

ASUS[®] AP1720-E1

Dual Intel[®] Xeon 5U Rackmount Server
533MHz Front Side Bus

User Guide



E1528

Revised edition V2

March 2004

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Contents

Notices	v
Safety information	vi
About this guide	vii
Chapter 1: Product introduction	1-1
1.1 System package contents	1-2
1.2 System specifications	1-3
1.3 Front panel features	1-4
1.4 Rear panel features	1-5
1.5 Internal features	1-6
1.6 LED information	1-8
Chapter 2: Hardware setup	2-1
2.1 Chassis cover	2-2
2.1.1 Removing the side cover	2-2
2.1.2 Installing the side cover	2-3
2.2 Motherboard information	2-4
2.3 Central Processing Unit (CPU)	2-5
2.3.1 Installing a CPU	2-6
2.3.2 Installing the CPU heatsink and fan	2-7
2.4 System memory	2-10
2.4.1 Memory configurations	2-10
2.4.2 Installing a DIMM	2-11
2.4.3 Removing a DIMM	2-11
2.5 Front panel assembly	2-12
2.5.1 Removing the front panel assembly	2-12
2.5.2 Re-installing the front panel assembly	2-14
2.6 5.25-inch drives	2-15
2.7 Hard disk drives	2-18
2.7.1 Installing a hot-swap SCSI HDD	2-18
2.7.2 Installing an IDE HDD	2-20
2.8 Expansion cards	2-25
2.8.1 Installing a standard size expansion card	2-25
2.8.2 Installing a long expansion card	2-27
2.8.3 Removing an expansion card	2-28

Contents

2.9	Cable connections	2-29
2.9.1	Motherboard connections	2-29
2.9.2	SCSI backplane connections	2-30
2.10	Removable components	2-36
2.10.1	Chassis fan	2-36
2.10.2	HDD fans	2-37
2.10.3	SCSI backplanes	2-39
2.10.4	Power supply module	2-41
2.10.5	Floppy disk drive	2-44
2.10.6	Front I/O board	2-46
2.10.7	Chassis footpads and roller wheels	2-48
Chapter 3: Installation options		3-1
3.1	Installing a second SCSI drive cage	3-2
3.2	Installing an IDE drive cage	3-5
3.3	Mounting the system to a rack	3-7
3.3.1	Remove the footpads or roller wheels	3-7
3.3.2	Remove the top cover	3-7
3.3.3	Attach the rack rails	3-7
Appendix: Power supply		A-1
A.1	General description	A-2
A.2	Specifications	A-3

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. 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

- 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.

Operation Safety

- 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.



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.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

About this guide

Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

Contents

This guide contains the following parts:

1. Chapter 1: Product Introduction

This chapter describes the general features of the AP1720-E1 server. 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 or removing system components.

3. Chapter 3: Configuration options

This chapter describes how to install optional components and devices into the barebone server and create your desired configuration.

4. Appendix: Power supply

This appendix gives information on the power supply that came with the barebone server.

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.

References

Refer to the following sources for additional information, and for product and software updates.

1. **ASUS PC-DL Deluxe motherboard user guide**

This manual contains detailed information about the PC-DL Deluxe motherboard.

2. **ASUS websites**

The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

Chapter 1

This chapter describes the general features of the barebone server. It includes sections on front panel and rear panel specifications.



1.1 System package contents

Check your ASUS AP1720-E1 package with the items on the following table. The package contents vary for 8-SCSI, 4-SCSI, and 4-IDE HDD configurations. Contact your dealer immediately if any of the items is damaged or missing.

Item Description	HDD Bays		
	AS8 (8 SCSI)	AS4 (4 SCSI)	A14 (4 IDE)
1) ASUS AK25 5U rackmount chassis with:			
• ASUS PC-DL Deluxe motherboard	✓	✓	✓
• 450W power supply	✓	✓	✓
• SCSI backplane board (2 pieces) (1 piece)	✓	✓	
• ASUS U160/320 SCSI card/SCSI cable	✓	✓	
• 52x CD-ROM drive	✓	✓	✓
• floppy disk drive	✓	✓	✓
• chassis fan	✓	✓	✓
• HDD fan (2 units) (1 unit)	✓	✓	
• hot-swap SCSI HDD trays (8 units, including screws for HDDs) (4 units, including screws for HDDs)	✓	✓	
• internal HDD rails (4 pairs)			✓
• chassis roller wheels (4 sets)	✓	✓	✓
• CPU heatsink and fan assembly (2 sets)	✓	✓	✓
• front I/O board	✓	✓	✓
• HDD dummy covers (for IDE bays)	✓	✓	✓
2) AC power cable	✓	✓	✓
3) System screws and cables	✓	✓	✓
4) System keys (2 pcs.)			
5) Bundled CDs			
• AP1720-E1 support CD	✓	✓	✓
• ASWM software CD	✓	✓	✓
• TrendMicro® ServerProtect® CD	✓	✓	✓
6) Documentation			
• ASUS AP1720-E1 user guide	✓	✓	✓
• ASUS PC-DL Deluxe user guide	✓	✓	✓
7) Optional items			
• ASUS AK25 rackmount rail kit	✓	✓	✓
• AK25 internal HDD cage (non-hot swap)	✓	✓	✓

1.2 System specifications

The ASUS AP1720-E1 is a barebone server system featuring the ASUS PC-DL Deluxe motherboard. The server supports dual Intel® Xeon™ processors in 604-pin sockets, and includes the latest technologies through the chipsets embedded on the motherboard.

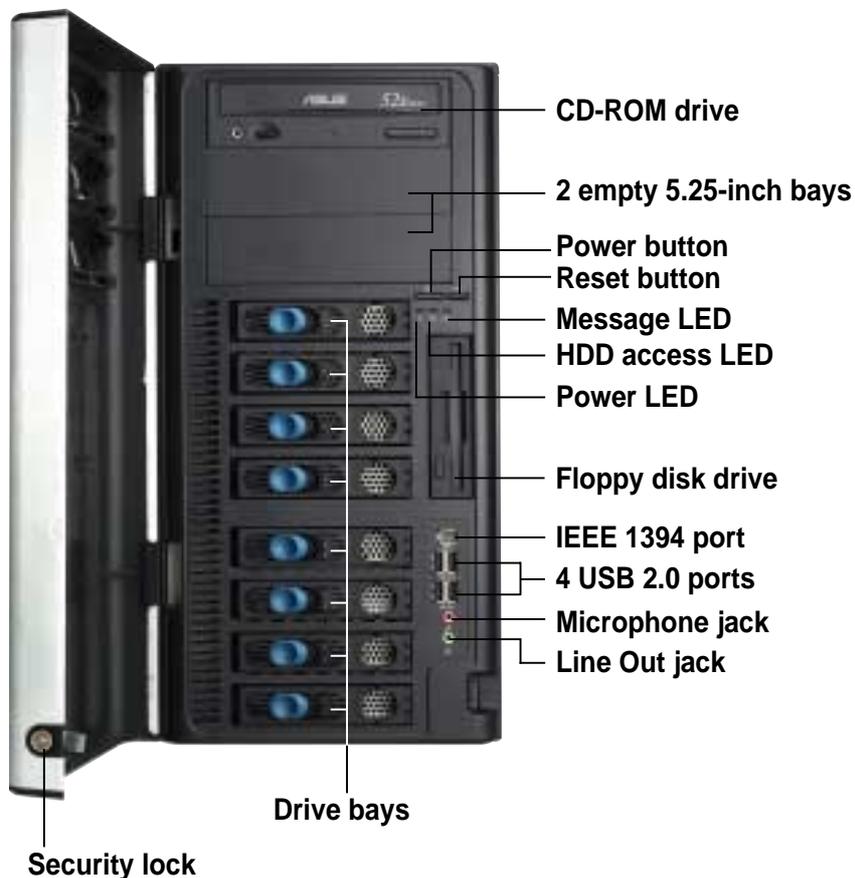
Chassis	Pedestal or rackmount 5U with removable front door bezel and chassis foot stand or roller-wheels.
Motherboard	ASUS PC-DL Deluxe (ATX form factor: 12 in x 9.6 in)
Chipset	Intel® 82875 Memory Controller Hub (MCH) Intel® 82801ER I/O Controller Hub (ICH5R)
Processor	Supports dual Intel® Xeon™ CPUs up to 3.06+ GHz with 533MHz FSB
Memory	4 x 184-pin DDR sockets for up to 4GB memory Supports PC2700/PC2100 unbuffered ECC or non-ECC DDR DIMMs
LAN	Intel® 82547EI Gigabit LAN controller
IEEE 1394	TI TSB43AB22A IEEE 1394 controller
RAID	Promise® PDC20378 controller (supports RAID 0/RAID 1/RAID 0+1/Multi-RAID)
Expansion slots	1 x AGP Pro/8X slot 5 x 32-bit/33Mhz 5V PCI slots
Drive bays	1 x 3.25-inch FDD bay 3 x 5.25-inch drive bays
Front I/O	4 x USB 2.0 1 x IEEE 1394 port Line Out/Microphone ports
Rear panel I/O	1 x Parallel port 2 x Serial ports 1 x RJ-45 port 1 x IEEE 1394 port 4 x USB 2.0 ports 1 x PS/2 keyboard port 1 x PS/2 mouse port Line In/Line Out/Microphone ports
Management	ASUS Server Web-based Management (ASWM) 2.0
Hardware monitors	Voltage, temperature, and fan speed monitoring Automatic System Restart (ASR) feature
Power supply	SSI-type 450W power supply (with 24-pin and 8-pin power plugs)

* Refer to the motherboard user guide for more information on internal connectors.

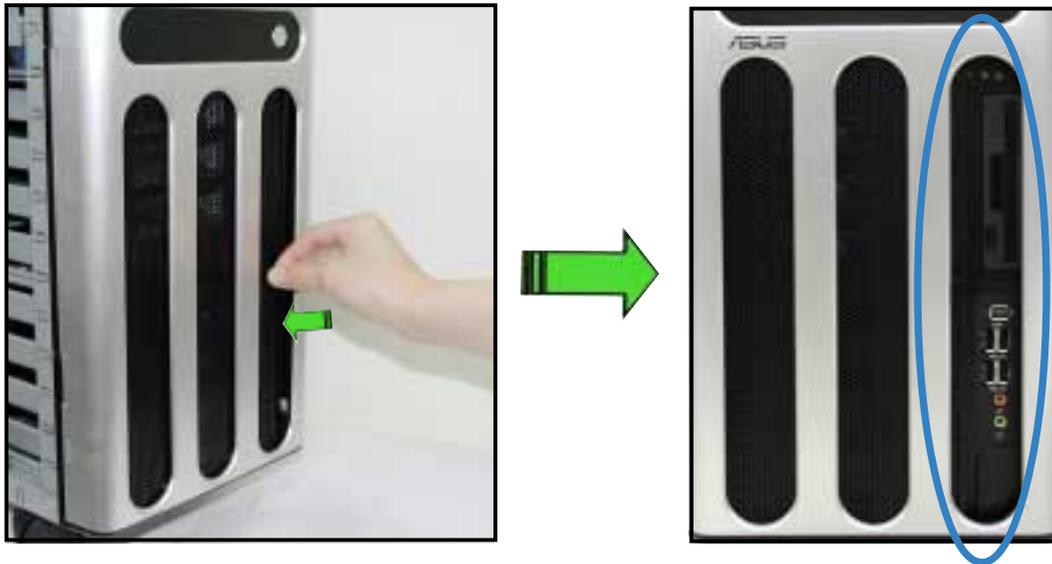
1.3 Front panel features

The AP1720-E1 chassis displays a stylish front bezel with lock. The bezel covers the system components on the front panel and serves as security. Open the bezel to access the front panel components.

The drive bays, power and reset buttons, LED indicators, CD-ROM drive, floppy drive, and four USB ports are located on the front panel. For future installation of 5.25-inch devices, two drive bays are available.

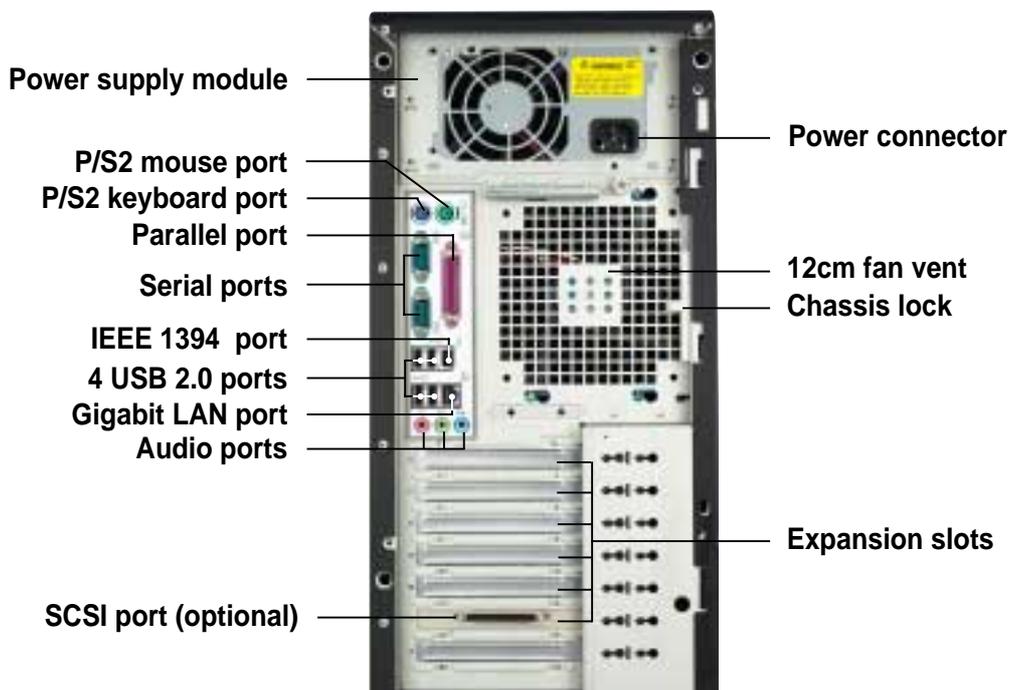


If you wish to access front I/O ports and floppy disk drive without opening the bezel, hold the tab and move the sliding panel (rightmost panel) to the left as shown.



1.4 Rear panel features

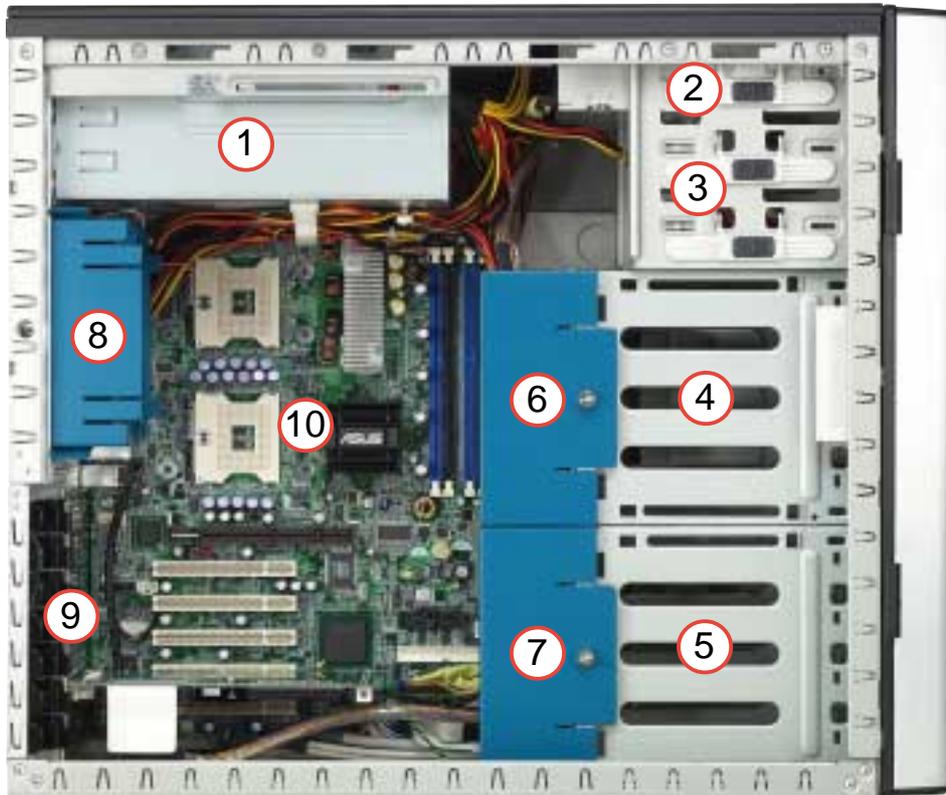
The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a chassis lock and intrusion switch, a vent for the system fan, and power supply module.



