations do not include an SFP connector in every SFP port. To add or change SFP connectors, see “Changing Your SFP Configuration” on page 2-16.

The channels and associated ports for the SANnet II 200 SATA arrays are summarized in Table 2-4.

Table 2-4 Number of Ports in SANnet II 200 SATA Arrays

Item	SANnet II 200 SATA Array
Total number of ports	8
Channel 0	2 FC0 dedicated host ports ³
Channel 1	2 FC1 dedicated host ports ³
Channel 2 ¹	1 FC2 dedicated drive port
Channel 3 ²	1 FC3 dedicated drive port
Channel 4	1 FC4 host or drive port; default: host port
Channel 5	1 FC5 host or drive port; default: host port

1. Channel 2 drive ports connect to drive loop A ports on expansion units.

2. Channel 3 drive ports connect to drive loop B ports on expansion units.

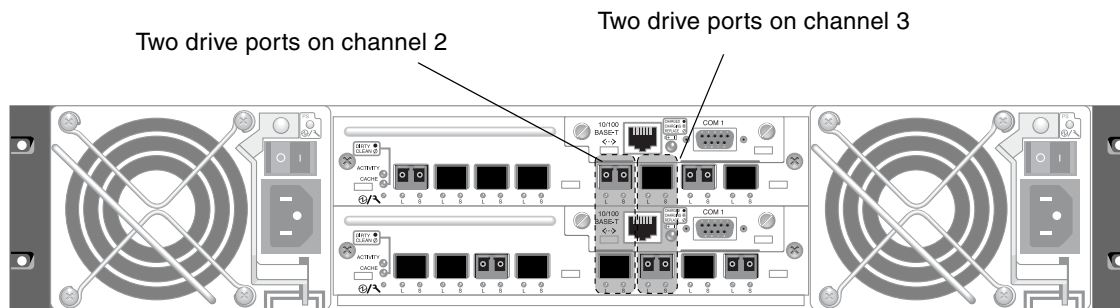
3. Only one host port connection per channel is allowed when connecting to a fabric switch.

2.7.1 Drive Port Connectivity in a Dual-Controller Array

Drive channels connect to the internal drives in the array and can also connect to drives in external expansion units. The SANnet II 200 SATA array has a drive channel assigned to one port on each I/O controller module in a dual-controller configuration.

2.7.1.1 SANnet II 200 SATA Array Drive Ports

Drive channels 2 and 3 are dedicated drive channels. Configured for redundancy, each drive channel of the top I/O controller module shares a loop with the matching drive channel on the bottom I/O controller module. For example, drive channel 2 of the top I/O controller module shares the same loop as channel 2 on the bottom I/O controller module (see Figure 2-7). Each drive channel has two SFP ports that can be connected to expansion units. Drive channels 2 and 3 access all the disk drives using internal FC-SATA routing technology and are interconnected to load balance I/O operations.



An upper port and a lower port are on each drive channel.

Figure 2-7 Dedicated Drive Channels 2 and 3 (on Both Controllers) in a Dual-Controller SANnet II 200 SATA Array

2.7.2 Host Port Connectivity in a Dual-Controller Array

Host channels connect to host computers either directly or through storage switches or other devices. In a default dual-controller RAID configuration, each controller has four host channels, channels 0, 1, 4, and 5. Port bypass circuits connect each pair of host SFP ports on a host channel; as a result, each host channel accesses both controllers.

2.7.2.1 SANnet II 200 SATA Array Host Ports

In a default dual-controller RAID configuration, each controller has six host ports, as shown in Figure 2-8:

- Two host ports connect to channel 0 (FC 0)
- Two host ports connect to channel 1 (FC 1)
- One host port connects to channel 4 (FC 4)
- One host port connects to channel 5 (FC 5)

Channels 0 and 1 support 1-Gbit or 2-Gbit data transfer speeds. Channels 4 and 5 support 2-Gbit data transfer speeds only.

If a fabric switch is connected to one port of channel 0 or channel 1, no connections can be made with the other three ports of that channel. If channel 0 (FC 0) is connected to a fabric switch, for example, the second port for channel 0 on that controller, and both ports on a redundant controller cannot be used. Similarly, if channel 1 (FC 1) is connected to a fabric switch, the second port on that controller and the two FC 1 ports on a redundant controller cannot be used.

