AR200

2U RAID Storage Subsystem

User Guide

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Product Name:	**ASUS AR200**
Manual Edition:	**First Edition V1 (E1287)**
Release Date:	**May 2003**

Contents

Notices

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

> **WARNING!** The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

Safety information

Electrical Safety

IMPORTANT

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

CAUTION

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Operation Safety

IMPORTANT

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

About this guide

Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge on RAID configuration.

Contents

This guide contains the following parts:

1. **Chapter 1: System overview**

   This chapter describes the general features of the AR200 RAID system. It includes sections on front panel and rear panel specifications.

2. **Chapter 2: Hardware setup**

   This chapter lists the hardware setup procedures that you have to perform when installing system components.

Conventions

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Information that you MUST follow to complete a task.

NOTE: Tips and information to aid in completing a task.

ASUS contact information

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AR200 specifications summary

RAID level support	RAID 0, 1, 0+1, 3, 5, or JBOD
RAID processor	IBM PowerPC 6031 RISC CPU
SCSI interface	Ultra160 SCSI
SCSI channel	4 SCSI channels (each channel supports 15 SCSI devices)
Max. logical devices	6 devices (each logical drive can implement a different RAID level)
Cache RAM	Onboard 128MB registered ECC SDRAM DIMM
Max. transfer rate	160 MB/sec. per channel
Connectors	2 x 68-pin Ultra160 SCSI
Drive partitions	8 partitions for each logical drive, maximum of 64 partitions
SAF-TE	Supports SAF-TE (SCSI Access Fault Tolerant Enclosure)
Management SW features	Graphicaland web-based interface for RAID management Background reconstruction (automatic or manual selection) Automatic bad sector re-assignment Automatic drive failure detection Spare drive operations (including global and local spare drive)
Fault tolerance	Online hard disk replacement Supports global and local spare drives Supports HDD hot-swap feature
Power supply	Redundant power supply Input: 115/230V (automatic switching) Output: 5V, 40A; 12V, 12A; -5V, 0.5A; -12V, 0.5A Wattage: 280W+280W redundant power supply
Maintenance	LCD panel and RS-232 port RAID configuration Uses SNMP protocol for remote control functions
Size	59.5 cm (L) x 43.0 cm (W) x 8.8 cm (H)
Weight	17.5 kg (without HDDs)

Chapter 1

Product introduction

This chapter describes the general features of the AR200 RAID system. It includes sections on front panel, rear panel, and internal features of the system.

1.1 Package contents

1.1.1 Standard items

• Chassis	AR-20 2U rackmount (19”)
• Power supply	280W redundant
• Cables	Internal SCSI, management
• Terminator	LVD/SE Active Terminator (2 pcs.)
• RAID controller	DA3100
• Memory	128MB registered ECC SDRAM
• Rackmount rails	R-20 rackmount rail kit
• Documentation	AR200 User Guide DA3100 Hardware Manual

1.1.2 Optional items

• Hard disk drives	Up to six SCA-2 Ultra160 SCSI

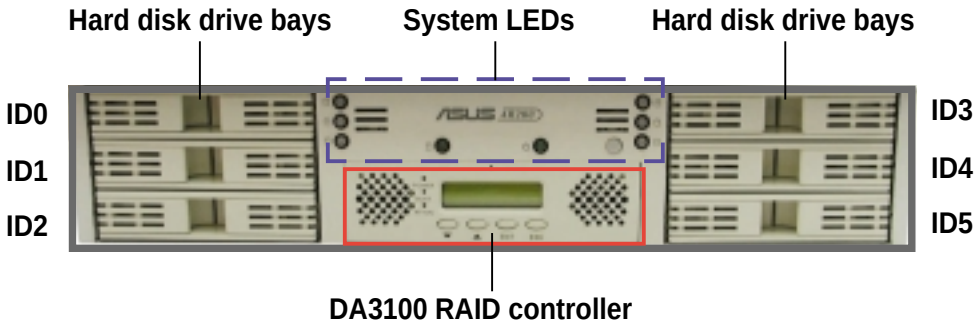
If any of the above items is damaged or missing, contact your retailer.

1.2 System overview

The AR200 is a 2U RAID subsystem in a 2U chassis and configured on the DA3100 RAID controller. The controller includes four channels that allow several hard disk configurations to provide more than 365GB storage capacity while keeping optimal fault tolerance and performance.

