Intel® Astor II Server Chassis Subassembly Product Guide

A Guide for Technically Qualified Assemblers of Intel® Identified Subassemblies/Products

Order Number: 722623-001

If an FCC declaration of conformity marking is present on the board, the following statement applies:

FCC Declaration of Conformity

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

For questions related to the EMC performance of this product, contact:

Intel Corporation
5200 N.E. Elam Young Parkway
Hillsboro, OR 97124
1-800-628-8686

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 the 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 the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canadian Department of Communications Compliance 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.

Le présent appareil numerique németpas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Réglement sur le broullage radioélectrique édicté par le ministére des Communications du Canada.

Disclaimer

Information in this document is provided in connection with Intel products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, and Intel disclaims any express or implied warranty, relating to sale and/or use of Intel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Intel products are not designed, intended or authorized for use in any medical, life saving, or life sustaining applications or for any other application in which the failure of the Intel product could create a situation where personal injury or death may occur. Intel may make changes to specifications and product descriptions at any time, without notice.

The Astor II Chassis may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request. Copies of documents which have an ordering number and are referenced in this document, or other Intel literature, may be obtained from:

Intel Corporation
P.O. Box 5937
Denver, CO 80217-9808

or call in North America 1-800-548-4725, Europe 44-0-1793-431-155, France 44-0-1793-421-777, Germany 44-0-1793-421-333, other Countries 708-296-9333.

Contents

B Warnings

C Warranty

Figures

Tables

1 System Description

Kit Contents

The Astor II chassis subassembly kit includes this Product Guide, a power cord, an I/O shield EMI gasket, two chassis feet, and three hardware bags:

- Server board installation bag: includes three rubber bumpers, 13 standoff clips, and 13 retention screws.
- Chassis intrusion switch bag: includes one intrusion switch/cable assembly, one mounting screw, and three wire tie clips.
- Internal/external peripheral mounting bag: includes four 5.25-inch external drive rails and mounting screws without washers (2 screws/rail x 4 + 2 for diskette = 10 total); mounting screws with washers for SCA2 hard drive caddies (4 screws/drive x 5 + 1 spare = 21 total); mounting screws with washers for chassis feet (2 screw/foot x 2 = 4 total); and gold colored mounting screws for IDE drives (4 screws/drive x 2 = 8 total).

Feature Summary

Table 1.   Feature Summary

Feature	Description
Drive Bays	One 3.5-inch diskette drive bay, accessible from front.
	Two 5.25-inch wide bays that are externally accessible, designed to hold half-height standard removable media devices; the bays can be converted into a single full-height bay.
	Hot-swap bay for 3.5-inch hard disk drives: space for up to five 1-inch high, SCA2 hard drives.
	Two 3.5-inch wide bays that are not externally accessible, designed to hold half-height IDE drives.
Expansion slot covers	Up to seven expansion slots can be used; every slot that does not have an add-in board installed must have a slot cover installed.
Power supply	300 watt power factor correction (PFC) power supply, integrated cooling fan. Detachable AC power cord.
Cooling	Three system fans inside the chassis and one power supply fan provide cooling and airflow.