Two hosts can be directly connected to either channel 0 (ports FC 0) or channel 1 (ports FC 1), but in that configuration, host filters are required if you want to control host access to storage. Each host channel has an upper port and a lower port.

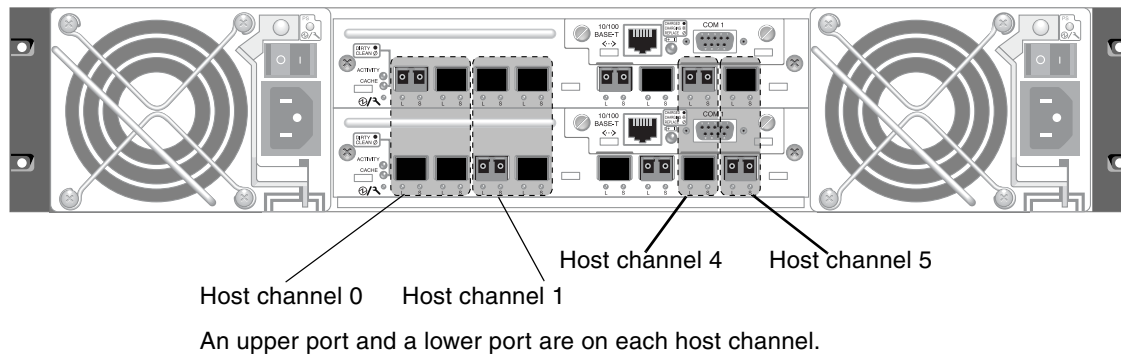


Figure 2-8 Host Channels on a Dual-Controller SANnet II 200 SATA Array

2.7.3 Default SFP Placement

Default configurations do not include an SFP connector in every SFP port. You might want to add or rearrange SFPs, depending on the configuration mode (loop or point-to-point), the number of planned host connections, the necessary number of redundant connections to hosts, and the number of expansion units needed.

The supported SFP is a single-port, optical SFP transceiver for multimode (short wave) or single-mode (long wave) use. It is compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA, Sep. 2000), and 1x and 2x Fiber Channel. The optical connector used is the low-profile LC connector.

SFPs are Dot Hill field-replaceable units (FRUs) and can be ordered from Dot Hill. These SFPs have been selected and tested to provide the necessary reliability and performance. SFPs from other vendors are not supported.

To review various configuration options, refer to the *SANnet II 200 FC, SATA, and SATA SE Array Installation, Operation, and Service Manual* and the *SANnet II 200 FC and SATA Array Best Practices Manual*.

In dual-controller arrays, SFPs are initially plugged into one of each pair of host and drive ports. The default port connections are:

- The upper I/O controller module has SFPs in the FC0, FC2, and FC4 ports.
- The lower I/O controller module has SFPs in the FC1, FC3, and FC5 ports.

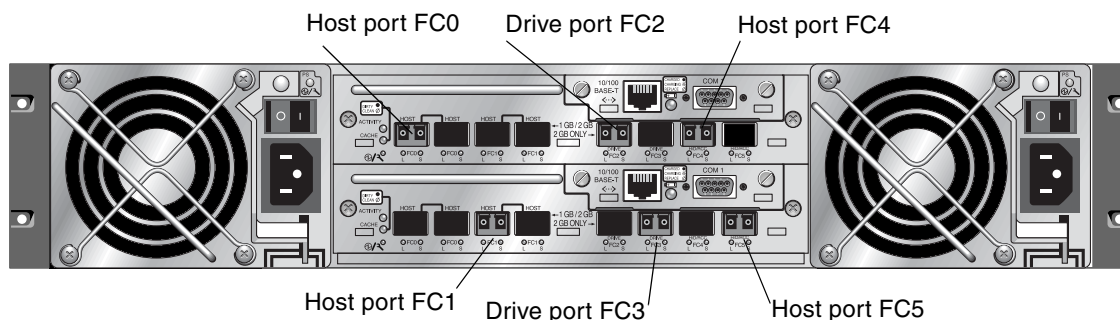


Figure 2-9 Default Dual-Controller SANnet II 200 SATA Array SFP Placement

In the default single-controller array, SFPs are initially plugged into the following ports:

- FC0
- FC1
- FC4
- FC5

No SFPs are plugged into the drive channels. This configuration is appropriate for connecting to up to four hosts or fibre switches, with no connection to expansion units (see Figure 2-10).