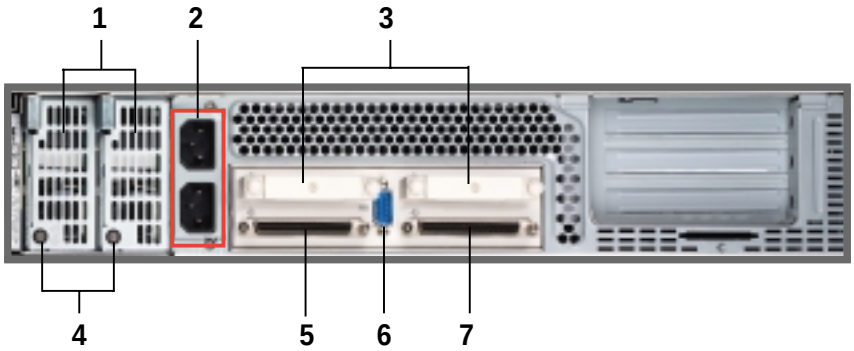
The system supports RAID 0, 1, 3, 5, 0+1, and JBOD protocols, and comes with a comprehensive LCD panel information for easy configuration.

1.2.1 Front panel features



See section “1.3 System power button and LEDs” for the LED descriptions, and section “1.4 DA3100 RAID controller” for the RAID controller front panel information.

1.2.2 Rear panel features

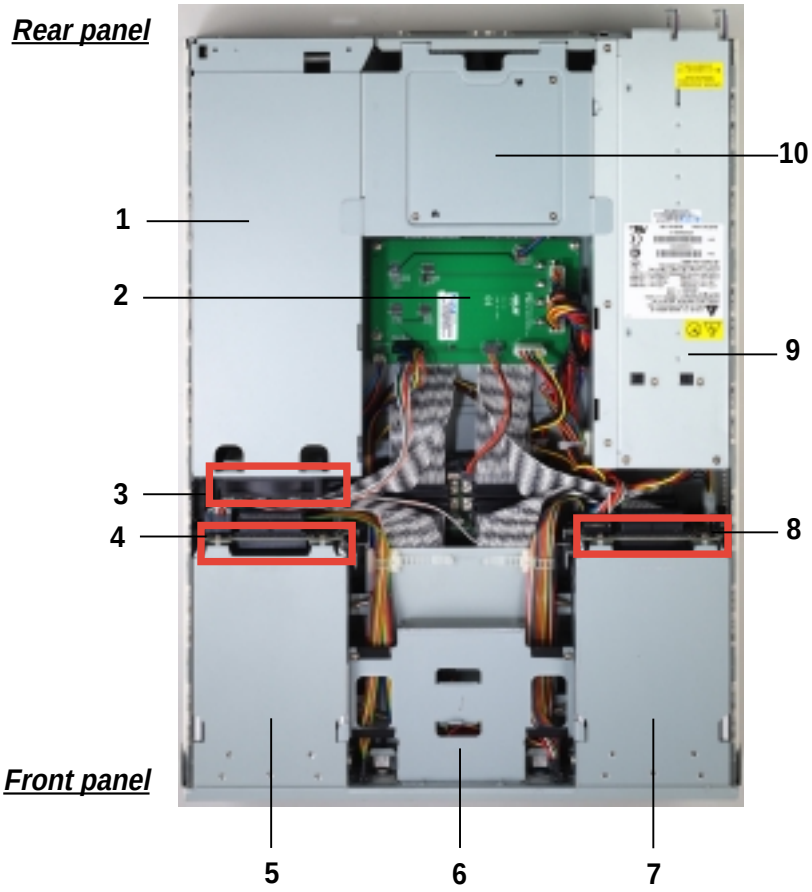


1. **Redundant power supply units**
2. **Redundant AC-In connectors**
3. **Terminators**
4. **Power supply power LED**
5. **SCSI host channel 2**
6. **RS-232 management port**
7. **SCSI host channel 1**

1.2.3 Internal features

When you remove the top cover of the chassis, you will see the pre-installed components of the RAID system.

Refer to “Chapter 2 Hardware Setup” for instructions on removing and installing the top cover of the chassis.



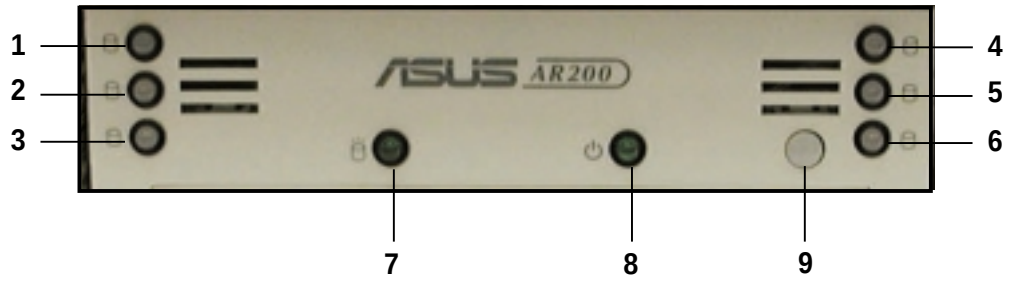
1. **PCI cage***
2. **System interface board**
3. **9-cm system fan**
4. **SCSI backplane board**
5. **Three SCSI drive bays**
6. **DA3100 RAID controller**
7. **Three SCSI drive bays**
8. **SCSI backplane board**
9. **Redundant power supply**
10. **12-cm system blower (underneath)**

* The PCI cage is not used in this system.