Chassis Front Controls and Indicators
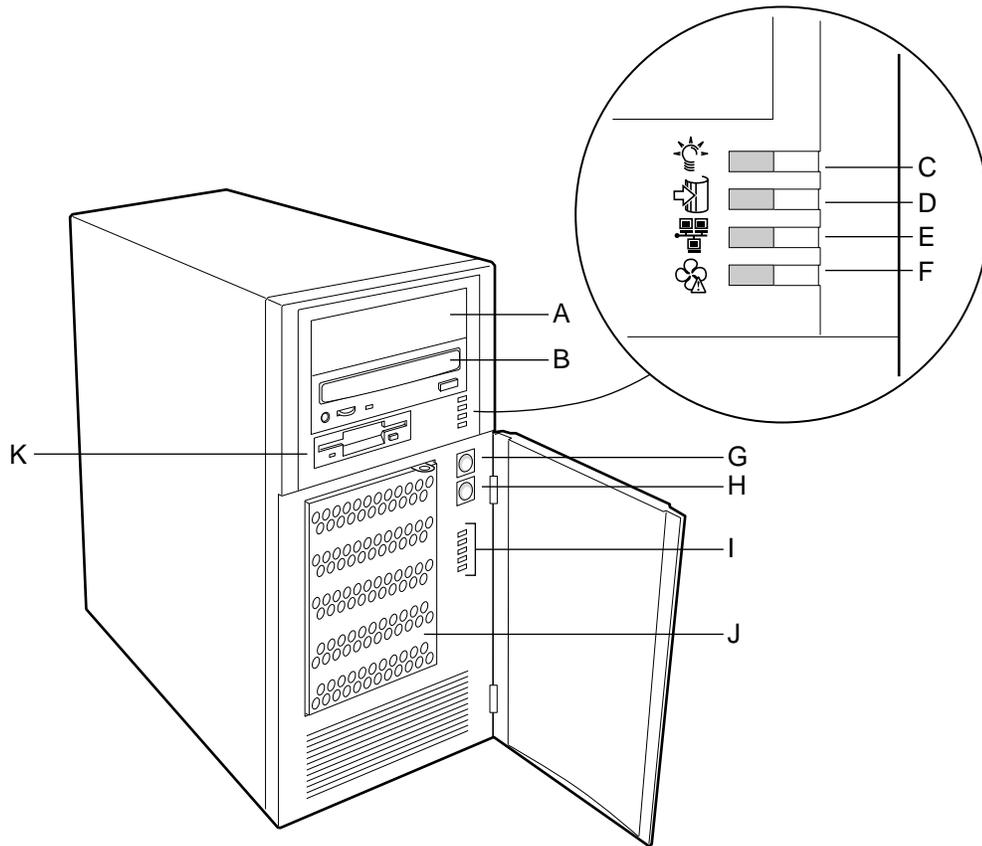
OM07034

Figure 1. Front Controls and Indicators

A.   Empty 5.25-inch drive bay
B.   CD-ROM drive*
C.   Power LED
D.   Hard disk access LED
E.   Network LED
F.   Fan fault LED
G.   Power button
H.   Reset button
I.   Hot-swap drive failure LEDs
J.   Hot-swap drive bay
K.   Diskette drive*

 * Items shown may not be included in the chassis.

Chassis Back I/O Ports and Features
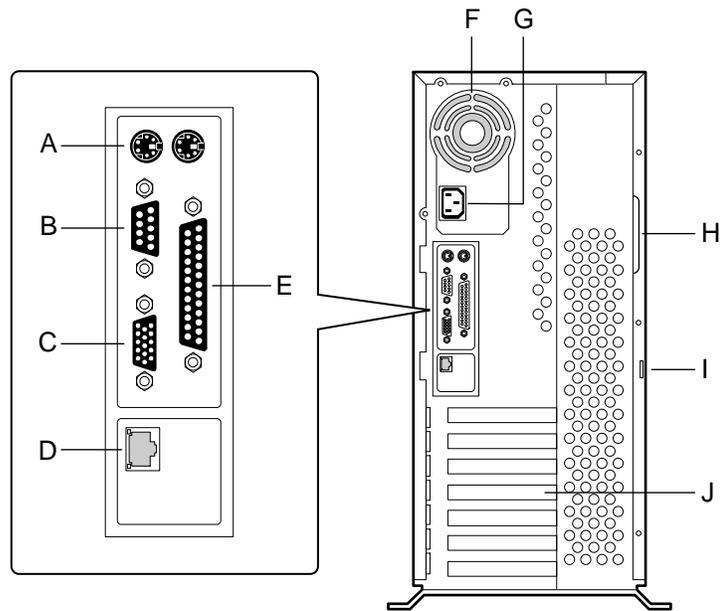
OM07038

Figure 2. Back I/O Ports and Features

A.   Mouse and keyboard connectors*
B.   Serial port A, COM1*
C.   VGA monitor connector*
D.   Network connector port*
E.   Parallel port*
F.   Power supply fan
G.   AC input power connector
H.   Side cover grip handle
I.   Loop for padlock (padlock not supplied, see page 13
      for padlock size)
J.   Seven slot covers

 * Typical baseboard I/O connectors shown.