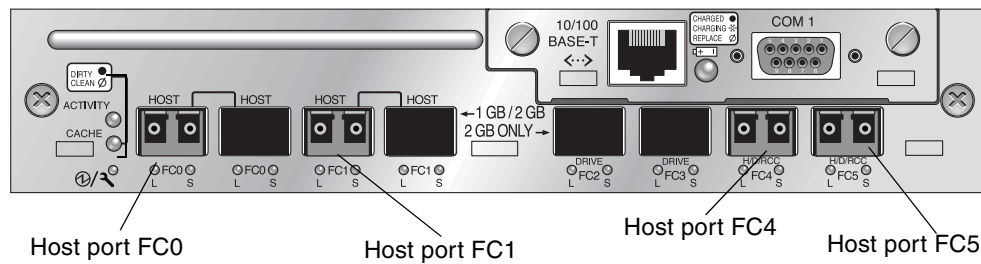


Figure 2-10 SANnet II 200 SATA Array Default Single-Controller SFP Placement

In a default SANnet II 200 SATA expansion unit, SFPs are initially plugged into the left-most Loop A port in the upper I/O expansion module and in the left-most Loop B port in the lower I/O expansion module (see Figure 2-11).

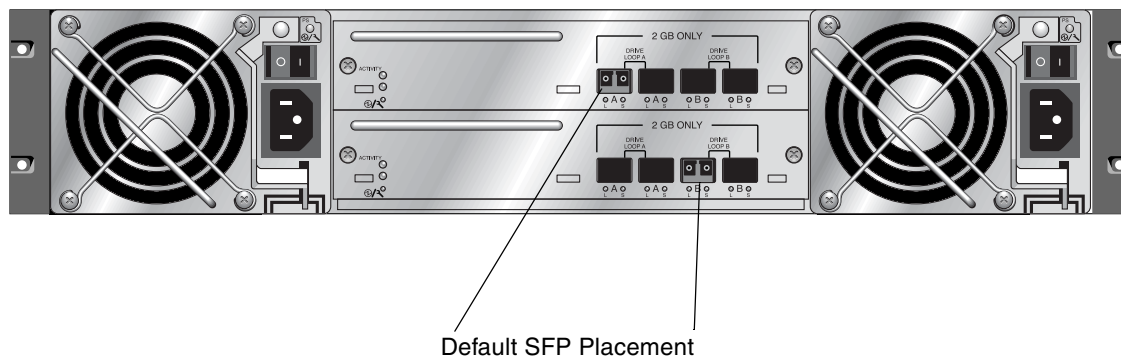


Figure 2-11 SANnet II 200 SATA Expansion Unit Default SFP Placement

2.7.4 Changing Your SFP Configuration

SANnet II 200 SATA arrays use SFP connectors to attach to hosts and expansion units. These SFP connectors resemble the one shown in Figure 2-12, with a single connector at the end that plugs into an SFP port on the array or expansion unit chassis, and a duplex jack into which you insert a cable to make the connection.

- To connect to an empty port, first slide the SFP connector into the port so that it connects firmly with the chassis. Then plug the fiber-optic cable's SFP connector into the duplex jack at the end of the SFP.
- To remove an SFP connector, remove the cable if one is connected to it, and then slide the SFP out from the port.

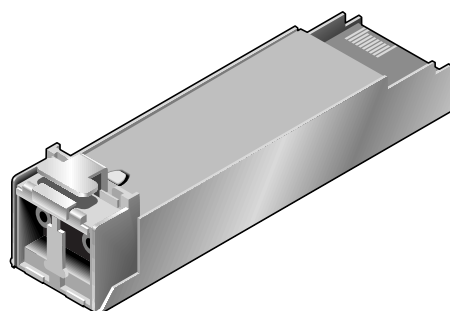


Figure 2-12 Typical SFP Connector Used to Connect Cables to Chassis SFP Ports

2.8 Establishing Communications With An Array

Before you can configure an array, you must establish one or more communication links between at least one host and an array. You can use any combination of the array's RS-232 COM (serial) port, the Ethernet port, and the in-band data connection between the host and the array.