All the components of the AR200 RAID system are pre-installed and all the internal cables are properly connected before shipping. Do not remove any components or disconnect the cables. Chapter 2 provides details on the internal components, and describes all the cable configurations in case you accidentally detached any cable.

If you encounter any problems with the system, contact ASUS technical support. See page vii of this user guide for ASUS contact information.

1.3 System power button and LEDs



1-3 Hard disk drive power and status LEDs (ID0, ID1, ID2 HDDs)
4-6 Hard disk drive power and status LEDs (ID3, ID4, ID5 HDDs)
7. Hard disk activity LED
8. Power LED
9. Power button

Hard disk drive power and status LEDs

The SCSI hard drives have individual LEDs. When a hard drive is installed, the specific LED for that hard drive is ON (steady green) under normal conditions. If there is a problem, the LED may turn to a steady amber. These LEDs are unlit when there is no hard drive is present.

Hard disk activity LED

This LED flickers (green) whenever there is a SCSI hard disk activity. This LED is unlit when there is no disk activity.

Power LED

This LED lights up (steady green) when you apply power to the system by pressing the power button. This LED goes off when you turn off the system.

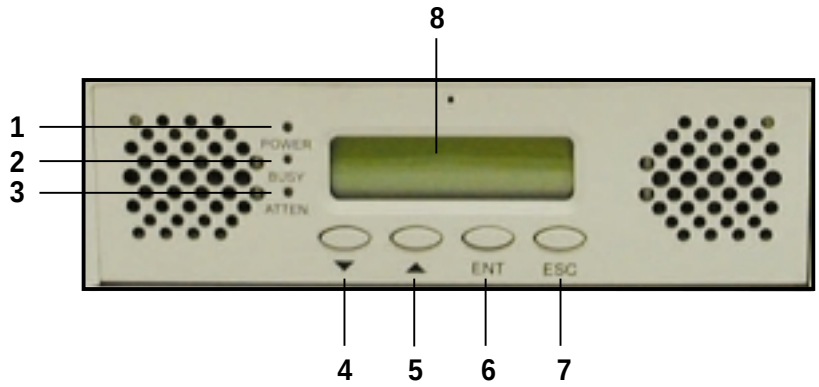
Power Button

The system power button is connected to the motherboard and is used for turning the system ON or OFF.

1.4 DA3100 RAID controller

The front panel of the DA3100 RAID controller consists of an LCD display, status LEDs, and navigation buttons that allow you full access to system information and complete control of the RAID operation.

For detailed information on the RAID controller, refer to the DA3100 Hardware Manual that came with your system package.



1.	**POWER LED**	Lights up when the power is ON
2.	**BUSY LED**	Unlit (OFF) when there is no disk activity Blinks when data on any of the HDDs is being accessed Lighted (ON) when any unprocessed data is still in the cache memory
3.	**ATTEN LED**	Lights up when an error message appears, or when service is required (e.g. when a drive fails and needs to be replaced)
4.	**Down arrow**	Scroll down to view available options
5.	**Up arrow**	Scroll up to return to previous options
6.	**ENT**	Selects and/or executes an option
7.	**ESC**	Returns to the previous menu or cancels a selection
8.	**2x16 LCD**	Displays system throughput during normal operation, approximately 128Kbps per division. Displays messages for configuration and management.

Do not remove the DA3100 RAID controller unit from the AR200 system. If you encounter any problems with the controller, or if you wish to upgrade the memory, contact ASUS technical support. See page vii of this user guide for ASUS contact information.

Chapter 2

Hardware setup

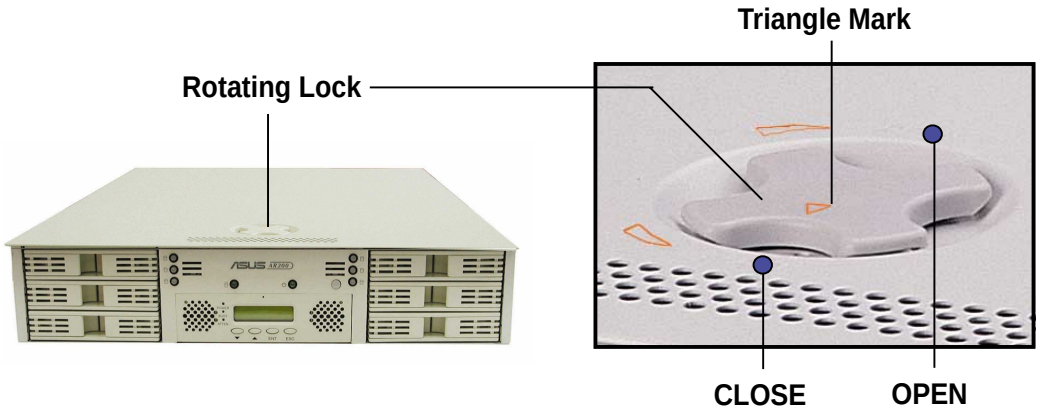
This chapter describes the internal hardware components and provides the procedures for installing and removing hard disk drives. The SCSI cable connections is also described and illustrated in this chapter.