Chassis Side View
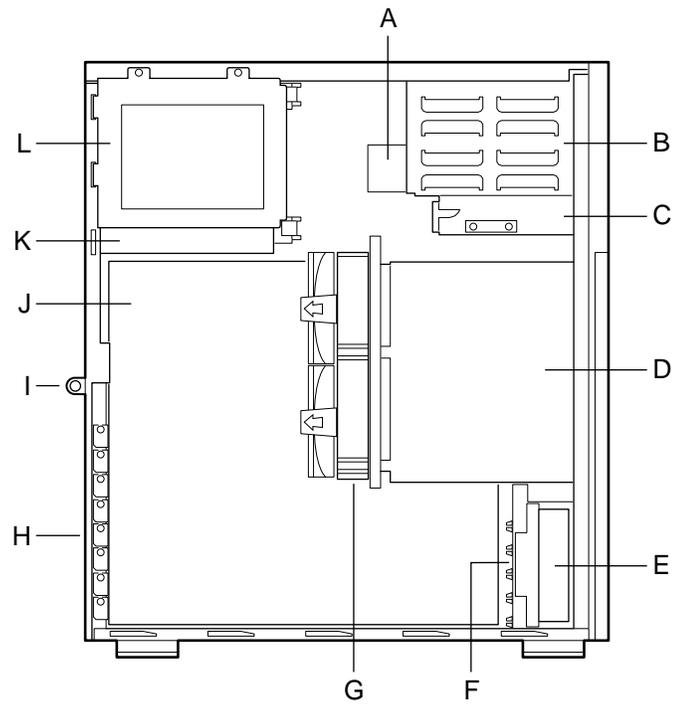
OM07563

Figure 3. Chassis Side View

A.   CD-ROM drive*
B.   5.25-inch external bays
C.   3.5-inch diskette drive*
D.   Hot-swap drive bay
E.   Fan housing
F.   Card guide
G.   Hot-swap fan shroud with two fans
H.   Add-in board expansion slot covers
I.   Security lock
J.   Server board
K.   Power supply
L.   3.5-inch IDE drive bay

 * Items shown may not be included in the chassis.

Peripherals

External Bay for 5.25-inch Removable Media Devices

The chassis has a bay for two 5.25-inch half-height peripherals that is accessible from the front of the system. This bay is intended to provide space for CD-ROM, tape backup or other removable devices.

You can convert the 5.25-inch bays to a single full-height bay. We recommend that you do not use this bay for hard disk drives, because they generate EMI, ESD susceptibility increases, and the drive will not be adequately cooled.

Internal Bay for 3.5-inch IDE Hard Drives

The chassis has a 3.5-inch bay for two half-height or 1-inch high IDE hard drives. The bay is not externally accessible.

Hot-swap Bay

A hot-swap bay is provided for five SCSI SCA2 hard drives that are 3.5 inches wide and 1 inch high. The bay is designed for drives that consume up to 17 watts of power each. Drives must be specified to run at a maximum ambient temperature of 50 °C.

The system was designed to allow the user to install a Redundant Array of Independent Disks (RAID). A software implementation with onboard SCSI or an add-in RAID controller card can be used to set up RAID applications.

SCSI Hot-swap Backplane

The hot-swap backplane provides the following:
- Five Single Connector Assembly (SCA2) connectors for SCA2-compatible SCSI drives
- Power control for each drive, including automatic slot-power-down upon removing a drive
- Signal for a fault indicator on the front panel for each drive
- Internal IMB (Intelligent Management Bus)
- Two +12 V connectors for a fan with tachometer
- Local IMB-based temperature sensor

The SCSI hot-swap backplane provides control signals and power for five Ultra2/LVD 3.5-inch, 1-inch high, SCA2 SCSI hard disk drives. The backplane receives control signals from the SCSI controller on the server board through a cable connected to the wide SCSI connector on the backplane. The backplane is powered through cables connected to the two power connectors.

The drives get their control signals and power from the SCA2 connectors on the backplane.