- A direct RS-232 COM port connection guarantees that a host can communicate with a RAID array even if the array's IP address changes or is unknown, or if the TCP/IP network suffers a temporary outage. See "Configuring the RS-232 Serial Port Connection" on page 2-19 for more information. For pinout information, refer to the *SANnet II Installation, Operation, and Service Manual* for your array.

When you connect via the serial port, you immediately access the controller firmware application, a management program embedded in the firmware.

Note – If you are connected through a serial port connection (including a Solaris tip session) rather than through a telnet session, it is possible that when a controller is inserted, deasserted, or failed over, unwanted "garbage" characters can be displayed or the firmware application can appear to be frozen. This is due to the controller negotiation that occurs during a power-up or restart cycle. In most cases using the Ctrl-L keyboard shortcut corrects this problem. If this fails, the workaround is to close the tip session and start another, or use a telnet session instead.

- SANnet II Family arrays ship with the Dynamic Host Configuration Protocol (DHCP) TCP/IP network support protocol enabled. If your network uses a DHCP server to automatically allocate IP addresses to attached devices, as soon as the RAID array is powered up, an IP address is assigned to it.

You can use this IP address to monitor and manage the array's firmware through telnet sessions. See "Setting Up Out-of-Band Management Over Ethernet" on page 2-21 for information about setting up a telnet session.

The out-of-band management tools are:

- The host-based SANscape software.
- The host-based SANscape Command-Line Interface (CLI).
- The firmware application you access when you use the telnet command to connect to the IP address of the controller.

Note – By default, the CLI and the SANscape console automatically access in-band all arrays connected to the host server where the software is installed.

- A static IP address enables you to use telnet or other out-of-band management sessions to manage the array with no risk of a DHCP server changing its IP address. See "Manually Setting a Static IP Address" on page 2-20 for information.

2.8.1 Determining the Default IP Address

When the array is first powered up, the default IP address setting uses the IP address assigned by a DHCP server.

Note – If you do not use a DHCP server with the array, you will not have an IP address and will need to use the serial port connection to create an IP address. See “Configuring the RS-232 Serial Port Connection” on page 2-19.

If the RAID array is connected to a network with an active DHCP server, you can determine the IP address assigned to the array in several ways:

- Access the firmware and follow the procedure “Configuring the RS-232 Serial Port Connection” on page 2-19.

When you connect via the serial port, you immediately access the controller firmware application, a management program embedded in the firmware.

- If you already installed the SANscape CLI program, use the **show network-parameters** CLI command.

If the RAID controller is not on a network connected to an active DHCP server, an IP address of 0.0.0.0 is displayed. Refer to the *SANscape CLI User's Guide* for more information.

- If you already installed the SANscape program, use the Change Network Settings window to display the IP address of the array. Refer to the “Updating the Configuration” chapter in the *SANscape User's Guide* for more information.

Event messages sent as SNMP traps to the email address you specify also contain the IP address of the array from which they are sent. Refer to the “Configuration Parameters” chapter in the *SANnet II Family RAID Firmware User's Guide* for more information.

Once you have determined the RAID controller's IP address using one of these methods, you can establish a telnet session to that IP address.



Caution – Because of the dynamic nature of DHCP-assigned IP addresses, the RAID array's IP address might change in the event of a controller reset, a network outage, or if the DHCP server is rebooted. If this happens, telnet sessions to the previous IP address can no longer communicate with the array, and it is necessary to use one of the methods described above to determine the new IP address.

If you do not have an active DHCP server on the same network as the RAID array, or if you prefer to have a static IP address, use the procedures in “Manually Setting a Static IP Address” on page 2-20.

2.8.2 Configuring the RS-232 Serial Port Connection

The RS-232 COM (serial) port on either controller module can be used to configure and monitor the RAID array using the controller firmware. It can be connected to a VT100 terminal, terminal emulation program, terminal server, or the serial port of a server.

1. Use a null modem serial cable to connect the COM port of the RAID array to the serial port on a host workstation.

A null modem serial cable is included in your package.

2. Set the serial port parameters on the workstation as follows:

- 38,400 baud
- 8 bit
- 1 stop bit
- No parity

For additional information on how to set serial port parameters on a specific server, refer to the *SANnet II 200 FC, SATA, and SATA SE Installation, Operation, and Service Manual*.