1.5 Internal features

The barebone server system includes the basic components as shown.

AS8 (8-SCSI configuration)



- | | |
|------------------------------|------------------------------|
| 1. Power supply cage | 6. HDD fan 1 |
| 2. CD-ROM drive | 7. HDD fan 2 (optional) |
| 3. 2 x 5.25-inch drive bays | 8. Chassis fan |
| 4. first drive cage (upper) | 9. Expansion card lock |
| 5. second drive cage (lower) | 10. PC-DL Deluxe motherboard |



The lower 4-bay hot swap SCSI drive cage may be changed to an internal IDE drive cage (non-hot swap) if you wish to install long PCI cards. The internal drive cage is optional and purchased separately.

AS4 (4-SCSI configuration)

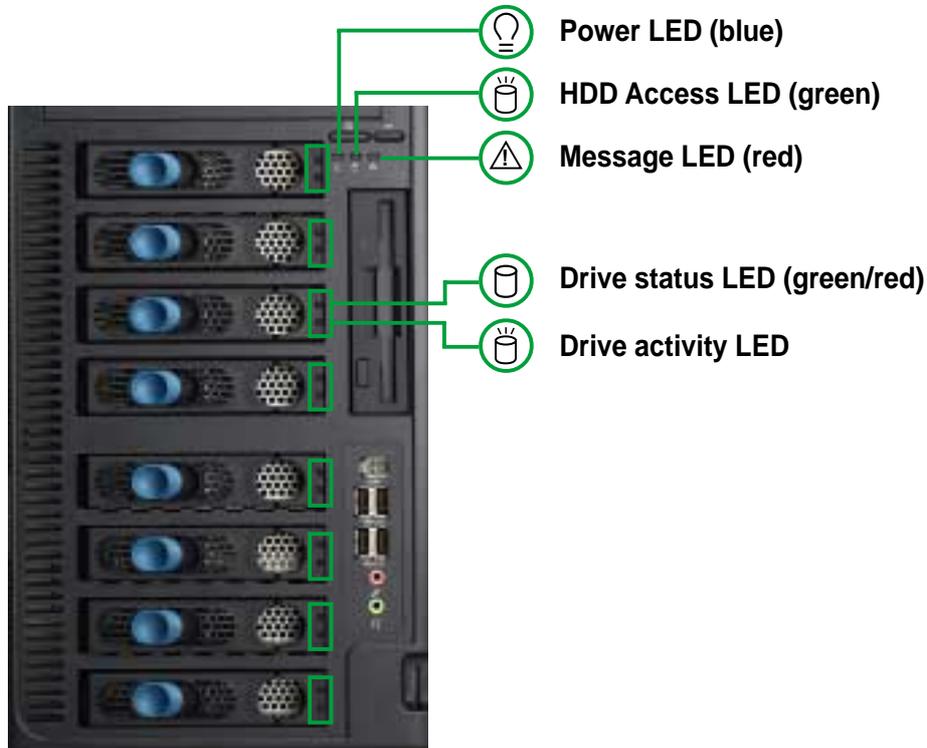


AI4 (4-IDE configuration)



1.6 LED information

The barebone system comes with five LED indicators. Refer to the following table for the LED status description.



LED	Icon	Display status	Description
System			
Power LED		ON Blinking	System power ON Suspend mode
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASMS indicates a HW monitor event
Hard disk drives			
Drive Status LED		Green Red Red-Blinking	Bridge board connected to backplane Installed HDD is in good condition HDD failure HDD rebuilding using the RAID card SAF-TE* function
Drive Activity LED		Blinking	Read/write data into the HDD

***SCSI Access Fault-Tolerant Enclosure**



The Power, HDD Access, and Message LEDs are visible even if the system front bezel is closed.

Chapter 2

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



ASUS AP1720-E1 barebone server

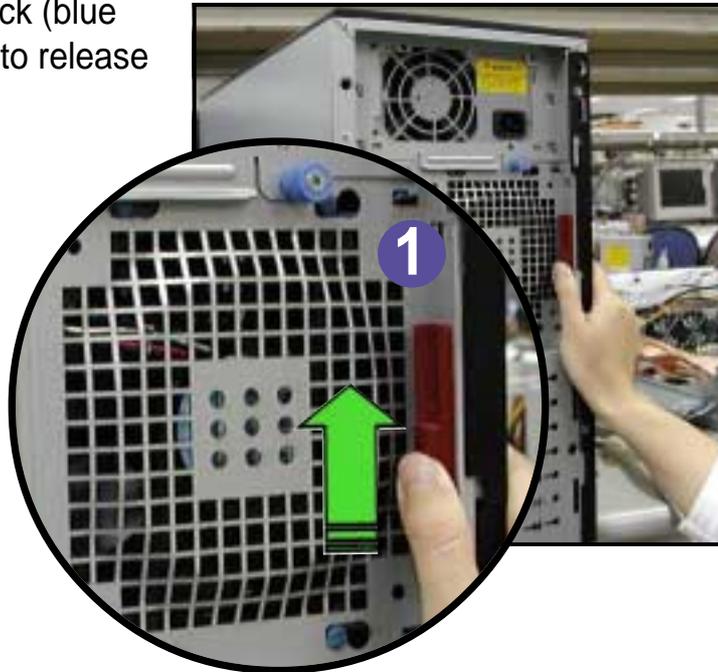
Hardware setup

2.1 Chassis cover

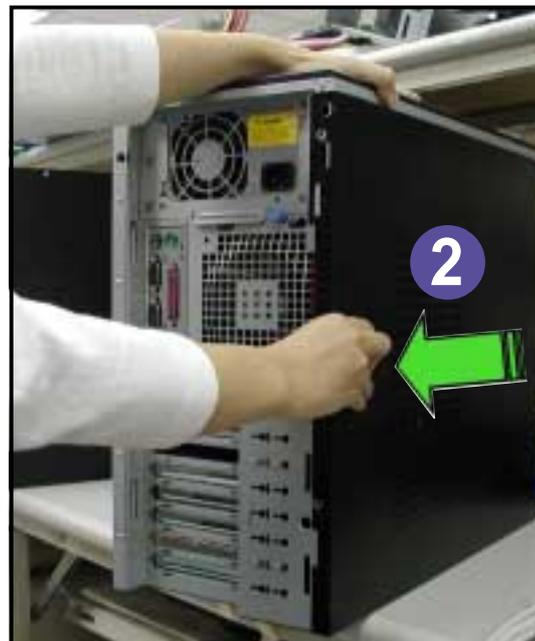
The chassis features a “screwless design” that allows convenient assembly and disassembly. Simply push or slide mechanical bolts

2.1.1 Removing the side cover

1. Push up the chassis lock (blue bolt) on the rear panel to release the side cover.



2. Slide the side cover for about half an inch toward the rear until it is disengaged from the chassis.



Viewing the internal structure

Without the side cover, the internal structure and installed components of the barebone server vary depending on the model you purchased. Refer to section “1.5 Internal features” for the different model configurations.

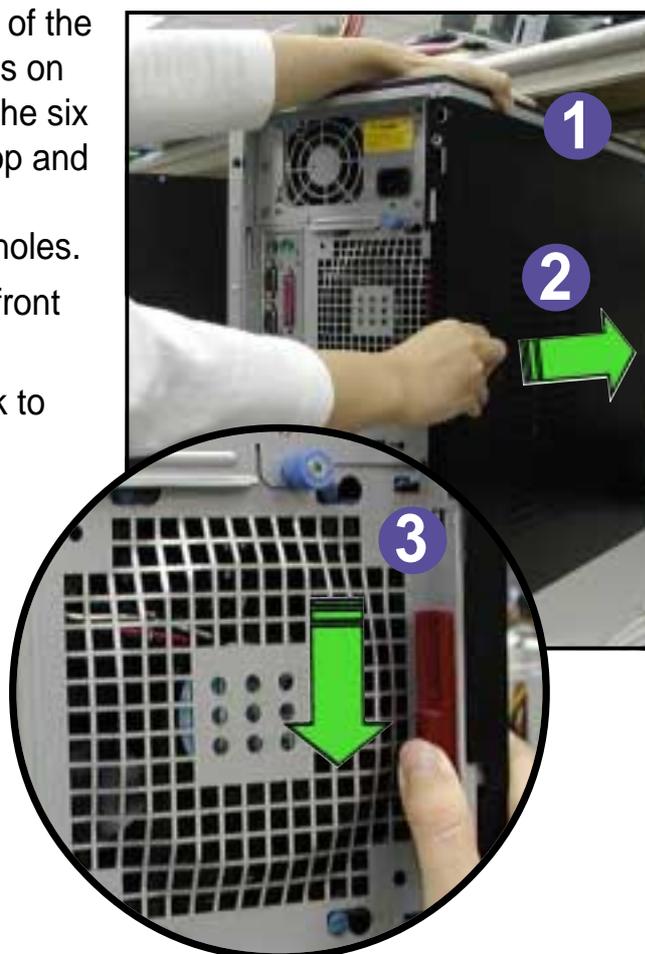
Perform the procedures in the succeeding sections to install the CPU, system memory, disk drives, and expansion cards; replace fans and power supply; and connect the system cables.



You may need to remove some of the installed components to access the DIMM sockets and internal connectors. Refer to section “2.10 Removable components” for instructions.

2.1.2 Installing the side cover

1. Match and insert the hooks of the cover to the elongated holes on the side of the chassis. All the six hooks (three each on the top and bottom) of the cover must properly fit the designated holes.
2. Slide the cover toward the front until it snaps in place.
3. Push down the chassis lock to secure the side cover.



2.2 Motherboard information

The barebone server comes with the ASUS PC-DL Deluxe motherboard already installed. The motherboard is secured to the chassis by nine (9) screws as indicated by circles in the illustration below.



Refer to the motherboard user guide for detailed information on the motherboard.

This side towards
the rear of the chassis



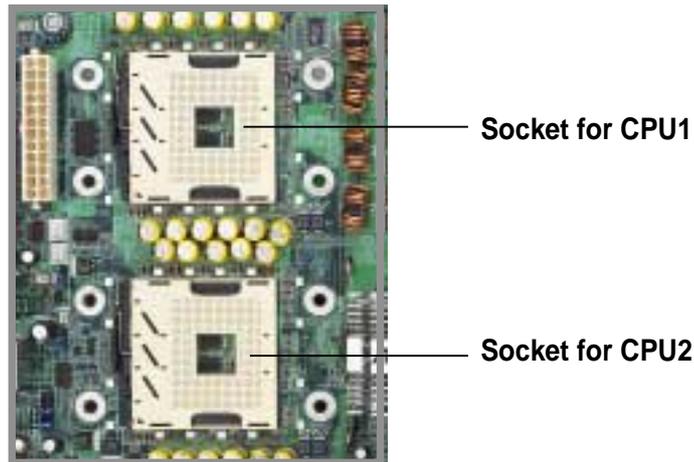
Make sure to unplug the power cord before installing or removing any motherboard component or connection. Failure to do so may cause you physical injury and may damage motherboard components.

2.3 Central Processing Unit (CPU)

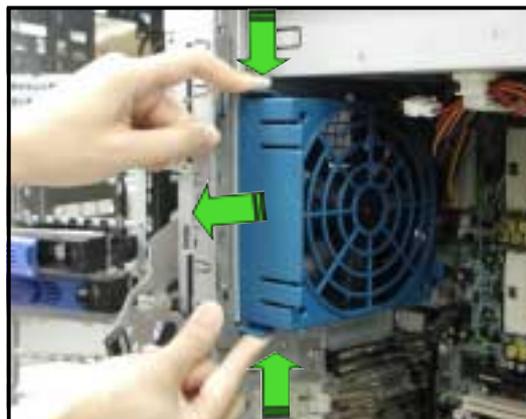
The motherboard comes with dual surface mount 604-pin Zero Insertion Force (ZIF) sockets. The sockets are designed for the Intel® Xeon™ processors in the 604-pin package with 512KB L2 cache.



If installing only one CPU, use CPU socket 1 to ensure system stability.



Before installing the CPU, remove the chassis fan attached to the inner side of the rear panel to allow enough space for the installation. Refer to section “2.10 Removable components” for instructions.



2.3.1 Installing a CPU

Follow these steps to install a CPU.

1. Locate the 604-pin CPU1 socket on the motherboard. Flip up the socket lever and push it all the way to the other side.



Make sure that the socket lever is pushed back all the way, otherwise the CPU does not fit in completely.

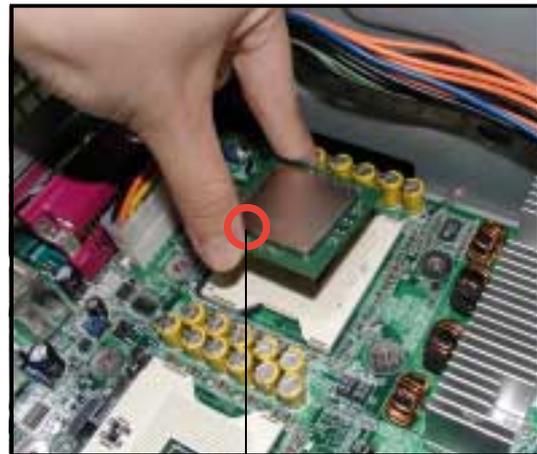


CPU1 socket

2. Position the CPU above the socket as shown.
3. Carefully insert the CPU into the socket until it fits in place.



The CPU fits only in one correct orientation. **DO NOT** force the CPU into the socket to prevent bending the pins and damaging the CPU!



Marked corner

4. Carefully push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.
5. Apply the thermal interface material (thermal grease) to the top of the CPU. This thermal grease should come with the CPU package.
6. Follow steps 1 to 5 if you wish to install a second CPU.



2.3.2 Installing the CPU heatsink and fan

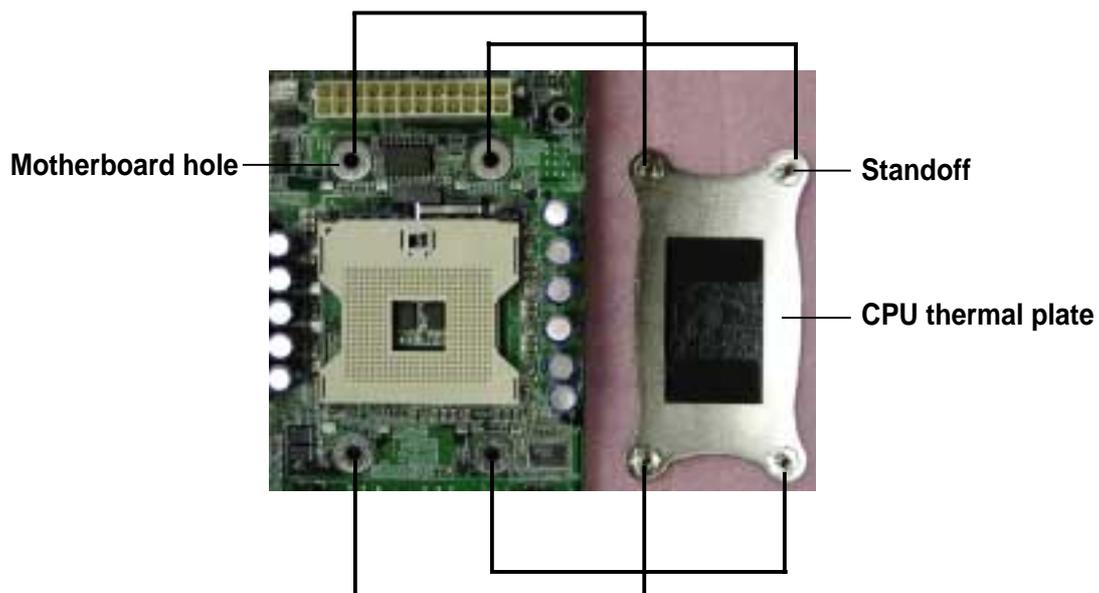


The system package came with two sets of CPU heatsink and fan assemblies. Use **ONLY** the bundled CPU heatsink and fan to ensure optimum thermal condition and performance.