2.1 Removing the chassis cover

The AR200 chassis is a 2U form factor designed for easy assembly and disassembly, making the installation of internal components very convenient. At the top of the chassis is a rotating lock that secures the cover to the chassis.

Unlocking the Cover

To unlock the cover, turn the rotating lock clockwise until the triangle mark points to OPEN.



Removing the cover

Slide the top cover toward the front for about an inch, then lift it from the chassis.

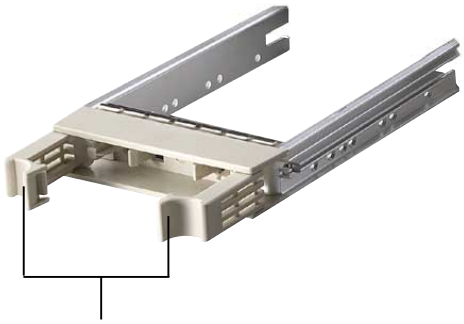
The top cover of the chassis has locking tabs at the rear end that connect to the inner side of the back panel. Make sure to disengage the locking tabs before lifting up the cover.

2.2 Installing SCSI hard disk drives

The RAID system comes with six externally accessible hard disk drive bays.

Hot-Swap Drive Tray

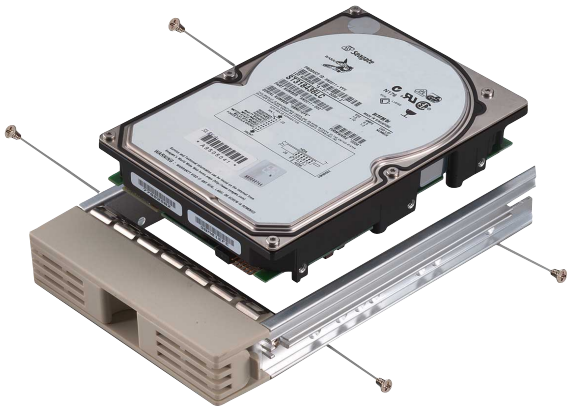
On each of the HDD bays is a hot-swap tray for mounting a hard disk drive. Flip open the tray levers to release the tray, then slide the tray out of the chassis.



Take note of the drive tray orientation before you slide it out. The tray will not fit back into the bay if you insert it the wrong way.

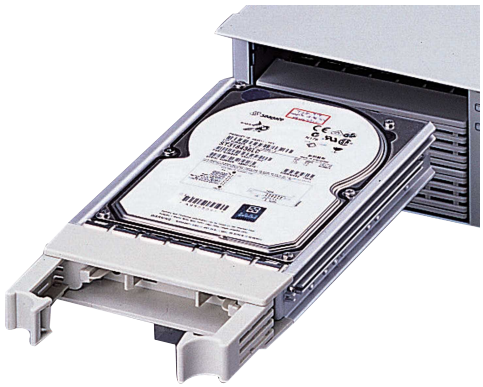
SCSI HDD Mounting

Place the SCSI hard disk drive to the hot-swap tray and secure it with four screws as shown.



HDD Installation

After the drive is secure on the tray, carefully insert the drive into the bay, then push the levers back in place.