3. Access the array through the COM port and select the VT100 terminal emulation to access the Main Menu.

4. Check the DHCP IP address and confirm that it is valid.

From the firmware Main Menu choose **Configuration Parameters** → **Communication Parameters** → **Internet Protocol (TCP/IP)**.

If the RAID controller is not on a network connected to an active DHCP server, “DHCP Client” is displayed rather than a DHCP-assigned IP address. Refer to the “Configuration Parameters” chapter in the *SANnet II Family RAID Firmware User’s Guide* for more information.

5. If you need to reset the IP address or make a static IP address, refer to “Manually Setting a Static IP Address” on page 2-20.

6. Configure the array.

- To configure the array through the firmware application, refer to the *SANnet II Family RAID Firmware User’s Guide*.
- To configure the array through out-of-band management, refer to “Setting Up Out-of-Band Management Over Ethernet” on page 2-21.

2.8.3 Manually Setting a Static IP Address

You can manually set an array's IP address using the controller's firmware by typing values for the IP address, the subnet mask, and IP address of the gateway. If your network uses a Reverse Address Resolution Protocol (RARP) server or a Dynamic Host Configuration Protocol (DHCP) server to automatically configure IP information for devices on the network, you can specify the appropriate protocol instead of typing the information manually.

Note – If you assign an IP address to an array to manage it out-of-band, for security reasons consider using an IP address on a private network rather than a publicly routable network.

To set the IP address, subnet mask, and gateway address of the RAID controller, perform the following steps.

1. Access the array through the COM port on the I/O Controller module or through a telnet session to the existing IP address.
2. From the controller firmware's Main Menu, choose **view and edit Configuration parameters** → **Communication Parameters** → **Internet Protocol (TCP/IP)**.
3. Select the chip hardware address and MAC address that is displayed.
4. Choose **Set IP Address** → **Address**.
5. Type in the desired IP address, subnet mask (if it is not automatically supplied), and gateway address, choosing each menu option in turn, backspacing over any existing entries.

If your network sets IP addresses using a RARP server and you prefer using it to using a fixed IP address, type **RARP** rather than an IP address, and do not type in a subnet mask or gateway address. If your network sets IP addresses using a DHCP server and you prefer using it to using a fixed IP address, type **DHCP** rather than an IP address, and do not type a subnet mask or gateway address.

6. Press **Esc** to continue.
A confirmation prompt is displayed.

Change/Set IP Address ?

7. Choose **Yes** to continue.

Note – You must reset the controller for the configuration to take effect.

You are prompted to reset the controller.

8. Choose **Yes** to reset the controller.
The controller takes a few minutes to reset.

2.9 Setting Up Out-of-Band Management Over Ethernet

The controller Ethernet port offers interactive out-of-band management through the following interfaces:

- The SANscape application. Refer to the *SANscape User's Guide* for details.
- The SANscape Command-Line Interface (CLI). Refer to the *SANscape CLI User's Guide* for details.
- The firmware application you access when you use the `telnet` command to connect to the IP address of the controller.

Using an Ethernet connection, you can configure and monitor RAID arrays and expansion units remotely by using the `telnet` command to access the firmware application on the array and by using the SANscape or SANscape CLI software.



Caution – If you assign an IP address to an array to manage it out-of-band, for security reasons consider using an IP address on a private network rather than a publicly routable network.

1. To access the RAID array over an Ethernet connection, first connect the RAID array's Ethernet port on each controller to the network.

Note – SANnet II family arrays require at least CAT-5 Ethernet cable.

Note – In a dual-controller RAID array, be sure to connect both Ethernet ports to the network. This provides failover if one controller fails.

2. Establish the IP address of the RAID array, as described in “Establishing Communications With An Array” on page 2-16.
3. To use the firmware application program from the host server, connect to the IP address of the RAID array controller with the following command:

```
# telnet IP-address
```

Note – Alternatively, you can use the Solaris operating system `tip` command or a terminal emulation program to access the firmware application program. See “Configuring the RS-232 Serial Port Connection” on page 2-19 for more information.

4. Press **Ctrl-L** to refresh the screen and view the Main Menu.

Note – If you reset the controller during a **telnet** session, you are disconnected from the RAID array. Use the **telnet** command to login to the array again.