CPU thermal plate

This motherboard requires a thermal plate for each of the CPUs. The thermal plates are already installed underneath the motherboard when the system is shipped.

In case you need to remove and re-install the thermal plates, refer to the picture below for the correct matching of the motherboard and thermal plate holes.





Make sure that you have applied the thermal grease to the top of the CPU before installing the heatsink and fan!

To install the CPU heatsink and fan:

1. Place the heatsink with fan assembly on top of the installed CPU1. Make sure it fits the screw holes of the heatsink bracket at the bottom of the CPU socket.



2. Use a Phillips screwdriver to tighten all four screws enough to secure the heatsink in place.



Take caution in tightening screws. Do not over-tighten screws, doing so may damage the motherboard!

TIP: Follow the sequence shown: half-tighten the screw on one corner of the heatsink and fan, then the next screw on the other corner and so on, making a cross pattern. Repeat until all four screws are tightened properly.



Make sure heatsink with fan assembly is mounted properly on the CPU to avoid burning the CPU and/or CPU socket!

3. When the heatsink and fan assembly is in place, connect the fan cable plug to the fan connector on the motherboard labeled CPUFAN1.



The fan cable plug is slotted so it fits only in one orientation. If it doesn't fit completely, try reversing it.



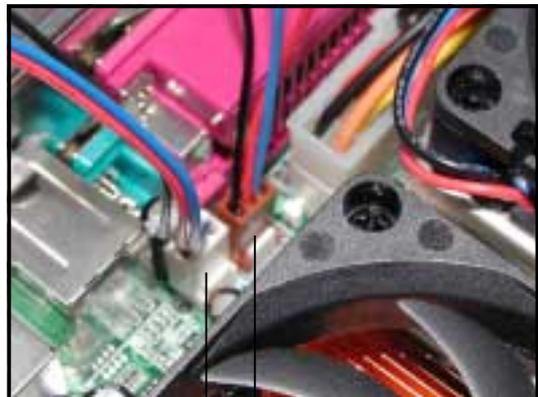
4. Make sure that the heatsink and fan assembly is stable in place and the fan power cable plug is properly connected.



Don't forget to connect the CPU fan cable plug. Hardware monitoring errors may occur if you fail to plug the fan cable.



5. Repeat steps 1 to 2 to install the heatsink and fan assembly for the second CPU, then connect the fan cable to the fan connector labeled CPUFAN2.



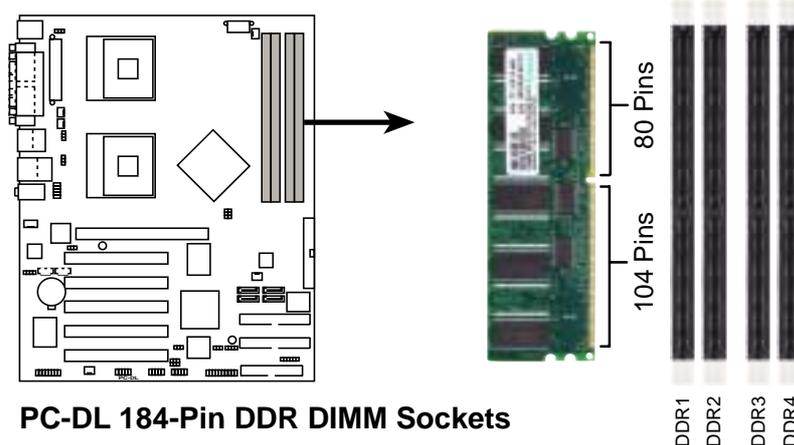
CPUFAN1 cable plug

CPUFAN2 cable plug

2.4 System memory

The motherboard comes with four Double Data Rate (DDR) Dual Inline Memory Module (DIMM) sockets. These sockets support up to 4GB system memory using 184-pin unbuffered ECC or non-ECC PC2700/PC2100 DDR DIMMs, and allow up to 5.33GB/s data transfer rate.

The following figure illustrates the location of the DDR DIMM sockets.



2.4.1 Memory configurations

Mode	SOCKETS			
	DIMM_A1 (blue)	DIMM_A2 (black)	DIMM_B1 (blue)	DIMM_B2 (black)
Single-channel	(1) Populated	—	—	—
	(2) —	Populated	—	—
	(3) —	—	Populated	—
	(4) —	—	—	Populated
Dual-channel	(1) Populated	—	Populated	—
	(2) —	Populated	—	Populated
	(3)* Populated	Populated	Populated	Populated

* For dual-channel configuration (3), you may:

- install identical DIMMs in all four sockets
- or
- install identical DIMM pair in DIMM_A1 and DIMM_B1 (blue sockets) and identical DIMM pair in DIMM_A2 and DIMM_B2 (black sockets)

2.4.2 Installing a DIMM



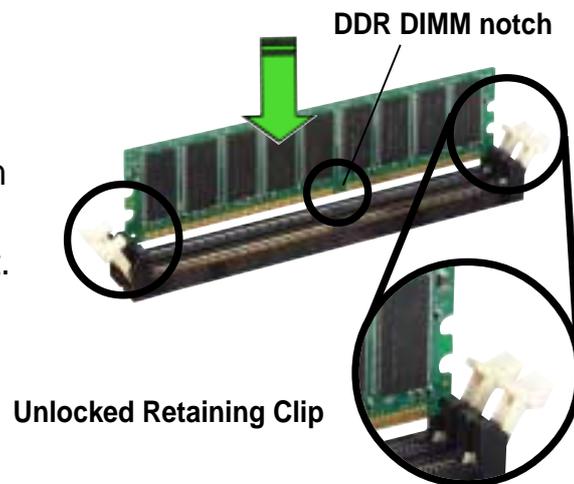
Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause damage to both the motherboard and the components.

Follow these steps to install a DIMM.

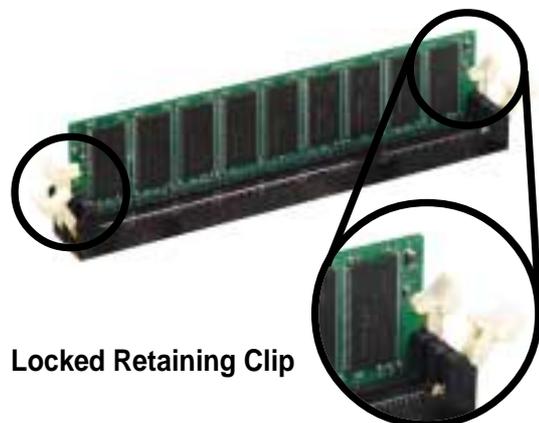


To access the DIMM sockets, remove the upper HDD fan cage. Refer to section “2.10 Removable components” for instructions.

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.



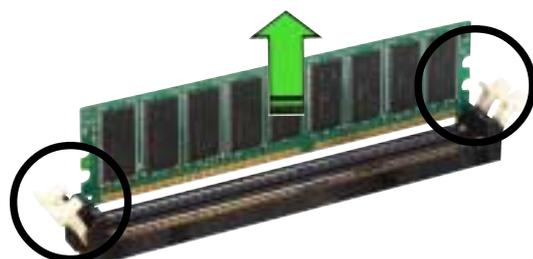
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



2.4.3 Removing a DIMM

Follow these steps to remove a DIMM.

1. While supporting the DIMM with your fingers, press the retaining clips outward simultaneously to release the DIMM from the socket.
2. Remove the DIMM from the socket.



2.5 Front panel assembly

2.5.1 Removing the front panel assembly



Before you can install a 5.25-inch drive, you should first remove the front panel assembly (front bezel and front panel cover). The front panel assembly is attached to the chassis through four **hooked tabs** on the left side and four **hinge-like tabs** on the right side.

To remove the front panel assembly:

1. Press the lock lever (blue bar) on the front edge of the chassis to release the front panel assembly.

Lock lever



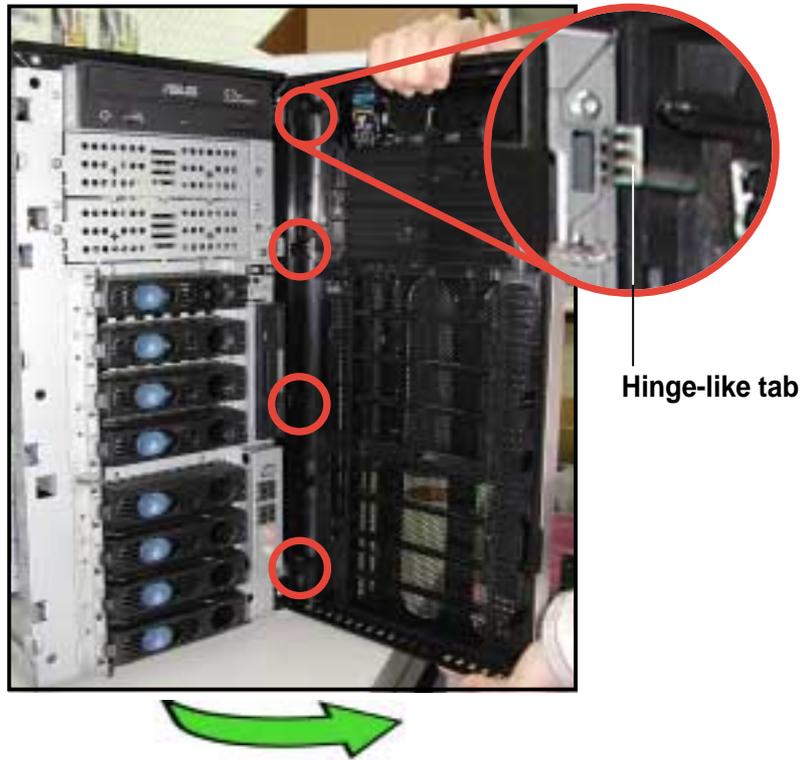
2. Pull and swing the left edge of the front panel outward.



3. Unhook the hinge-like tabs from the holes on the right side of the front panel to completely detach the front panel assembly from the chassis.



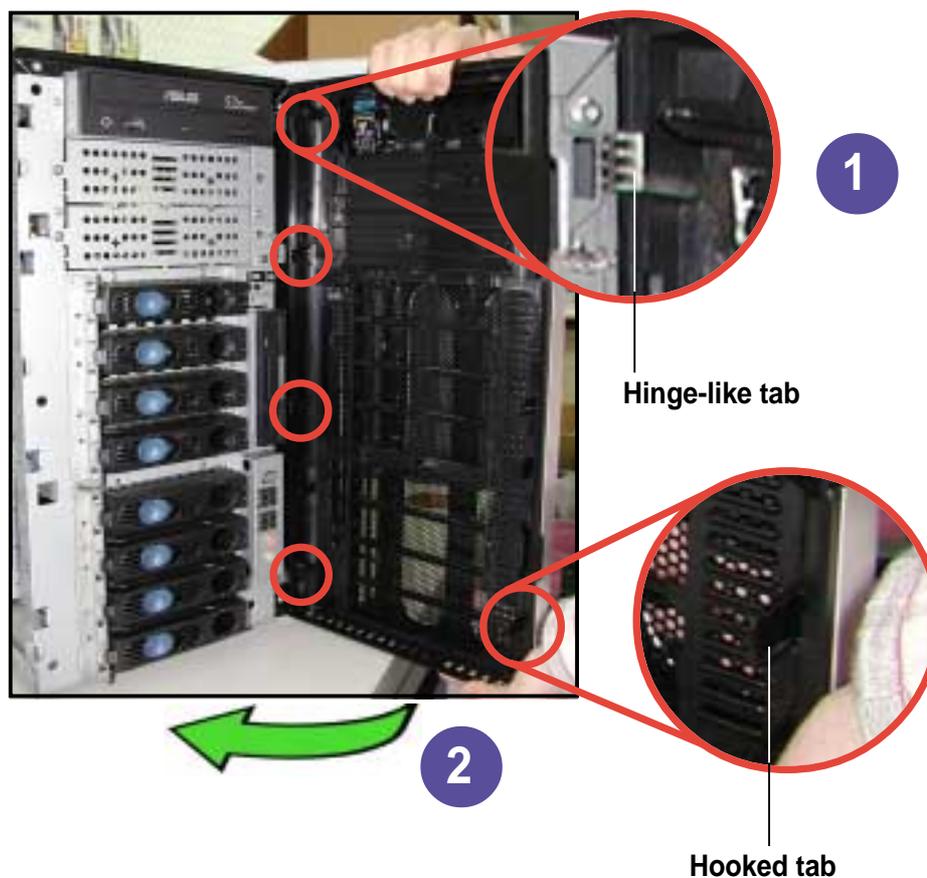
Do not use too much force when removing the front panel assembly.



2.5.2 Re-installing the front panel assembly

To re-install the front panel assembly (front bezel and front panel cover):

1. Insert the four hinge-like tabs to the holes on the right edge of the chassis.
2. Swing the front panel to the left and fit the four (4) hooked tabs to the left side of the chassis until the tabs snap back in place.

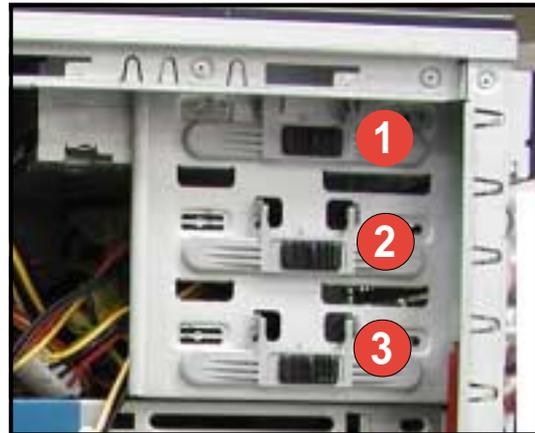


2.6 5.25-inch drives



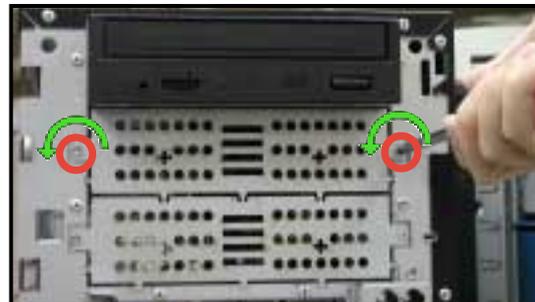
If you have previously used and powered up the system, and that it may be connected to an AC power source, make sure to unplug the power cable before installing or removing any system components. Failure to do so may cause damage to the motherboard and other system components!

Three 5.25-inch drive bays are located on the upper front part of the chassis. A CD-ROM drive that comes standard with the system package occupies the uppermost bay (*labeled 1*). The two lower bays (*labeled 2 and 3*) are available for additional 5.25-inch devices.