The fault indicators on the front panel indicate failure status for each drive in the bay. These indicators get their signals through a cable connected to the front panel connector on the backplane.

The temperature sensor on the backplane provides temperature information to the BMC (baseboard management controller) on the server board through chassis service messages.

The backplane power control will power down a drive when a failure is detected and reported to the SCSI bus. When a new drive is inserted, the power control waits a short time for the drive to become fully seated and then applies power to the drive.

Power Supply

The 300 watt PFC (power factor correction) universal type power supply is designed to minimize EMI. The supply operates within the following voltage ranges and is rated as follows:

- 100-120 V~ at 50/60 Hertz (Hz); 4.6 A maximum
- 200-240 V~ at 50/60 Hz; 2.3 A maximum

The DC output voltages of the power supply are +5 V, +12 V, +3.3 V, -5 V, -12 V, and +5 V standby. Power to the server board is provided through the power cable to the 24-pin main power connector.

Checking the Power Cord

⚠️ **WARNING**

Do not attempt to modify or use a supplied AC power cord if it is not the exact type required.

If a power cord supplied with the system is not compatible with the AC wall outlet in your region, get one that meets the following criteria:

- The cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the system.
- The connector that plugs into the wall outlet must be a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region.
- The connector that plugs into the AC receptacle on the system power supply must be an IEC 320, sheet C13, type female connector.
- In Europe, the cord must be less than 4.5 meters (14.76 feet) long, and it must be flexible <HAR> (harmonized) or VDE certified cordage to comply with the system's safety certifications.

System Cooling

The chassis includes four tachometer fans for cooling and airflow. One of these is the integrated fan in the power supply.

⟹ **NOTE**

The chassis side cover must be on the system for proper cooling.

System Security

To help prevent unauthorized entry or use of the system, the chassis includes a chassis intrusion switch that can be monitored by Server Management software and two padlock loops.

Mechanical Locks

A padlock loop on the rear of the system side cover can be used to prevent access to the microprocessors, memory, and add-in cards. A variety of lock sizes can be accommodated by the .300 diameter loop.

A padlock loop on the hard drive bay EMI door provides security for the hot swap hard drives. The allotted space accommodates a MasterLock† model 120-D or equivalent lock. Dimensions: .815" H x .830" W x .430" D. Pall diameter .145"

Monitoring

Install the chassis intrusion switch. When the side cover is removed, the switch transmits a signal to the BMC on the server board. Server management software can be programmed to respond to an intrusion by powering down or by locking the keyboard, for example.
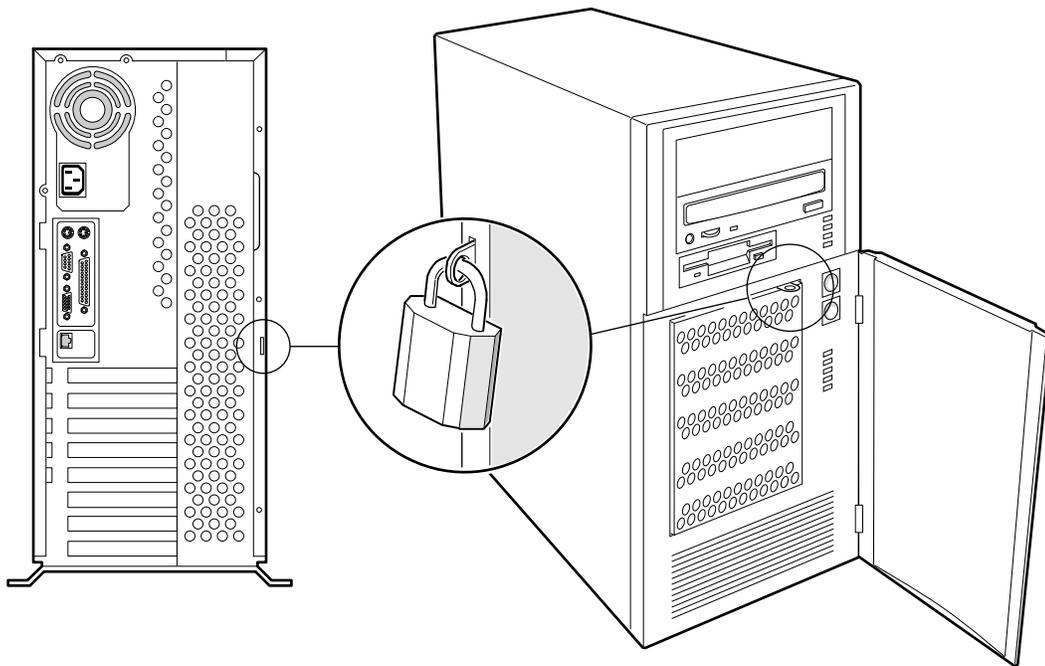
OM07044