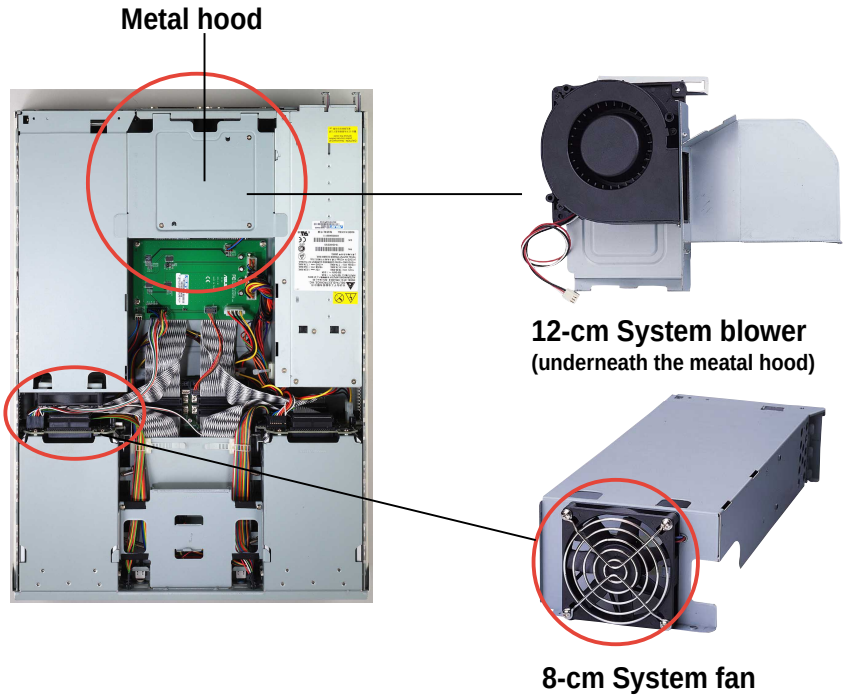
2.3 Cooling system

The chassis includes an 8-cm system fan located at the front end of the PCI cage, and a 12-cm system blower (underneath a metal hood) located between the PCI cage and the power supply.

The metal hood is held in place by two tabs (one on each side) that rest on the edge of the PCI cage and power supply, and two hooks attached to the rear panel.

To remove the 12-cm system blower:

1. Disconnect the fan cable from the connector (labeled FAN1) on the power interface board.
2. Lift up the inner side (with tabs) of the metal hood and detach the two hooks from the rear panel edge.

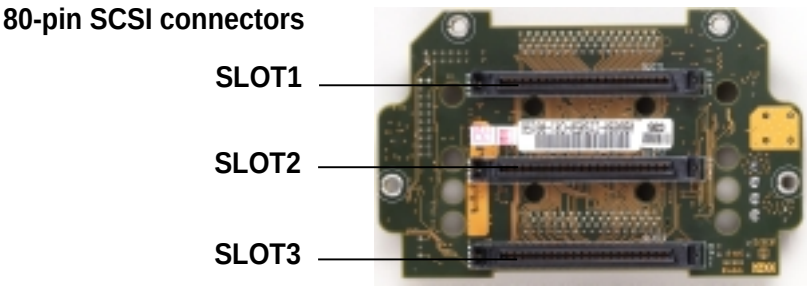


2.4 SCSI backplane boards

The system includes two SCSI backplane boards to support up to six Ultra160 SCA SCSI hard disk drives. The backplane design incorporates a hot-swap feature to allow easy connection or removal of SCSI hard disks.

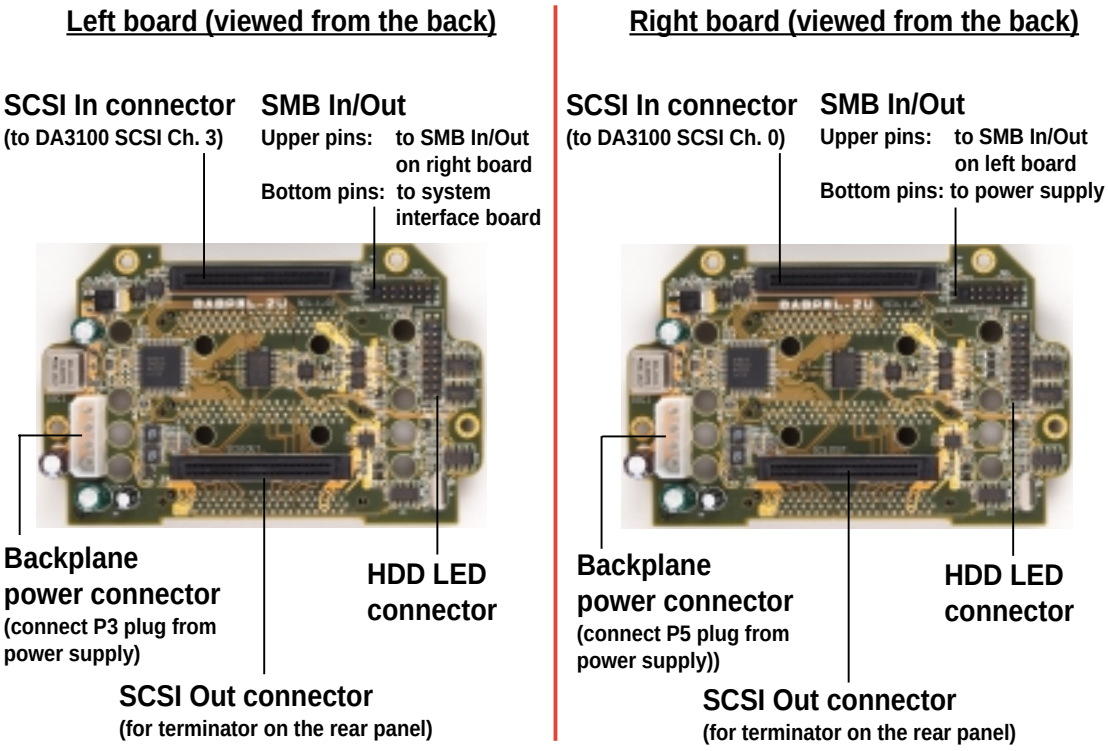
Front side

The front side of a backplane has three 80-pin connectors available for SCA SCSI hard disk drives. The hard disks are externally accessible from the system front panel.