To install a 5.25-inch drive:

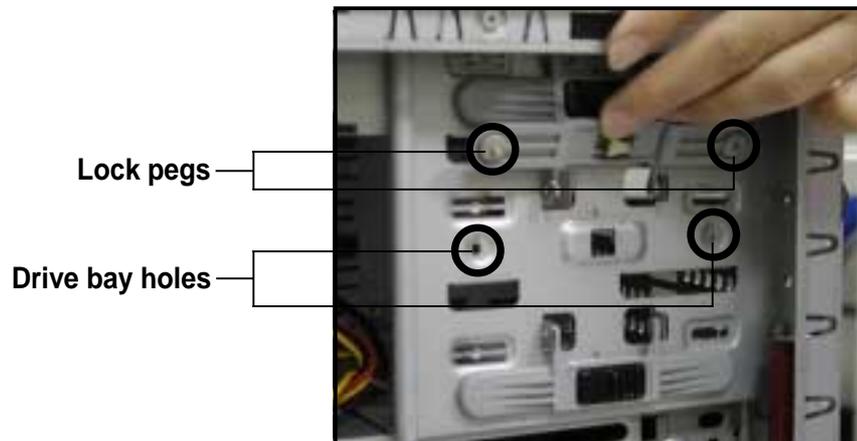
1. Use a Phillips (cross) screwdriver to remove the screws that secure the metal cover of the bay where you wish to install the drive.



2. From the side of the drive bay, slide the drive bay lock by pushing it to the left to release the drive lock bar.



- When released, pull up the drive bay lock bar. Underneath the lock bar are two pegs that match the holes on the drive bay. This mechanism secures the drive to the bay in place of screws.



- While holding up the bar lock, carefully insert a 5.25-inch drive into the bay, until the back of the drive aligns to the rear edge of the drive cage.



Due to space constraints inside the chassis, do not insert the drive all the way at this time. This will allow you enough space to easily connect the drive cables.

- Connect the IDE cable to the IDE connector on the back of the drive.
- Connect a 4-pin plug from the power supply to the power connector on the back of the drive.

IDE cable

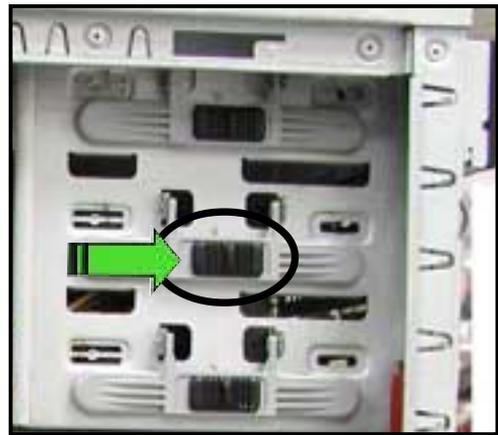


Power plug

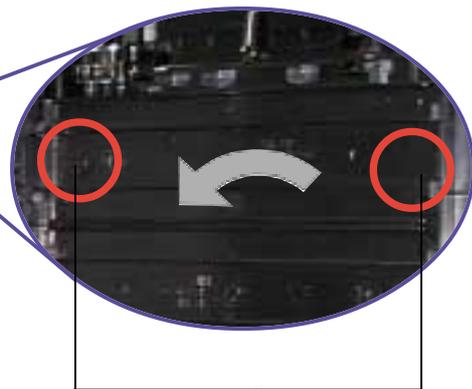
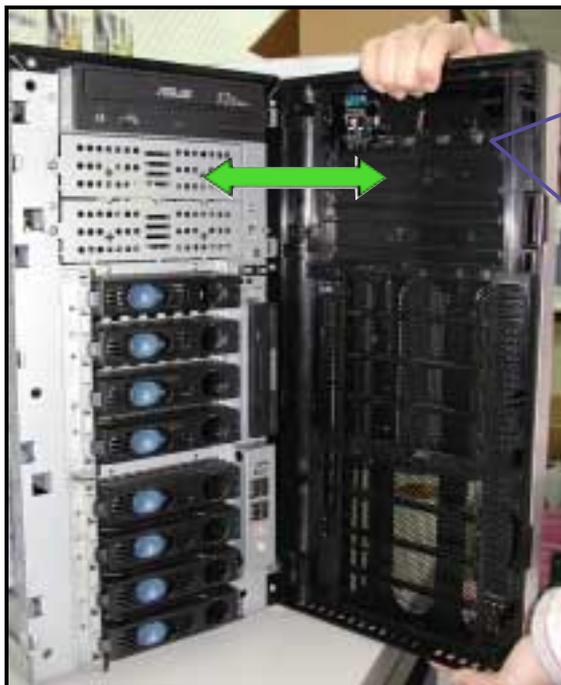
7. Make sure that the drive and bay holes align as shown. When in place, the drive protrudes about an inch from the front panel.



8. Pull down the bar lock and insert the lock pegs to the drive/bay holes, then push the drive lock to the right to secure the drive.



9. On the front panel assembly, detach the plastic bay cover opposite the 5.25-inch drive that you installed by pressing the two hooked tabs on each side of the bay cover.



Bay cover tabs

10. Re-install the front panel assembly when done. Refer to section “2.5.2 Re-installing the front panel assembly” for instructions.

2.7 Hard disk drives

2.7.1 Installing a hot-swap SCSI HDD

To install a SCSI hard disk drive:

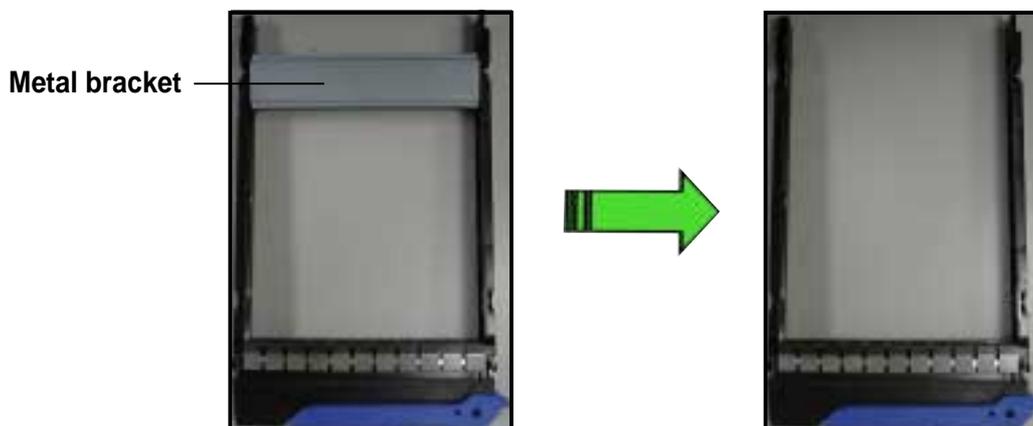
1. Open the front bezel to access the hot-swap drive trays.
2. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.



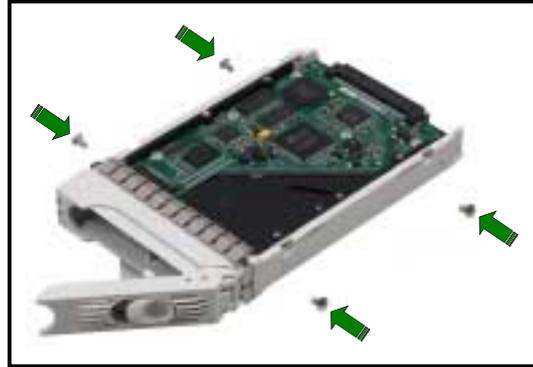
3. Firmly hold the tray lever and pull the drive tray out of the bay.



4. An empty drive tray requires a metal bracket for support. Use a Phillips (cross) screwdriver to remove the bracket if you wish to install a hard disk in the drive tray.



5. Place an SCA SCSI hard disk into the drive tray, and secure it with four screws.



6. Carefully insert drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.



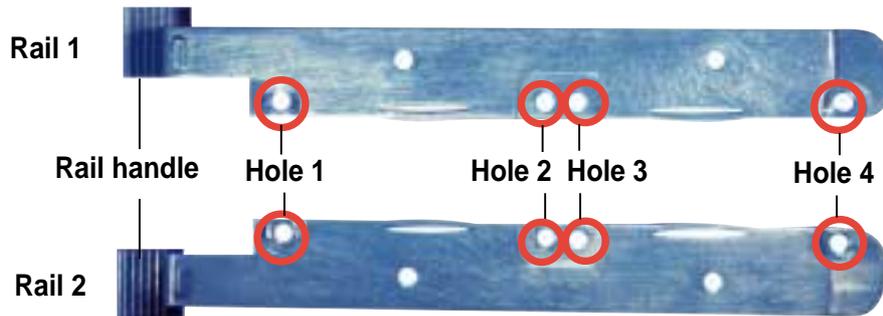
7. Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.



2.7.2 Installing an IDE HDD

If your system is an IDE model, your package comes with specially designed hard disk drive rails. Depending on which bay you wish to install your hard disk drive, the orientation of the drive rails vary so that the screw holes match those on the drive.

For identification purposes, the drive rails will be referred to as “Rail 1” and “Rail 2” as shown below.

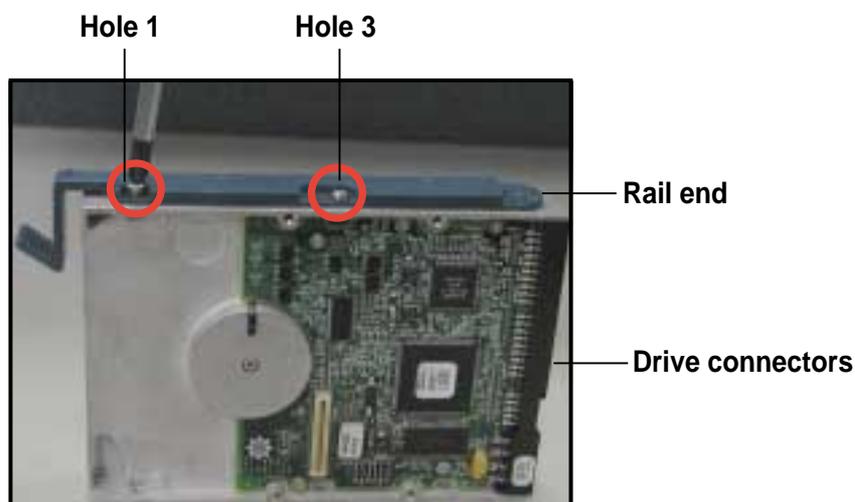


Take note of the correct orientation of the drive rails. There is only one **correct** way to attach the rails when installing drives on the first and second drive cages.

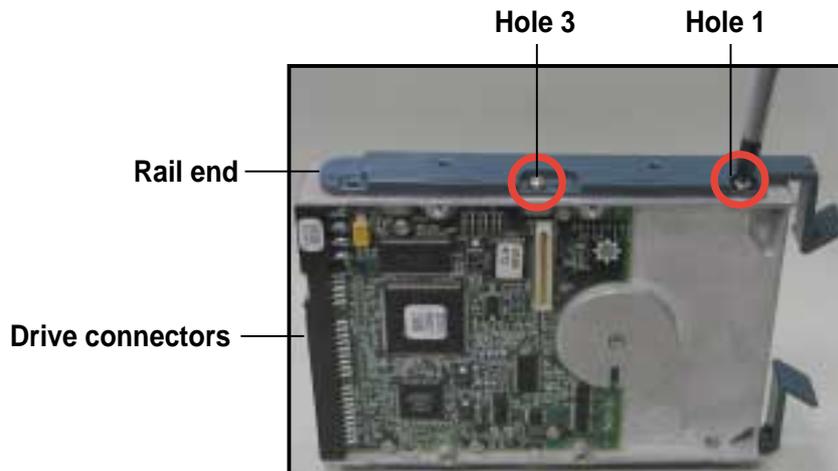
Installing into a bay on the first drive cage

To install a drive from the front panel opening:

1. Remove the front panel assembly. Refer to section 2.5.1 for instructions.
2. Use a Phillips (cross) screwdriver to attach **Rail 1** to the side of the drive as shown. The rail end should be on the side of the drive connectors.



3. Attach **Rail 2** to the other side of the drive as shown. The rail end should be on the side of the drive connectors.



4. Check the HDD jumper setting. Refer to the label pasted on the HDD for the setting description. The setting “Cable Select” is recommended.

5. Carefully insert the drive into a bay on the front panel.



6. Push the drive all the way to the depth of the bay until the rail locks clicks, indicating that the drive is securely in place.



7. Connect the IDE and power cables to their corresponding connectors on the back of the drive.
8. Follow steps 2 to 6 if you wish to install other hard disk drives.
9. Re-install the front panel assembly when done.



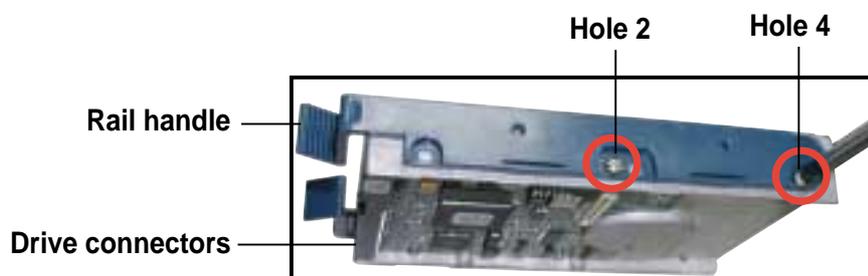
Installing into a bay on the second drive cage

To install an internal drive :

1. Remove the side cover. Refer to section 2.1.1 for instructions.
2. Use a Phillips (cross) screwdriver to attach **Rail 2** to the side of the drive with two screws as shown. The rail handle should be on the side of the drive connectors.



3. Attach **Rail 1** to the side of the drive with two screws as shown. The rail handle should be on the side of the drive connectors.

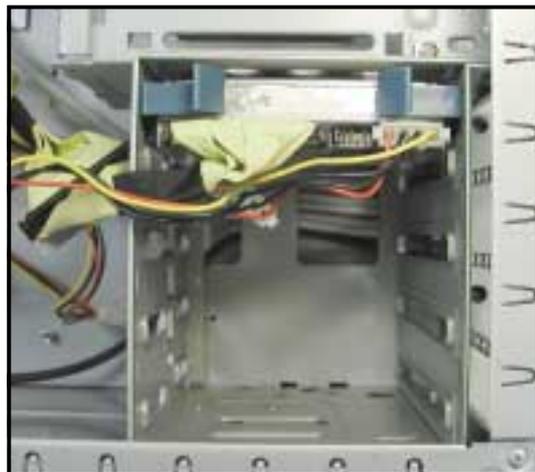


4. Check the HDD jumper setting. Refer to the label pasted on the HDD for the setting description. The setting “Cable Select” is recommended.

5. Carefully insert the drive into a bay on the second drive cage as shown.



6. Connect the IDE and power cables to their corresponding connectors on the back of the drive.



7. Follow steps 2 to 5 if you wish to install other hard disk drives.

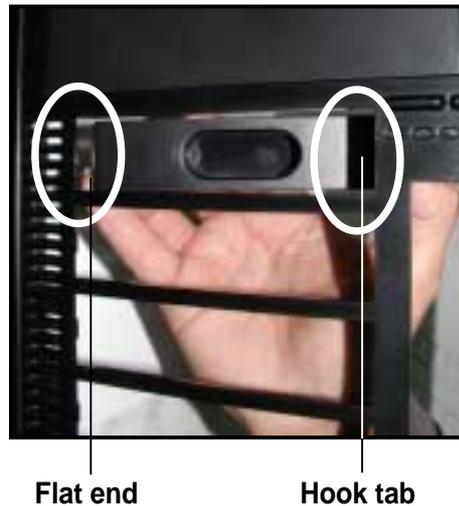
8. Re-install the side cover when done. Refer to section “21.2 Installing the side cover.”

Installing an HDD dummy cover

Except on the 8-SCSI configuration model (AS8), the HDD dummy covers come pre-installed on the front panel bezel. In case you removed the covers, follow these steps to re-install them.