Figure 4. System Security

2 Working Inside the System

Tools and Supplies Needed

- Phillips (cross head) screwdriver (#2 bit)
- Antistatic wrist strap (recommended)
- Needle-nosed pliers

Safety: Before You Remove the Side Cover

Before removing the system side cover for any reason, observe these safety guidelines.

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button on the front of the system. Then unplug the AC power cord from the system or wall outlet.
3. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.
4. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove the side cover of the system to access components inside the system. Only a technically qualified person should integrate and configure the system.

⚠ **WARNINGS**

The power button (a convex button) on the front panel DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet or the system.

Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the power cords, telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.

Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by technically qualified personnel.

⚠ **CAUTIONS**

ESD can damage disk drives, boards, and other parts. Perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. Do not touch the connector contacts. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. If you place the server board on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

For proper cooling and airflow, always install the chassis side cover before turning on the system. Operating it without the cover in place can damage system parts.

Removing the Side Cover

You need to remove the chassis side cover, and in some cases the front cover, to gain access to components inside the system.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Turn off all peripheral devices connected to the system.
3. Turn off the system by pressing the power button on the front panel, AND unplugging the AC power cord.
4. Label and disconnect all peripheral cables attached to the I/O panel on the back of the system.
5. Remove and save the three screws from the side cover; you will need them later to reattach the cover.
6. Place the fingertips of your left hand under the built in handle on the back of the cover.
7. Using an even pull, slide the cover backward, about an inch, until it stops.
8. Using your left hand, pull the back end of the cover toward you to disengage its bottom row of tabs from the notches in the chassis.
9. Using both hands, lift the cover upward to disengage the top row of tabs from the notches in the top edge of the chassis. Set the cover aside.
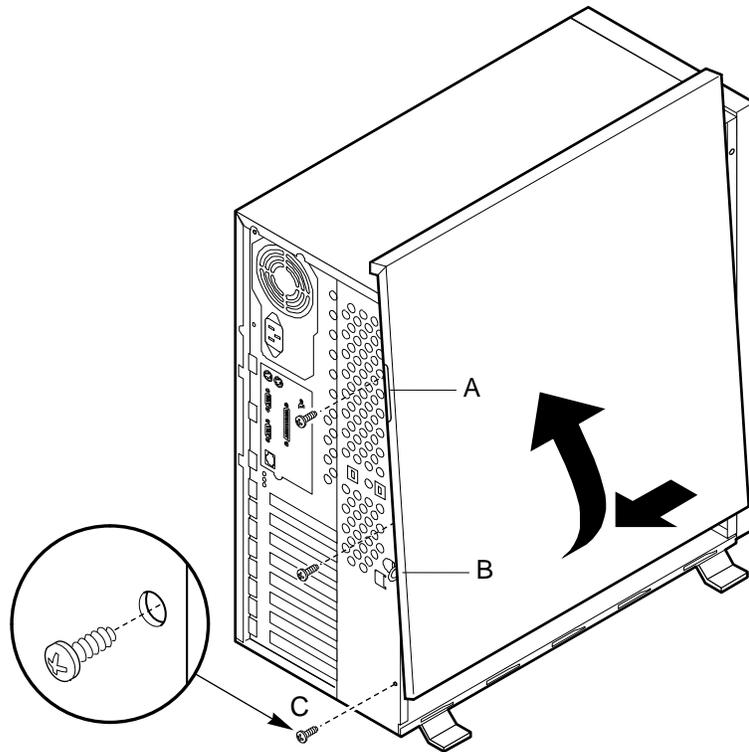
OM06410

Figure 5. Removing the Side Cover

    A.   Built in handle
    B.   Metal loop (for padlock)
    C.   Retaining screws (3)

Installing Chassis Feet

1. Each chassis foot has two sets of holes. The larger holes fit over alignment features in the chassis to assist positioning the feet.
2. Align the smaller holes with the corresponding screw holes on the chassis bottom, and attach each foot with two screws (silver screws with washers are provided).