Back side

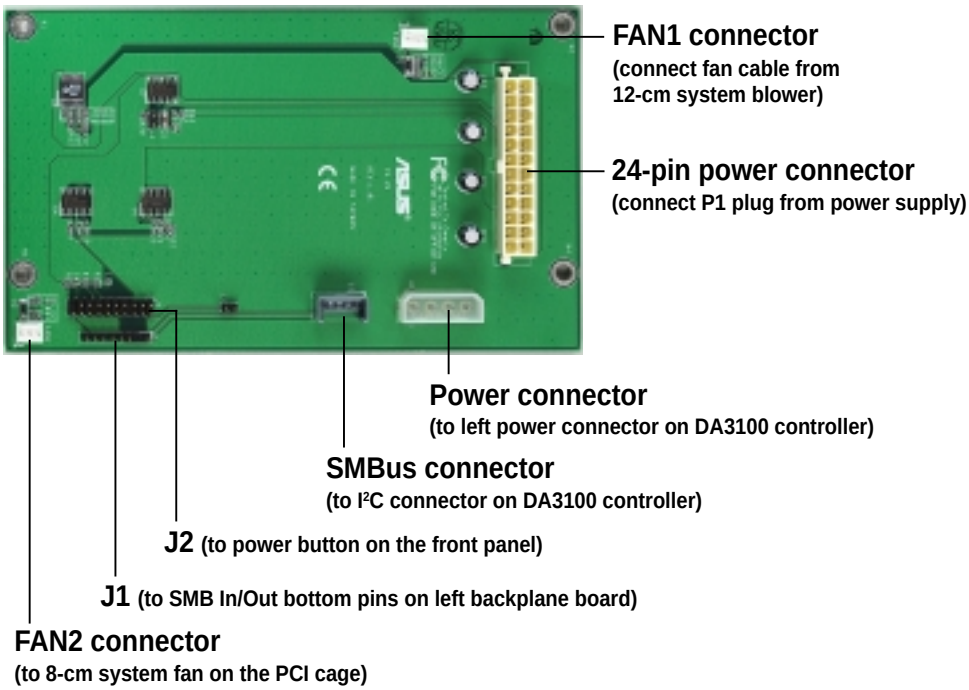
The back side of a backplane includes the SCSI, power, SMB, and LED connectors. The two backplane boards in the AR200 RAID system are the same but have different cable connections. The following pictures show the right and left backplane board connectors and indicate to which they are connected.



2.5 System interface board

The system interface board interconnects the backplane boards, power supply, cooling fans, and the DA3100 controller. Refer to the illustration below for the specific cables connected to the interface board.

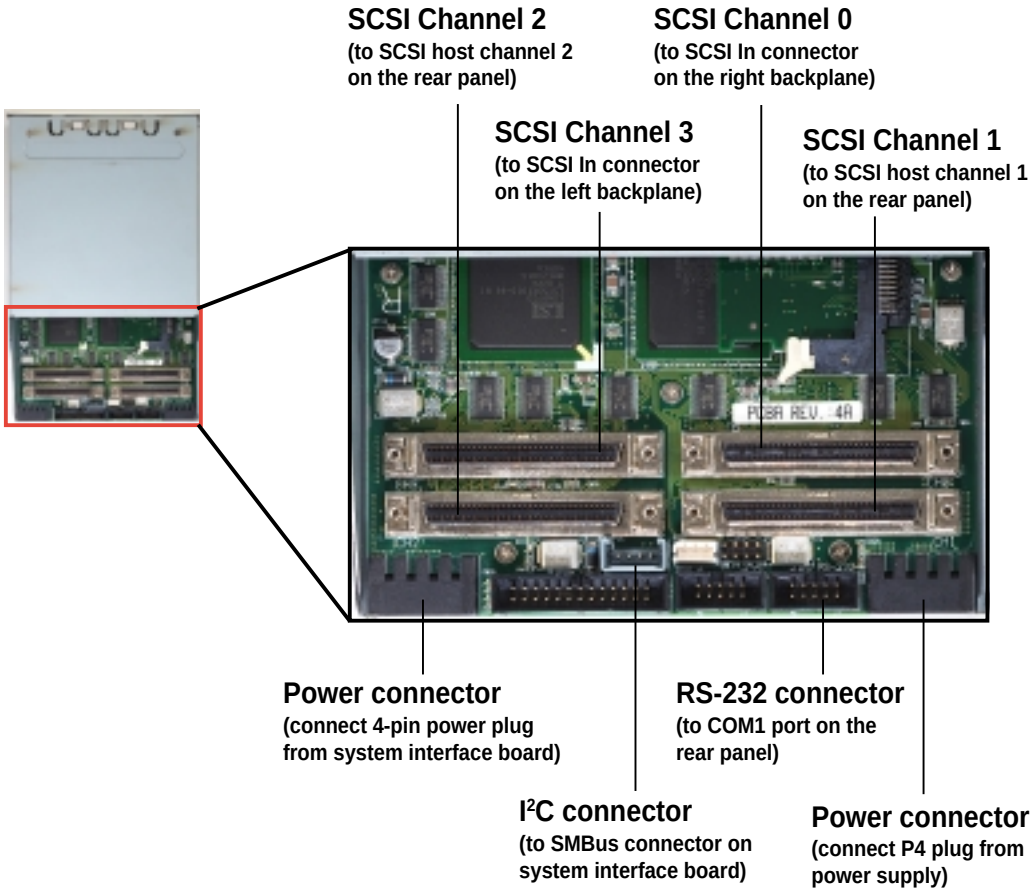
All the cables are already connected when you receive the system. You do not need to disconnect the cables when installing drives or creating a RAID configuration.