To install an HDD dummy cover:

1. From the inside of the front panel assembly, insert the flat end of a dummy cover into the slot as shown. The end with the hook tab should be close to the front panel LEDs.



2. Press the dummy cover into the slot opening until the hook tab clicks in place.



3. When installed, the dummy cover appears as shown.



2.8 Expansion cards

The chassis is designed with a screwless expansion slot frame on the rear panel. This design feature allows you to install or remove an expansion card in less steps.

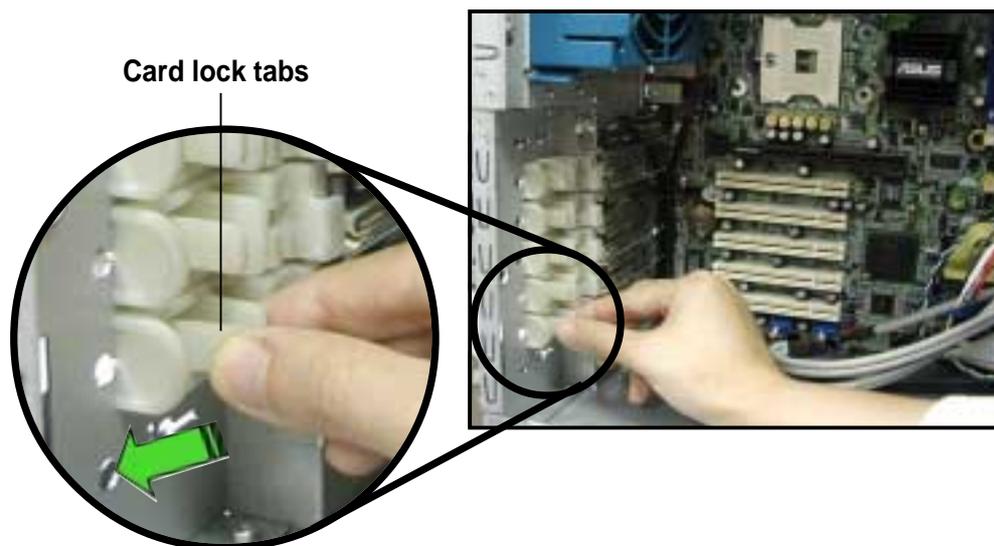


Make sure to unplug the power cord before installing or removing expansion cards. Failure to do so may cause physical injury, and damage to the card and motherboard components!

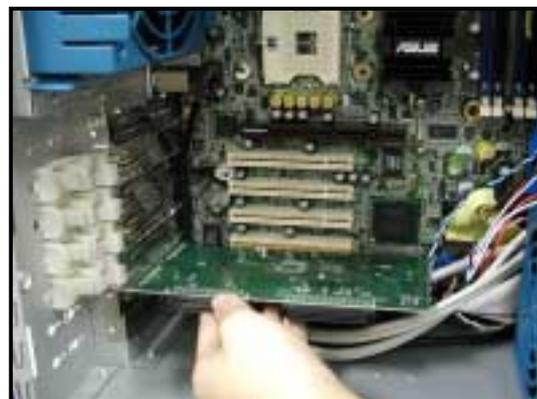
2.8.1 Installing a standard size expansion card

To install a standard size expansion card:

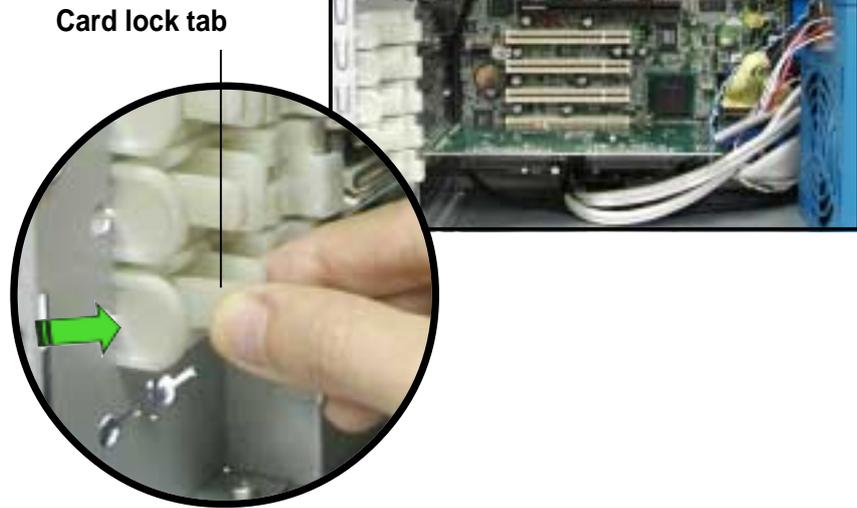
1. Remove the plastic card lock opposite the slot where you wish to install the expansion card. Release the card lock by pressing the center tabs and pushing outward. Set the card lock aside for later use.



2. Carefully install an expansion card making sure that it is properly seated on the slot.



3. When the card is in place, secure it with the plastic card lock that you removed earlier.



2.8.2 Installing a long expansion card

If you wish to install a long expansion card, such as some types of RAID cards, you need to remove the lower hot swap drive cage and install an internal (non-hot swap) drive cage with long card guides that keep the expansion cards firmly seated on the slots.

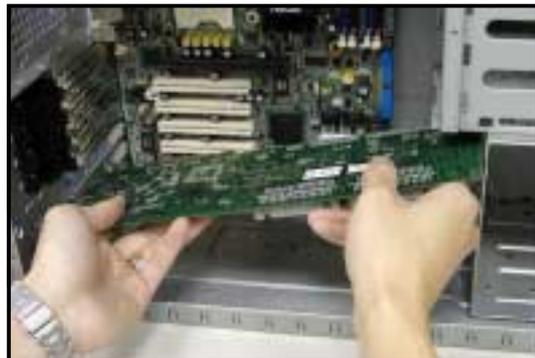


1. The internal drive cage is optional and separately purchased. See section “Chapter 3 Optional components” for instructions on installing the drive cage.
2. The **AS4** (4-SCSI configuration) and **AI4** (4-IDE configuration) models support long expansion cards.

To install a long expansion card:

1. Remove the plastic card lock opposite the slot where you wish to install the expansion card. Release the card lock by pressing the center tabs and pushing outward. Set the card lock aside for later use.

2. Tilt the long card as shown while aligning the metal bracket with the slot opening on the rear panel.



3. When the card is inside the chassis, push down the end of the card until it is level with the PCI slot.



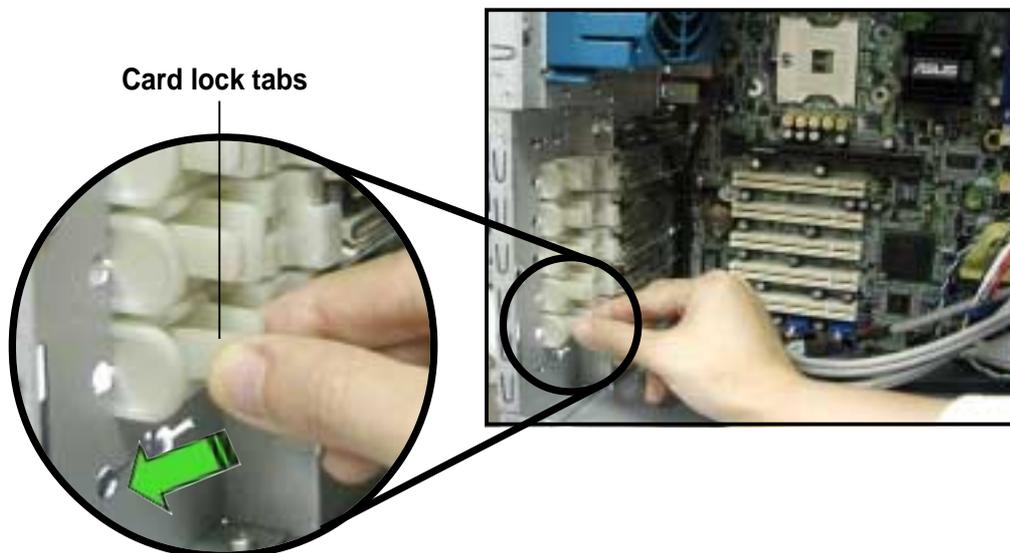
4. Push the card connector into the PCI slot until it is securely seated.
5. When the card is in place, secure it with the plastic card lock that you removed earlier.



2.8.3 Removing an expansion card

To remove an expansion card:

1. Remove the plastic card lock that secures the expansion card.



2. Firmly hold the expansion card and pull it out of the slot.



3. Place the plastic card lock back where you removed it.

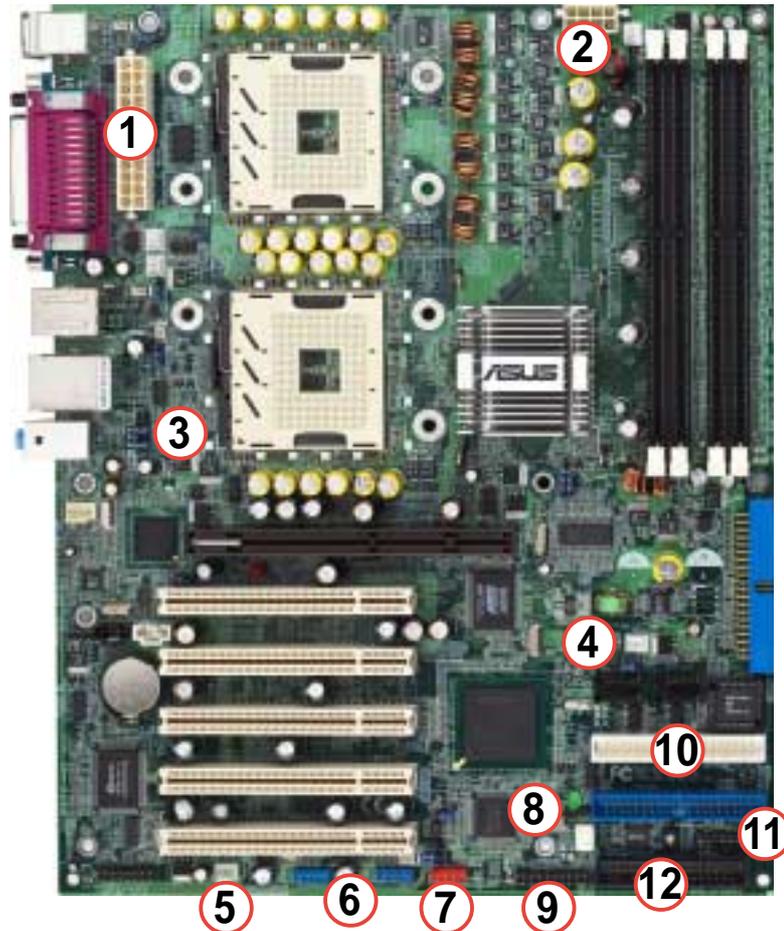
2.9 Cable connections



The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.

Refer to this section when reconnecting cables to ensure correct cable connections.

2.9.1 Motherboard connections



Standard cables connected to the motherboard

- | | |
|------------------------------|-----------------------------------|
| 1. 24-pin ATX power | 7. Front panel 1394 |
| 2. 8-pin 12V AUX power | 8. Chassis intrusion |
| 3. Front panel audio | 9. Front panel LEDs |
| 4. HDD fan 2 | 10. Secondary IDE (optical drive) |
| 5. HDD fan 1 | 11. SMBus panel to backplane |
| 6. Front panel USB (4 ports) | 12. Floppy disk |



Refer to the motherboard user guide for detailed information on the connectors.

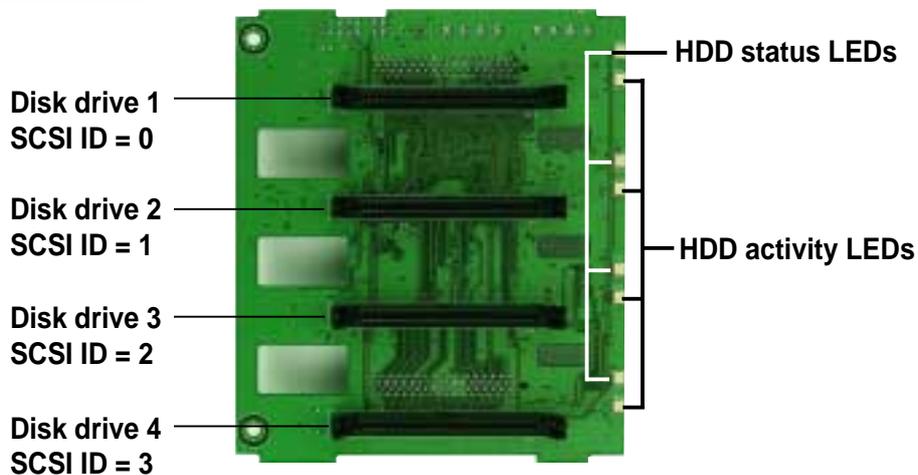
2.9.2 SCSI backplane connections

The SCSI backplane has four 68-pin SCSI connectors to support SCA SCSI hard disks. The backplane design incorporates a hot swap feature to allow easy connection or removal of SCSI hard disks. The LEDs on the backplane connect to the front panel LEDs to indicate HDD access, HDD failure, thermal failure, or fan failure. See section “1.6 LED information.”

Front side

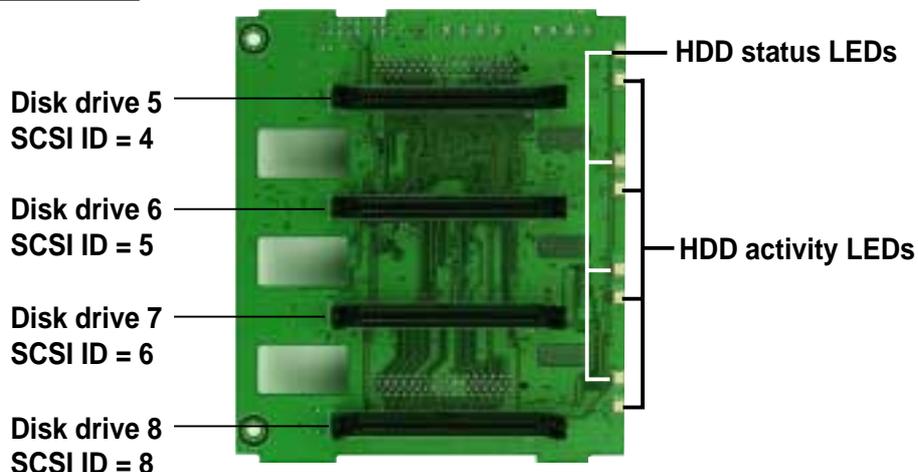
The front side of the SCSI backplane faces the front panel when installed. This side includes four SCSI connectors for the hot swap drive trays.

First backplane



If your barebone server supports a hot swap configuration for eight (8) hard disks, a second SCSI backplane comes with the system to connect drives 5 to 8.

Second backplane

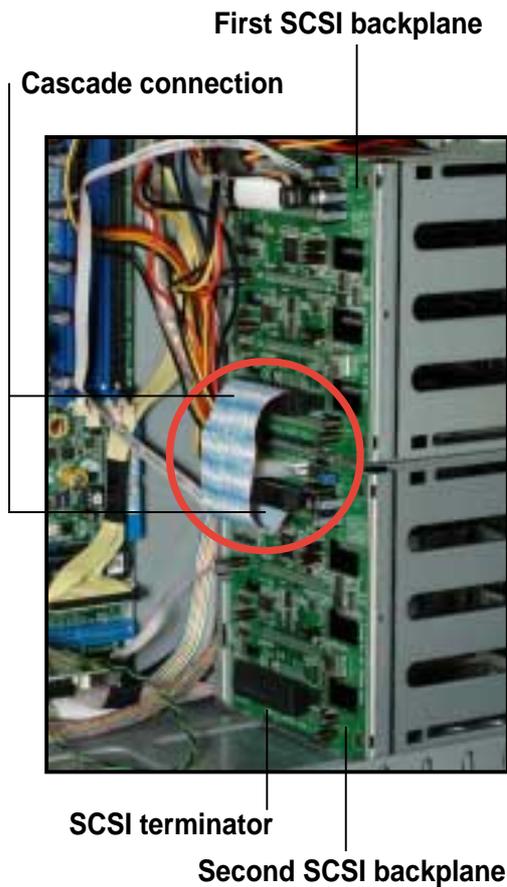


SCSI ID7 is reserved for the SCSI card.