To connect the SANscape program (on a host server) to a RAID array that has an IP address, refer to the out-of-band management instructions in the *SANscape User's Guide*.

The same document's “Email and SNMP” appendix provides information about configuring SANscape software to use Simple Network Management Protocol (SNMP) traps and Management Information Bases (MIBs) to provide information to other out-of-band enterprise management software. The “Monitoring the Array” chapter explains the use of SANscape agents to redirect event messages into host system logs.

You can also enable the controller firmware to send event messages using SNMP. Refer to the “Configuration Parameters” chapter in the *SANnet II Family RAID Firmware User's Guide* for more information.

2.10 Adding an Expansion Unit to an Existing RAID Array

To install an expansion unit to an existing, configured RAID array, perform the following steps.

1. Stop I/O and shut down the controller to ensure that all data in the cache is written to disk.

For details on shutting down the controller, see “Powering Off the Array” on page 2-25.

2. Verify that the loop ID of the expansion unit is set to a different ID than the RAID unit and any expansion units already attached.

For details on loop IDs, see “Setting Loop IDs on Expansion Units” on page 2-8.

3. Physically cable the new expansion unit to the array using a valid cabling configuration.

Refer to the *SANnet II 200 FC and SATA Array Best Practices Manual* for more information on expansion unit cabling configurations.

4. Power on the expansion units.

For details on the power-on sequence, see “Power-On Sequence” on page 2-24.

5. Power on the RAID array.
6. Verify the SES/PLD (programmable logic device) version of the expansion unit and the RAID array.

To review the version information, using the SANscape CLI, type `show ses`. Or, using SANscape, open the View Enclosure window.
7. If the SES/PLD version is not the same for the RAID array and the expansion unit, download the latest SES/PLD firmware from the Dot Hill website:
<http://www.dothill.com>.
 - a. Choose **Support** → **Downloads**.
 - b. Click **Firmware Downloads**.
 - c. Enter the required information, and click **Submit**.

Choose and download the appropriate SES/PLD firmware.

2.11 Connecting Ports to Hosts

In a default array configuration, channels 0, 1, 4, and 5 are host channels, so you can directly connect an array to four host computers. SFP connectors are plugged into channels 0 and 4 on the upper controller and channels 1 and 5 on the lower controller for this purpose.

You can connect two additional host computers to channels 0 and 1 of a SANnet II 200 SATA array. To support six host computers, however, you need to insert SFPs in the four unpopulated host ports. Except for some clustering configurations, when you connect two hosts to channel 0 or channel 1 on a SANnet II 200 SATA array, you must use host filtering if you want to control host access in this configuration. Refer to the user documentation for your clustering software to determine whether the clustering software can manage host access in this configuration.

If you want to connect a SANnet II 200 SATA array to more than six host computers without changing the default configuration, you can connect these four host channels to ports on storage switches in a storage area network (SAN) configuration.

When a fabric switch is connected to one port of channel 0 or channel 1 of a SANnet II 200 SATA array, no connections can be made with the other three ports of that channel. If channel 0 (port FC0) is connected to a fabric switch, for example, the second port of channel 0 on that controller and the FC0 ports on a redundant controller cannot be used.

Use fiber-optic cables to connect host channels to Fibre Channel HBAs on your host computers or to other devices such as storage switches.

1. Connect a fiber-optic cable to an HBA or FC port on each host or storage switch you want to connect to the array.

2. Connect the SFP connector at the other end of each of these fiber-optic cables to host channel SFP connectors on the back of the array.

If there is no SFP connector in the port you want to use, first insert an SFP connector into the port as described in “Changing Your SFP Configuration” on page 2-16.

2.12 Power-On Sequence

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

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

If an array is connected to a host using a serial port connection and powered on, the host terminal window displays a series of messages, as shown in the following example.

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

Do not use the **skip** option shown at the bottom of the example. This option is reserved for support personnel performing testing.

2.13 Powering Off the Array

You might need to power off the array (both power supplies) if you relocate the array or perform certain maintenance procedures with associated servers. Always shut down the array's controller before powering off the array.



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

To power off an array, perform the following steps.

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

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

3. Power off both power supply/fan modules.

See “Power-On Sequence” on page 2-24 for information about turning the array back on.