Removing the Hot-swap Bay

The hot-swap bay may be heavy if it is full of drives. It is not necessary to remove the drives from the bay before removing the bay from the chassis. However, we recommend you remove any drives in the bay before removing the bay to minimize the risk of personal injury or property damage.

1. Remove the side cover. You do not need to remove the plastic front cover.
2. Remove the three screws holding the bay chassis.
3. Disconnect the power and data cables from the SCSI backplane.
4. Pivot the bay until it comes out of the chassis.
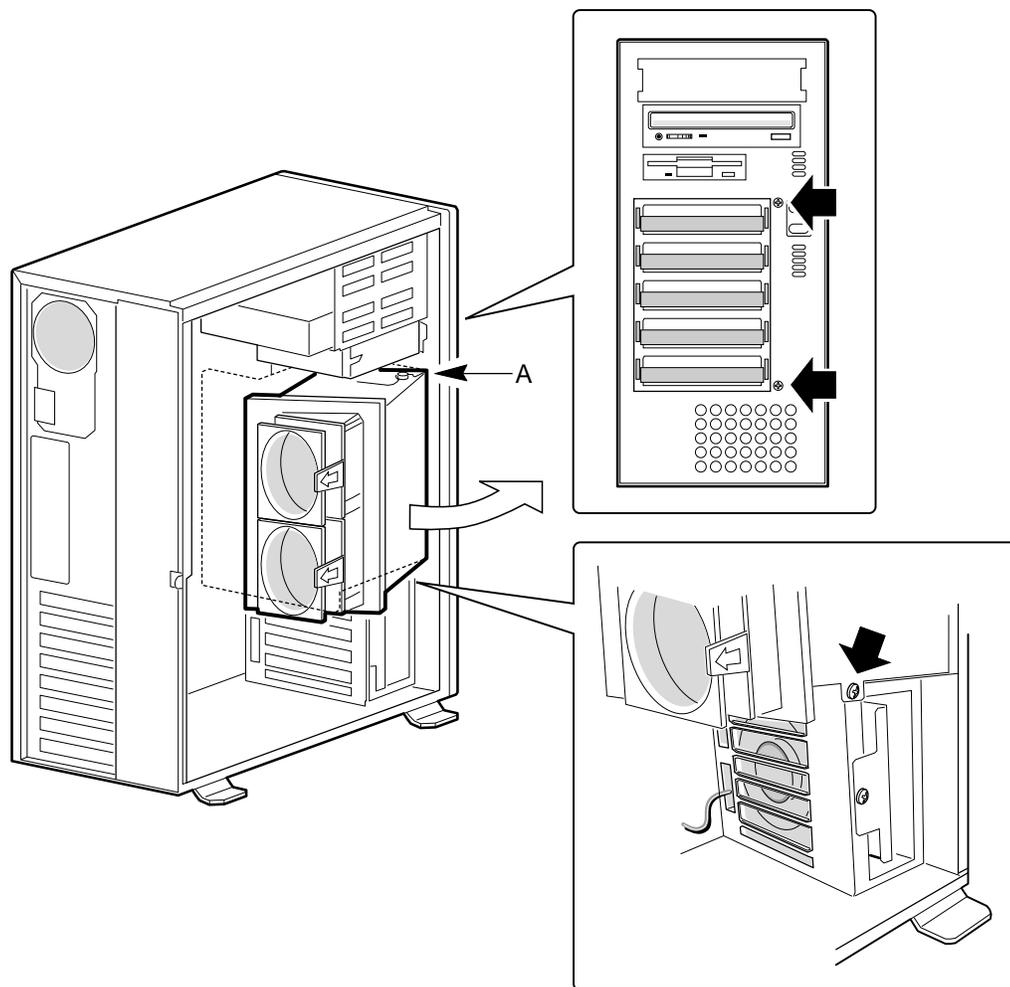
OM07043