Back side

The back side of SCSI backplane faces the rear panel when installed. This side includes the power connectors, SCSI interfaces for the SCSI/RAID card and terminator, and SMBus connectors.

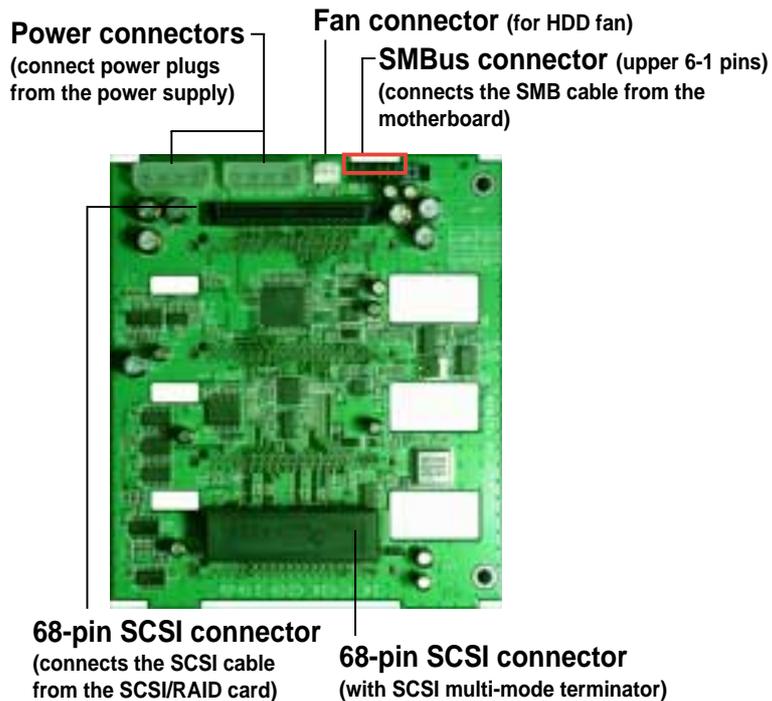
The following picture shows a two-backplane configuration in a cascade connection.



One-backplane configuration

In a **one-backplane** configuration:

- the upper SCSI interface of the backplane connects to the SCSI/RAID card
- a SCSI multi-mode terminator (LVD/SE) is connected to the lower SCSI interface of the backplane

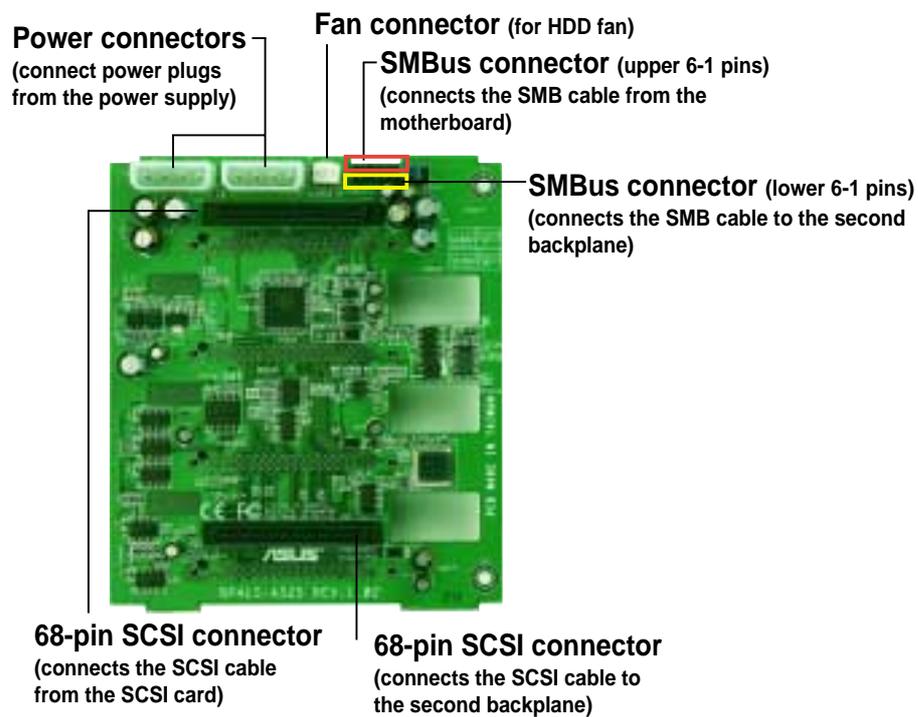


Two-backplane configuration

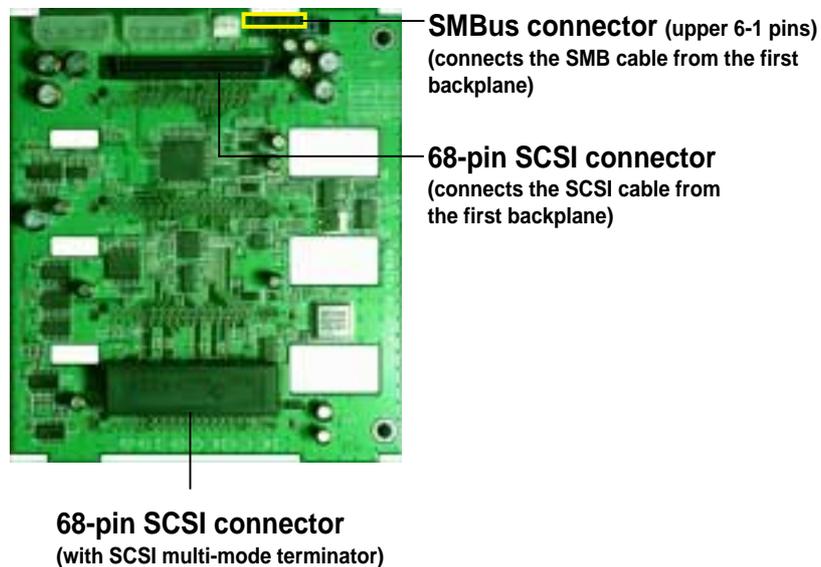
In a **two-backplane** configuration:

- the upper SCSI interface of the first backplane connects to the SCSI card
- the lower SCSI interface connects to the upper SCSI interface of the second backplane
- a SCSI multi-mode terminator (LVD/SE) is placed on the lower SCSI interface of the second backplane

First backplane



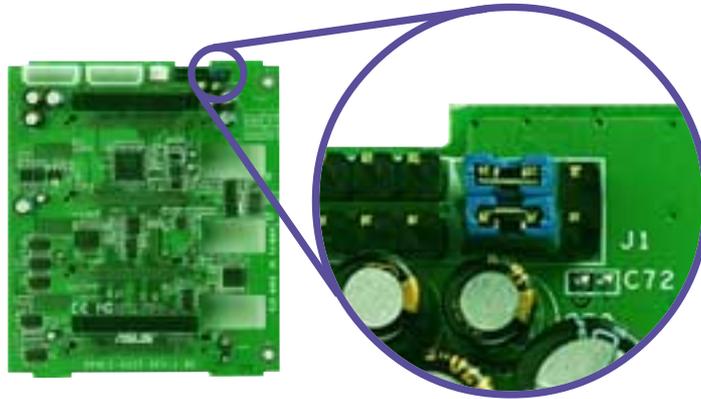
Second backplane



SCSI backplane jumper settings and HDD ID assignments

The 6-pin jumper **J1** on each of the SCSI backplanes allows you to define your desired SCSI configuration.

The picture below shows the location of jumper J1 with pins 1-3 and 2-4 shorted.



Refer to the following tables for the jumper settings and the appropriate ID# for each SCSI HDD bay.

Cascade configuration	
First backplane (BPB1)	
J1 setting (1-3 shorted, 2-4 shorted)	
	
Device	SCSI ID#
Drive Bay 1	ID0
Drive Bay 2	ID1
Drive Bay 3	ID2
Drive Bay 4	ID3
GEM SAF-TE	ID15
Second backplane (BPB2)	
J1 setting (3-5 shorted, 4-6 shorted)	
	
Device	SCSI ID#
Drive Bay 5	ID4
Drive Bay 6	ID5
Drive Bay 7	ID6
Drive Bay 8	ID8
GEM SAF-TE	ID11

Non-Cascade configuration	
First backplane (BPB1)	
J1 setting (1-3 shorted, 2-4 shorted) 	
Device	SCSI ID#
Drive Bay 1	ID0
Drive Bay 2	ID1
Drive Bay 3	ID2
Drive Bay 4	ID3
GEM SAF-TE	ID15 (SCSI channel-0)
Second backplane (BPB2)	
J1 setting (1-3 shorted, 2-4 shorted) 	
Device	SCSI ID#
Drive Bay 5	ID0
Drive Bay 6	ID1
Drive Bay 7	ID2
Drive Bay 8	ID3
GEM SAF-TE	ID15 (SCSI channel-1)



SCSI ID7 is reserved for the SCSI card.

2.10 Removable components

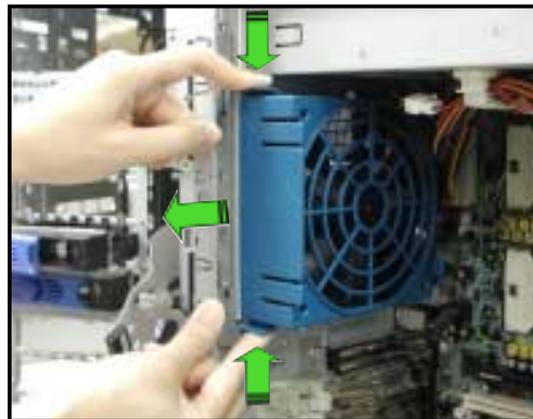
You may need to remove previously installed system components when installing or removing system devices, or when you need to replace defective components. This section tells how to remove the following components:

1. Chassis fan
2. HDD fans
3. SCSI backplanes
4. Power supply module
5. Floppy disk drive
6. Front I/O board

2.10.1 Chassis fan

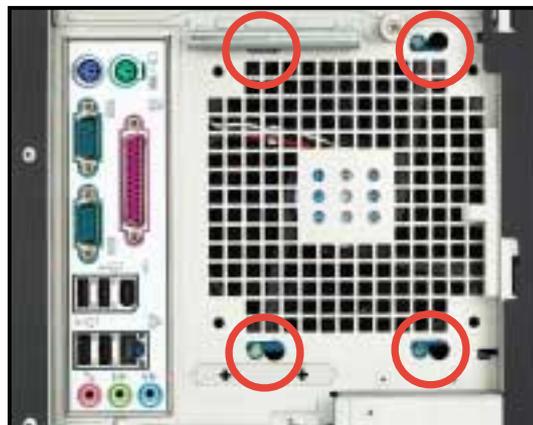
To remove the chassis fan:

1. Disconnect the 3-pin fan cable from the connector CHA_FAN1 on the motherboard.
2. Press the tabs on the outer corners of the system fan, then pull the fan out of the chassis.



To re-install the chassis fan:

1. Firmly hold the chassis fan on the side with the tabs and position it into its slot, making sure that the four hooks underneath the fan match the corresponding holes on the rear panel.
2. Push the fan into the chassis until the four hooks lock securely into the holes on the rear panel.
3. Re-connect the 3-pin fan cable from the connector CHA_FAN1 on the motherboard.



2.10.2 HDD fans

To remove the HDD fan:

1. Loosen the thumb screw that secures the HDD fan cage to the chassis.



2. Hold the outer side of the fan cage, then pull sideways to release it from the chassis.
3. Disconnect the 3-pin fan cable from the fan connector on the backplane before completely detaching the fan cage from the chassis.

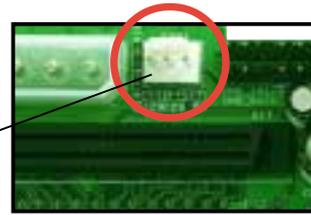


Due to space constraints inside the chassis, some cables may interfere with the removal of the fan cage. To easily remove the fan cage, try to slightly push it inward (toward the motherboard) before pulling it out of the chassis.

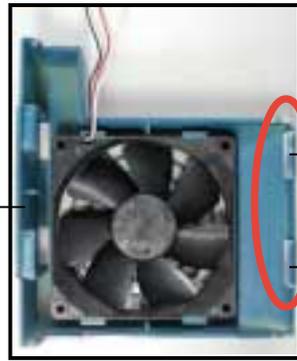
To re-install the HDD fan:

1. Re-connect the 3-pin fan cable to the fan connector on the backplane.

Fan connector on backplane (FAN1)

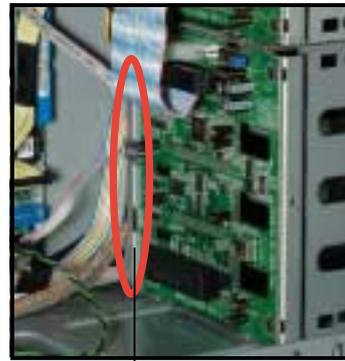


2. Hold the outer side of the HDD fan cage and hook the two side tabs to the inner edge of the drive cage. Make sure that the system cables are not caught up when you place the HDD fan.



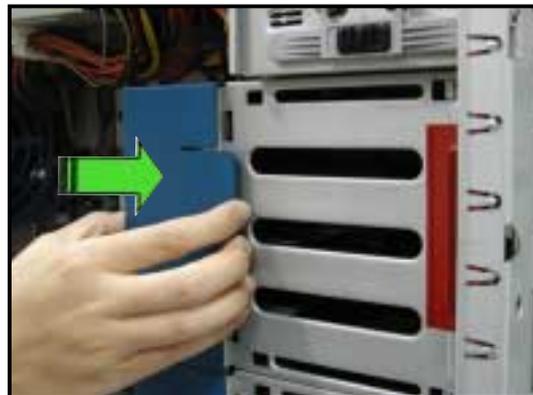
Outer side of fan cage

Side tabs



Inner edge of drive cage

3. Push the outer edge of the fan cage sideways to fit it to the drive cage. You hear a click when the fan cage correctly fits in place.



4. Secure the fan cage with the thumb screw.



2.10.3 SCSI backplanes

To remove a SCSI backplane:

1. Remove the HDD fan cage. Refer to section “2.10.2 HDD fans” for instructions.
2. Disconnect all cables from the backplane.



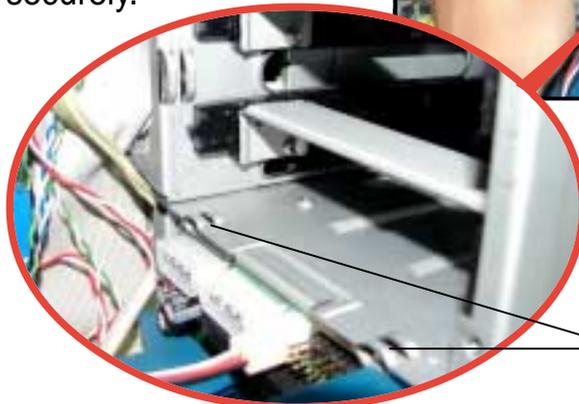
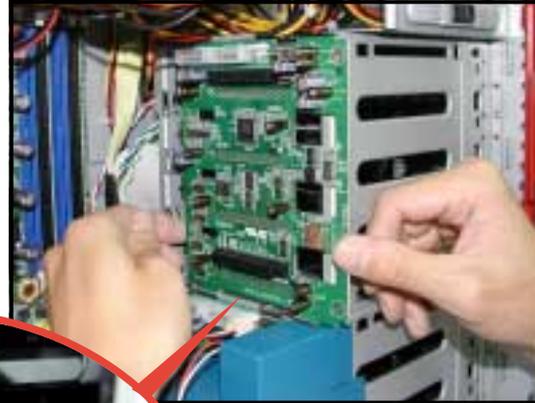
When disconnecting a cable, hold and firmly pull the cable plug. DO NOT pull the cable itself. Doing so may damage the cable!