2.6 DA3100 connectors

Inside the DA3100 RAID controller are connectors that connect to other system components using interface and power cables. Refer to the illustration below for the specific cable connections.

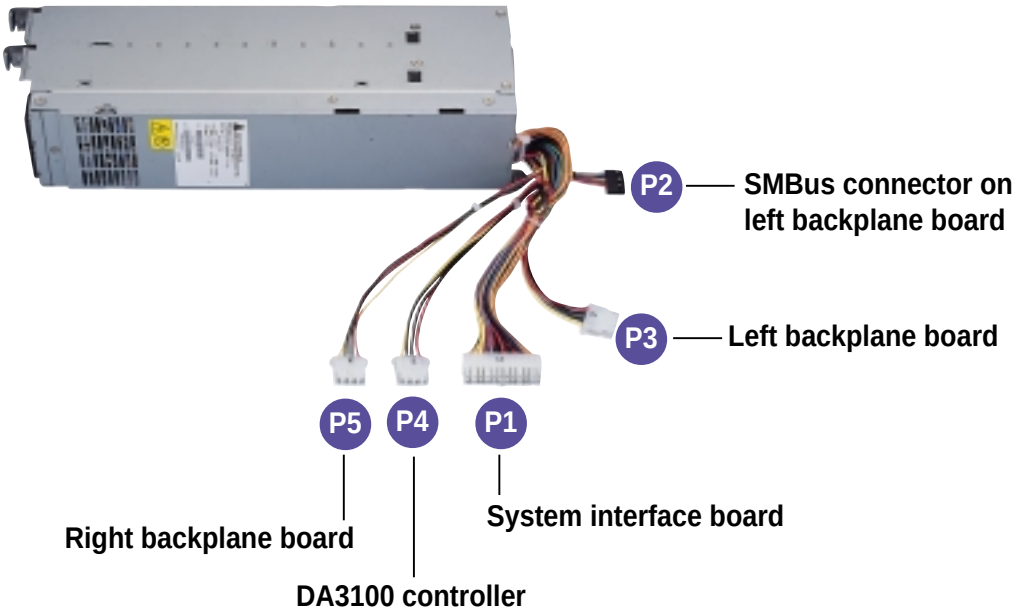
All the cables are already connected when you receive the system. You do not need to disconnect the cables when installing drives or creating a RAID configuration.



2.7 Power supply

2.7.1 Power cable connections

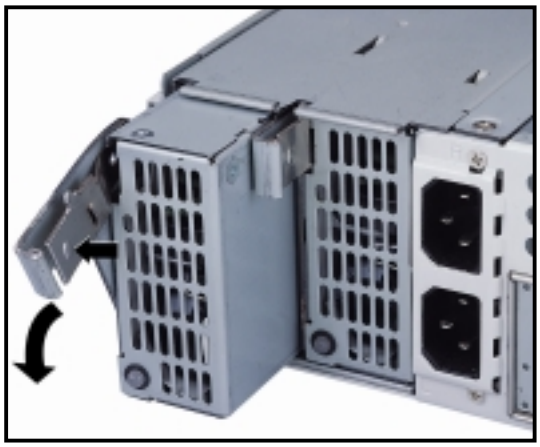
The AR200 power supply unit (PSU) consists of two redundant power supply modules with five power plugs. The picture below indicates where you need to connect the PSU power plugs.