3. From the inner edge, push the backplane outward so that the outer edge protrudes slightly from the slot.
4. From the outer edge, firmly hold the backplane and carefully slide it out.



To re-install a SCSI backplane:

1. Position the backplane into its slot with the component side facing the rear panel, and the power connectors on top.
2. Align the backplane with the rail-like dents on the slot to ensure that it fits securely.



Rail-like dents

3. Slide the backplane into the slot until it fits. If correctly installed, the outer edge of the backplane aligns with the corner of the drive cage.
4. Connect the appropriate cables to the backplane. Refer to section "2.9.2 SCSI backplane connections" for information on backplane cabling.

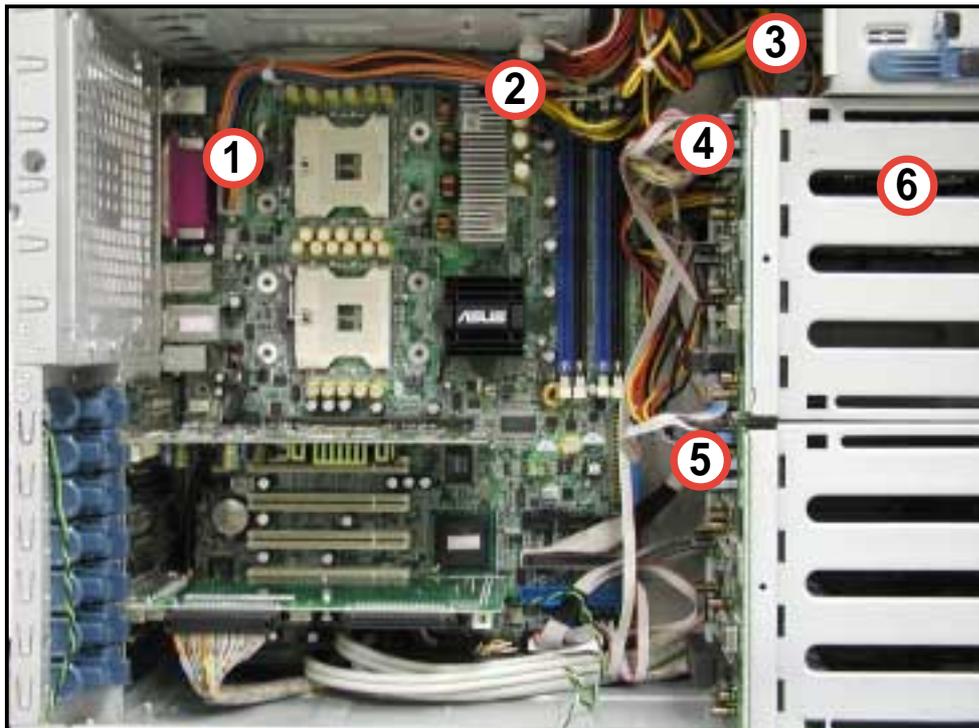


2.10.4 Power supply module



You **MUST** disconnect all power cable plugs from the motherboard and other installed devices before removing the power supply.

The picture below shows the motherboard and device connectors where the power plugs are connected. Refer also to Appendix at the end of this document for details on the power supply.



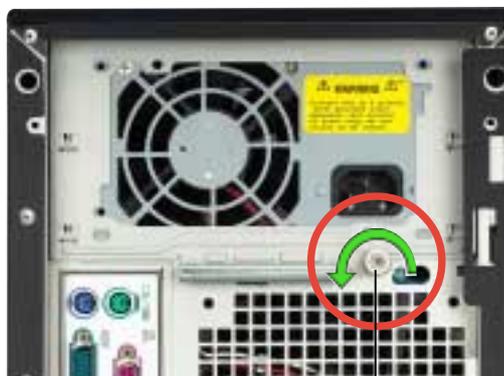
- 1 24-pin ATX (motherboard power connector)
- 2 8-pin +12V AUX (motherboard power connector)
- 3 4-pin plug (optical drive)
- 4 2 x 4-pin plugs (first backplane, if present)
- 5 2 x 4-pin plugs (second backplane, if present)
- 6 4-pin plug (floppy disk drive)



Make sure to unplug **ALL** power cables from the system devices before removing the power supply module.

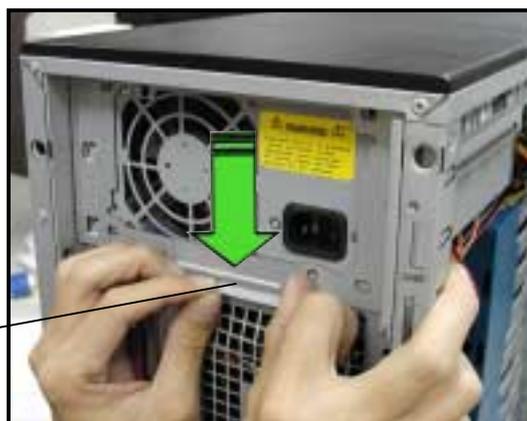
To remove the power supply module:

1. Loosen the thumbscrew that secures the power supply metal plate. Do not remove the thumb screw from the metal plate.



Thumbscrew

2. Hold the metal plate bar and push it downward to release the plate from the chassis. Remove the metal plate completely.



Metal plate bar

3. Use one hand to push the power supply module from inside the power supply cage, then carefully pull out the module from the chassis.



To install a power supply module:

1. Firmly hold the power supply module and insert it into the power supply cage.
2. Push the power supply all the way in until its outer end aligns with the rear panel.



Be careful with the power supply cables when inserting the power supply module into the cage. Due to space constraints, the cables may get entangled with the installed components or other cables, causing the cables to break!

3. Place the metal plate flat on the outer end of the power supply module, flushed to the top of the chassis, while matching the four hooks with their corresponding holes on the rear panel.



Hook matched to a hole

4. Hold the metal plate bar and push it upward to lock the hooks to their holes. At the same time, you may also push the top of the metal plate to fit it completely.
5. Secure the metal plate with the thumb screw.



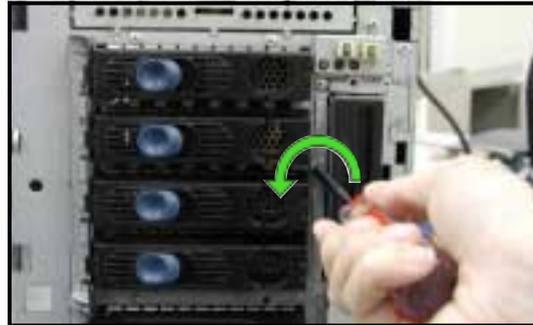
2.10.5 Floppy disk drive



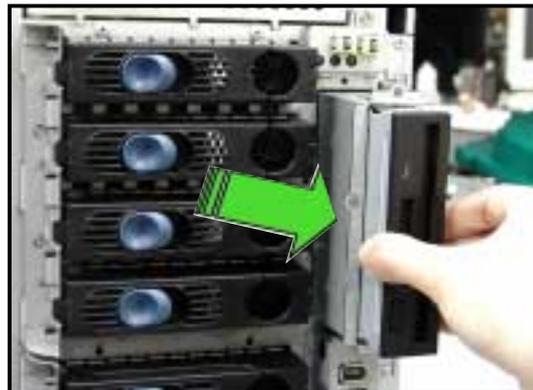
You need to remove the front panel assembly before you can remove the floppy disk drive. Refer to section “2.5.1 Removing the front panel assembly” for instructions.

To remove the floppy disk drive:

1. Remove the screw that secures the drive to the chassis.



2. Carefully pull out the drive from the chassis until you see the cables connected to the drive.

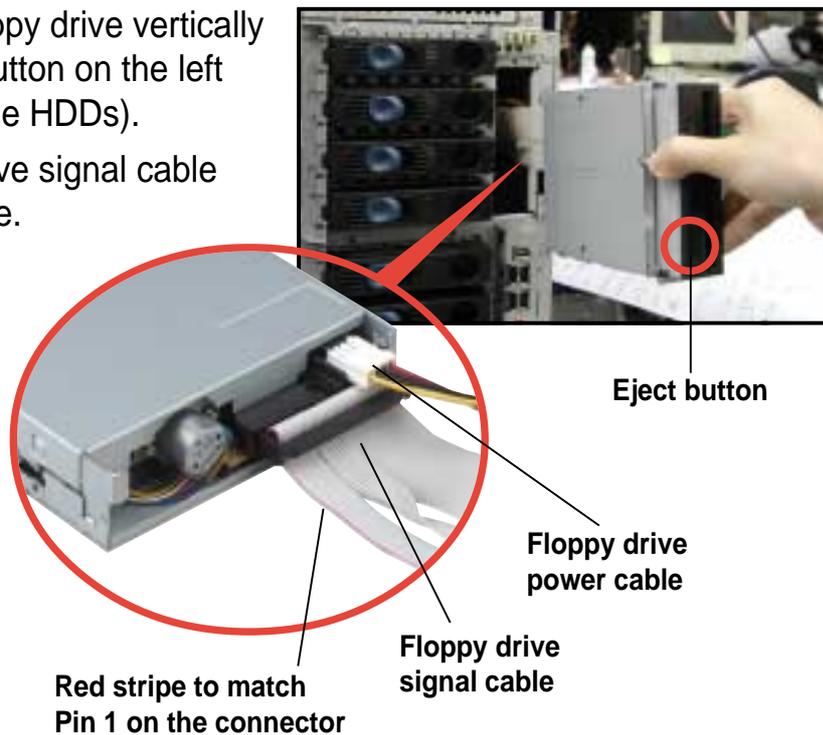


3. Disconnect the floppy disk cable and power cable from the drive to completely release the drive.



To install a floppy disk drive:

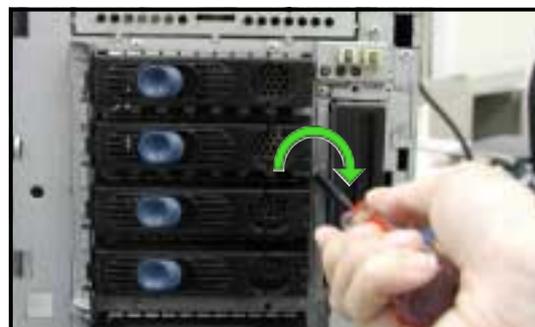
1. Position the floppy drive vertically with the eject button on the left side (close to the HDDs).
2. Connect the drive signal cable and power cable.



3. Carefully push the drive into the bay until the drive cage fits the front edge of the bay.



4. Secure the drive cage with a screw.



2.10.6 Front I/O board



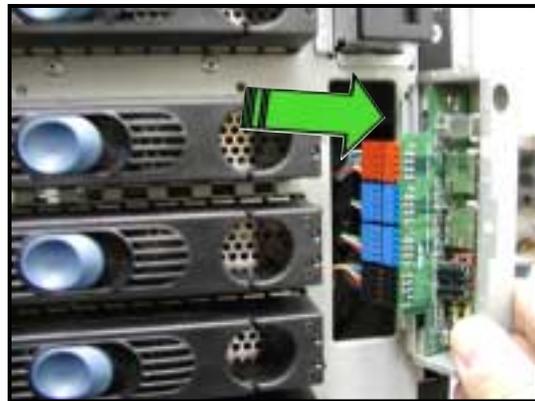
You need to remove the front panel assembly before you can remove the front I/O board. Refer to section “2.5.1 Removing the front panel assembly” for instructions.

To remove the front I/O board:

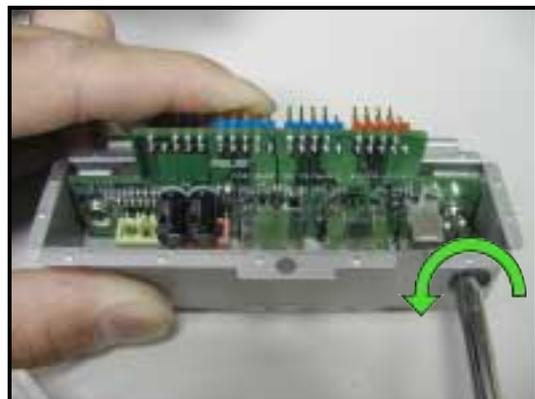
1. Remove the screw that secures the front I/O board bracket to the front panel.



2. Carefully pull out the bracket until you see the cables connected to the I/O board.
3. Disconnect all the cables from the I/O board.

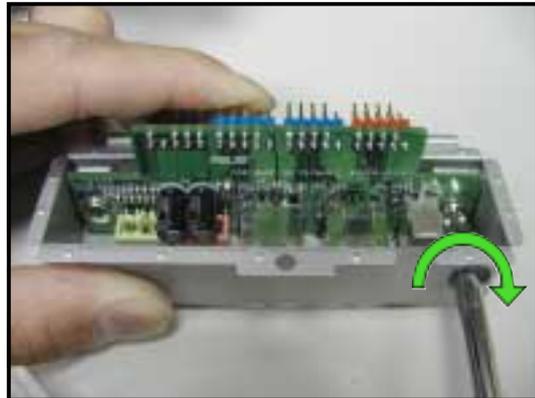


4. Remove the screw that secures the I/O board to the bracket.

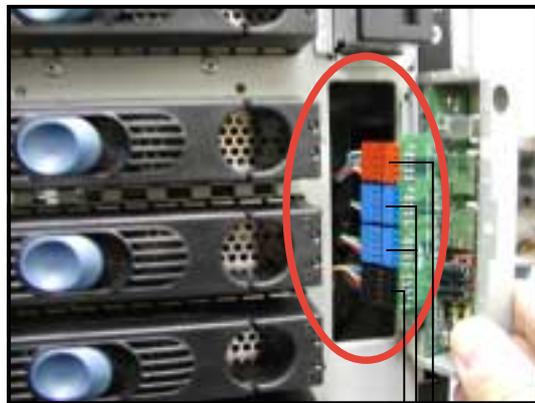


To install the front I/O board:

1. Place the I/O board in the bracket, component side up. Secure the front I/O board to the bracket with a screw.



2. Position the I/O board into the bay with the component side to the left (close to the HDDs). Connect the I/O cables to the connectors on the back of the I/O board.



Audio connector (black)
USB 2.0 connectors (blue)
1394 connector (red)

3. Insert the I/O board into the bay until the bracket fits the front edge of the bay.
4. Secure the I/O board bracket with a screw.