2.7.2 Removing a power supply module

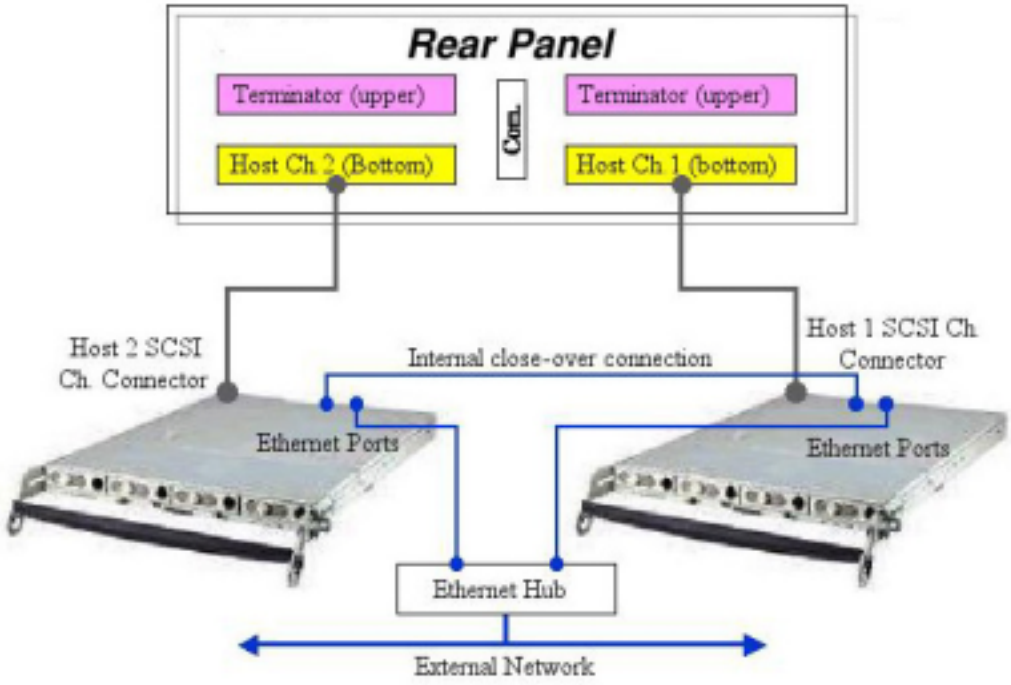
The power supply modules that came with the system is redundant and hot-swappable. This feature allows you to remove or change either one of the modules even while the system in powered ON.

To remove a power supply module, squeeze and push down the handle of the module that you wish to remove to release the module. The module ejects for about 2 inches when released. Carefully pull out the module.

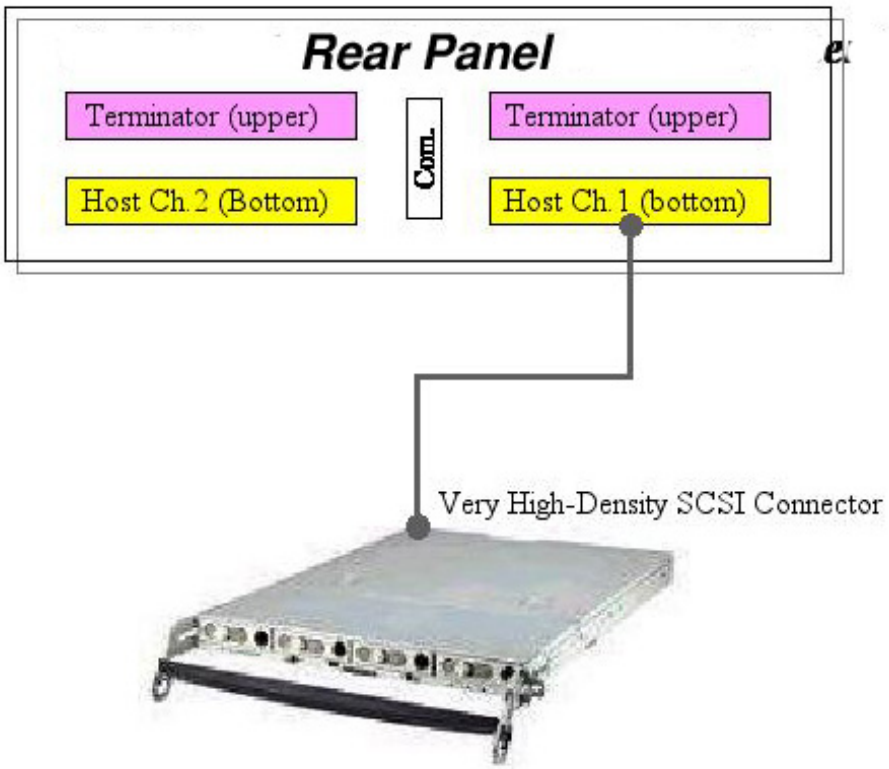


2.8 System connections

2.8.1 SCSI cabling for cluster system (MSCS)



2.8.2 Standalone system



2.8.3 Storage sub-system

Refer to the following diagram to connect AR200 with AR201 (storage cabinet) when creating a storage sub-system.