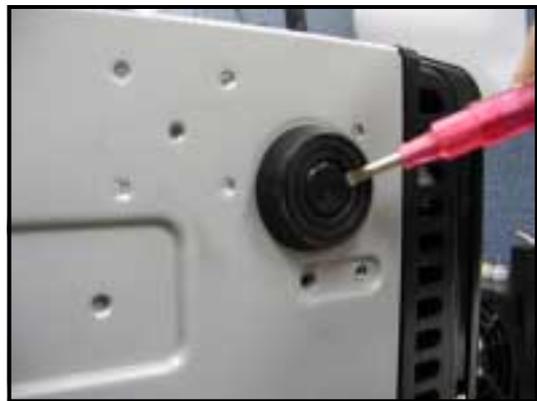
2.10.7 Chassis footpads and roller wheels

The barebone server system is shipped with four footpads attached to the bottom of the chassis for stability. You need to remove these footpads if:

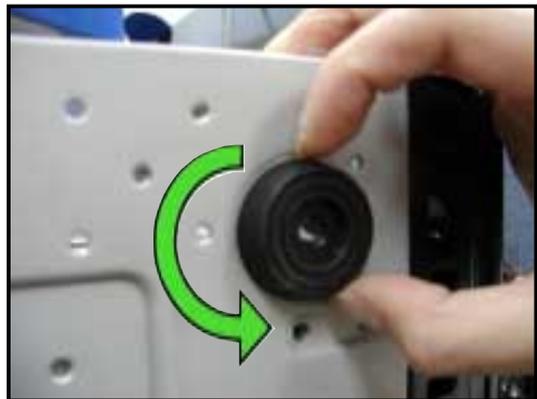
- if you want to replace the footpads with the bundled roller wheels
- you wish to install the system to a rack
(Refer to “Chapter 3 Installation options” of this user guide, and to the “Rackmount Kit” user guide for instructions)

To remove the footpads:

1. Lay the system chassis on its side.
2. Use a flat screwdriver to flip out the top layer of a footpad.



3. Remove the footpad by rotating it counterclockwise.



4. Repeat steps 2 and 3 to remove the other three footpads.

For convenient transport, install the roller wheels the came with the system package. Each wheel has a brake lock to stabilize the chassis in place.

To install the chassis wheels:

1. Lay the chassis in its side.
2. Locate the designated screw holes for each of the four wheel sets. Take note of the numbers alongside each hole when placing screws.



3. Secure each wheel to the bottom of the chassis using four screws.
4. Repeat steps 2 and 3 to install the other three wheels.



Remove the chassis roller wheels if you wish to mount the system to a rack.

To remove the chassis wheels:

1. Lay the system chassis on its side.
2. Use a Phillips screwdriver to remove the screws that secure the wheels to the bottom of the chassis.
3. Repeat step 2 to remove the other three roller wheels.



Chapter 3

This chapter describes how to install optional components and devices into the barebone server and create your desired configuration.



ASUS AP1720-E1 barebone server

Installation options



The items required for the optional configurations described in this chapter are not included in the standard barebone system package. These items are purchased separately.

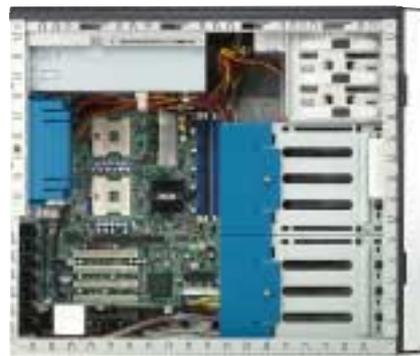
3.1 Installing a second SCSI drive cage

Perform this installation if you wish to upgrade your 4-SCSI configuration system (AS4 model) to an 8-SCSI configuration.

4-SCSI configuration



8-SCSI configuration



Clear the space under the first SCSI drive cage. Make sure that the pre-connected cables are properly routed so they do not get in the way when you install the second drive cage.

To install a second SCSI drive cage:

1. Position the drive cage in the same orientation as the first drive cage. Note that the lock tab on top of the cage faces the rear panel.



Cage lock tab

2. Carefully slide the drive cage toward the front panel until it fits in place.

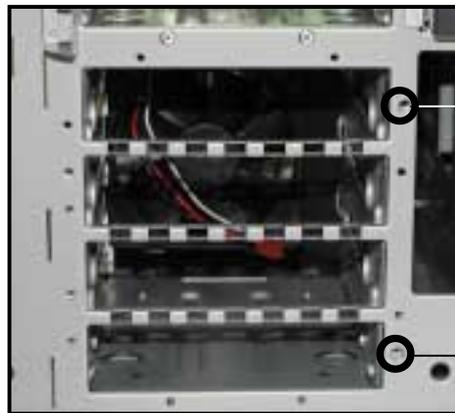


3. Make sure that the cage lock tab snaps to the bottom of the first drive cage. When properly installed, the cage should align with the first drive cage.

Cage lock tab snapped securely to the bottom of first drive cage

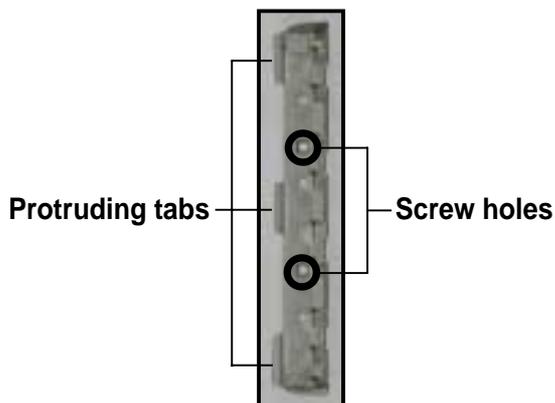


4. From the front side, secure the right side of the cage with two screws.

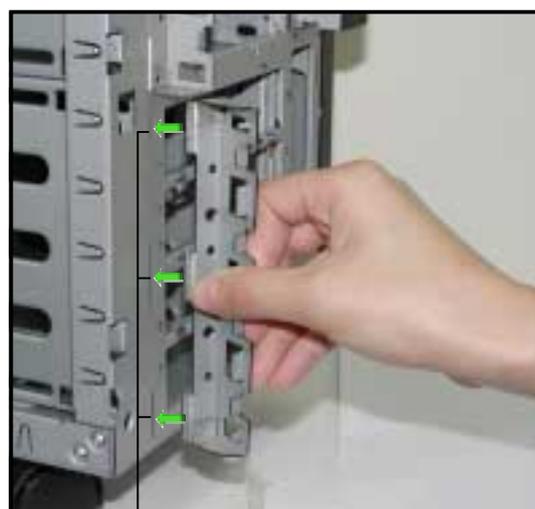


Front screw holes

5. Position the support bracket for the drive trays to the left side of the cage with the three protruding tabs matching the elongated holes on the chassis.

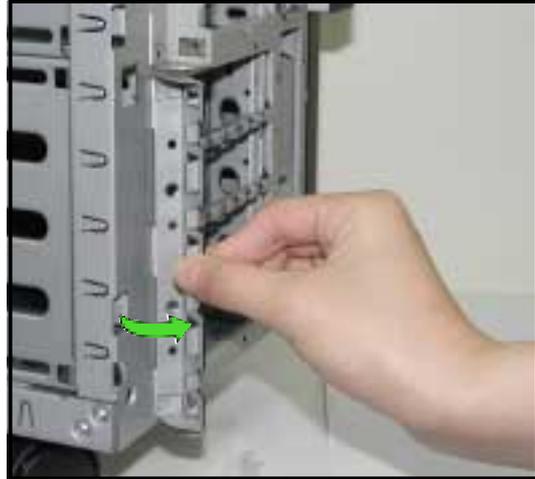


SCSI drive tray support bracket

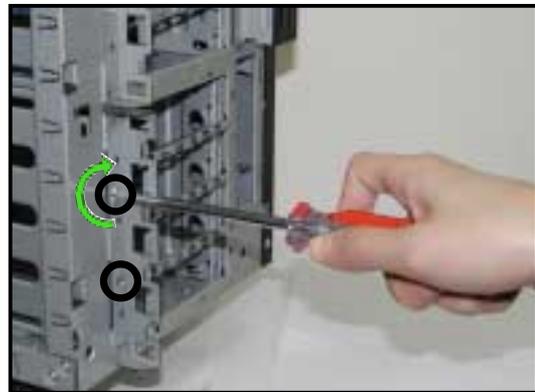


Elongated holes for bracket

5. Insert the tabs into the holes. You may need to swing the bracket a bit from left to right and back to fully insert the tabs.
6. When the tabs are fully inserted in the holes, swing the bracket to the right until one side is flat to the chassis.



7. Secure the bracket with two screws in the holes indicated.



Securing the bracket with the two screws also secures the left side of the SCSI drive cage.

3.2 Installing an IDE drive cage

Perform this installation if you wish to upgrade your 4-SCSI configuration system (AS4 model) to a combination 4-SCSI/4-IDE configuration.

4-SCSI configuration



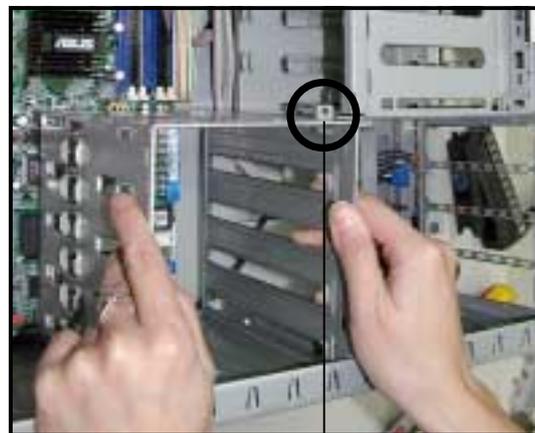
4-SCSI/4-IDE configuration



Clear the space under the first SCSI drive cage. Make sure that the pre-connected cables are properly routed so they do not get in the way when you install the second drive cage.

To install an IDE drive cage:

1. Position the drive cage into the bay with the screw hole tab on top and facing out.

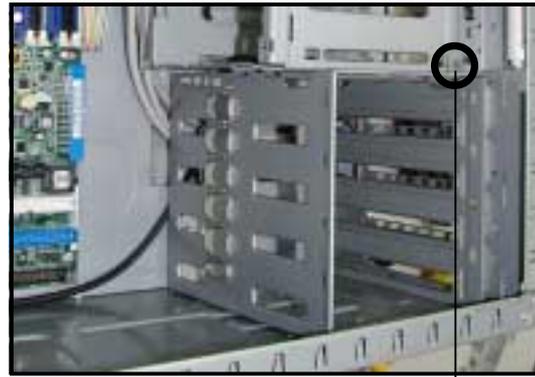


Screw hole

2. Carefully slide the drive cage toward the front panel until it fits in place.

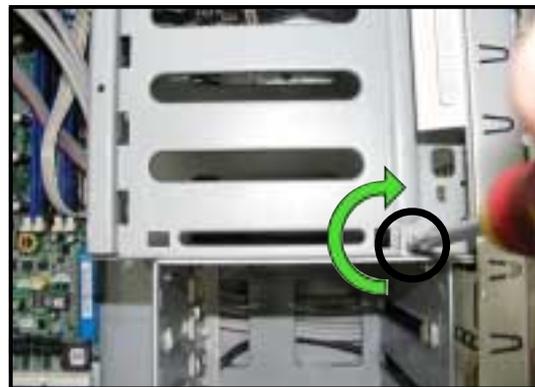


3. Make sure that the drive cage is fits snugly to the bay as shown. The drive cage is properly installed when it is parallel to the front panel, and the screw hole matches the hole of the first drive cage.



Screw hole

4. Secure the drive cage with a screw.



3.3 Mounting the system to a rack

3.3.1 Remove the footpads or roller wheels

Refer to section “2.10.7 Chassis roller wheels and footpads” for instructions on removing the footpads or roller wheels.

3.3.2 Remove the top cover

To remove the top cover:

1. Remove the side cover. Refer to section “2.1.1 Removing the side cover” for instructions.
2. Remove the front panel assembly. Refer to section “2.5.1 Removing the front panel assembly” for instructions.
3. Locate the lock tab underneath the top cover and press it outward to release the cover.
4. Slide the top cover toward the front panel, then lift it up from the chassis.



Lock tab of top cover
(bottom view)

3.3.3 Attach the rack rails

Refer to the installation guide that came with the Rackmount Rail Kit for instructions on how to attach the rails and on the barebone server system and the corresponding rails on the industrial rack.

Appendix

This appendix gives information on the power supply that came with the barebone server.

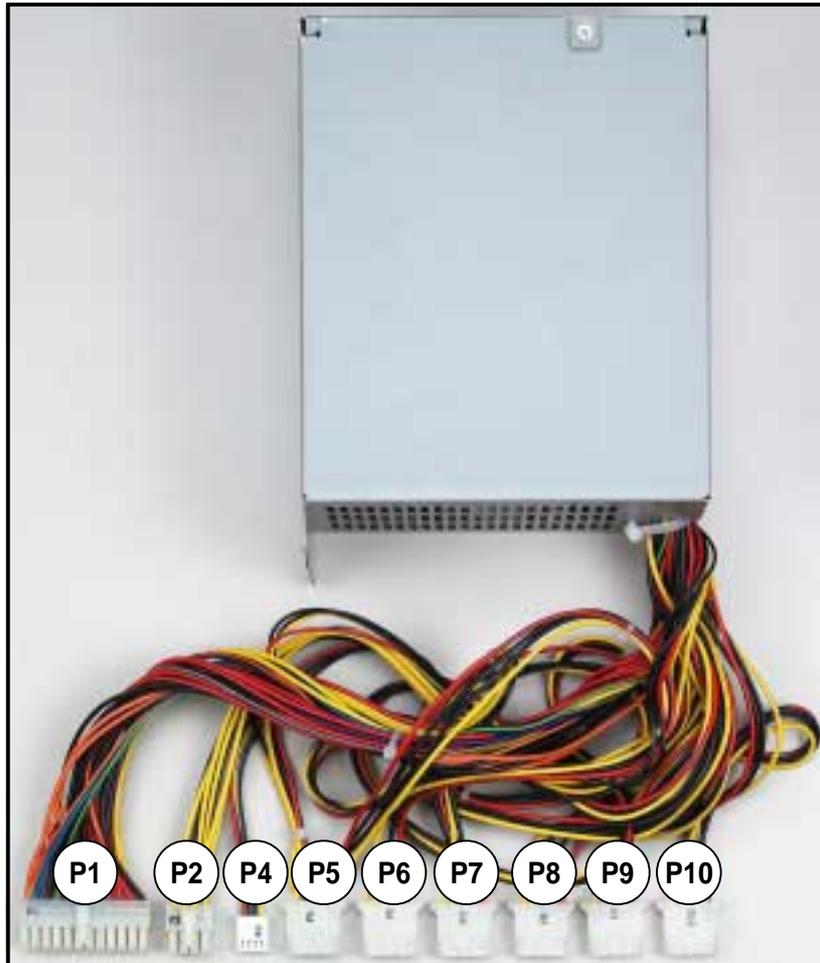


ASUS AP1720-E1 barebone server

Power supply

A.1 General description

The server comes with an SSI-type 450W ATX power supply with universal AC input that includes PFC and ATX-compliant output cables and connectors. The power supply has nine plugs labeled P1 to P10 (no P3). Take note of the devices to which you should connect the plugs.



- P1 Motherboard 24-pin ATX power connector
- P2 Motherboard 8-pin +12V AUX power connector
- P4 Floppy disk drive
- P5 Peripheral device (second backplane, if present)
- P6 Peripheral device (available)
- P7 Peripheral device (second backplane, if present)
- P8 Peripheral device (first backplane, if present)
- P9 Peripheral device (first backplane, if present)
- P10 Peripheral device (optical drive)

A.2 Specifications

Output voltage regulation

Output Voltage	Min (V)	Nom (V)	Max (V)	Ripple/Noise
+3.33V	3.16	3.30	3.46	50mV _{p-p}
+5V	4.8	5.00	5.25	50mV _{p-p}
+12V	11.52	12.00	12.60	120mV _{p-p}
-12V	-11.4	-12.20	-13.08	120mV _{p-p}
+5VSB	4.8	5.00	5.25	50mV _{p-p}

Output current capacity

Output Voltage	Min (A)	Max (A)	Max. Load (W)
+3.33V	0.5	24.0	79.0
+5V	2.0	20.0	100.0
+12V	4.0	30.0	360.0
-12V	0.0	0.5	6.0
+5VSB	0.1	2.0	10

Over-voltage protection

Voltage	Min (V)	Max (V)
+3.33V	3.9	4.5
+5V	5.7	6.5
+12V	13.3	15.0
+12V	-13.3	-15.0
+5VSB	5.7	6.5