Figure 6. Removing the Hot-swap Bay

A. Pivot point

Removing the IDE Drive Bay

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the side cover.
3. Disconnect the power and signal cables from any drives in the bay.
4. Remove and save the two screws at the top of the bay.
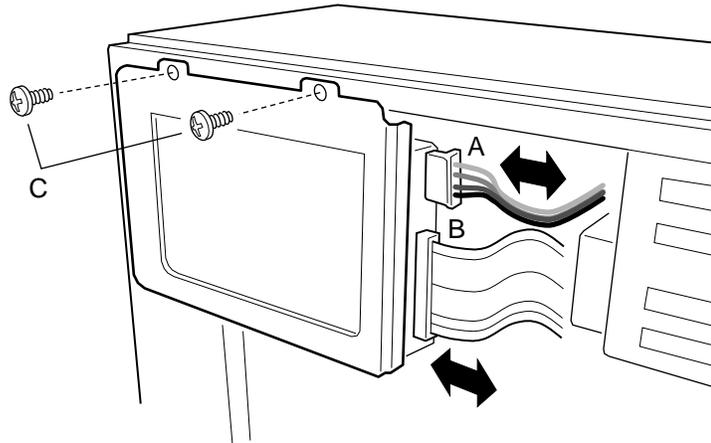
OM07560

Figure 7. Disconnect Cables and Remove Screws

    A.   Power cable
    B.   Data cable
    C.   Screws

5. Remove and save the screw in the flange at the bottom of the drive bay (see Figure 8, A).
6. Push the drive bay up and pull it out of the chassis. Do not swing it on its hinges, as the flange may get caught in the fans mounted on the hot-swap bay.
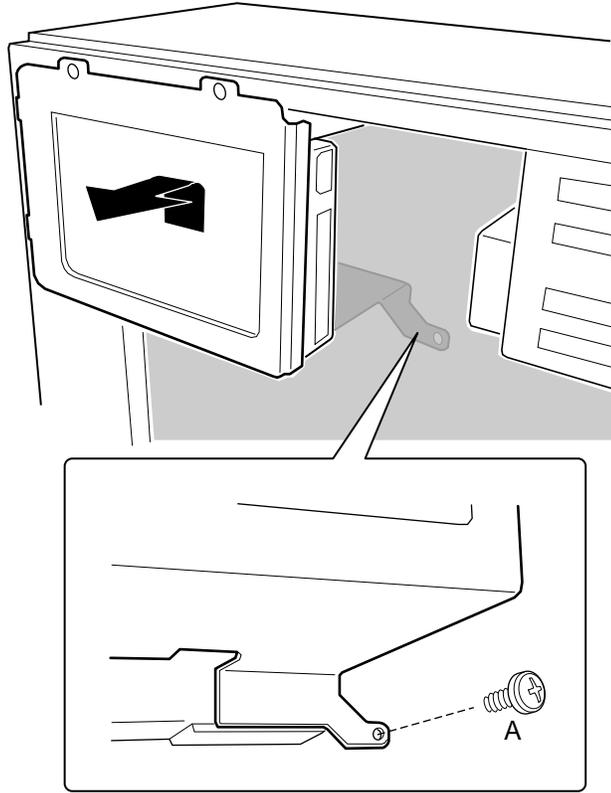
OM07561

Figure 8. IDE Hard Drive Bay

A.   Screw

Installing Server Board Clips and Bumpers

To support the server board in the Astor II chassis, you must install three rubber bumpers and eleven or twelve standoff clips (depending on the server board you are installing).

1. Peel the adhesive backing from three rubber bumpers; stick the bumpers to the chassis wall (see Figure 9, A).
2. Install eleven or twelve standoff clips in the chassis wall (see Figure 9, B). Gently pinch the open end of each clip with needle-nosed pliers, insert into a slot on the chassis wall, and release. Pressure holds the clip in place.
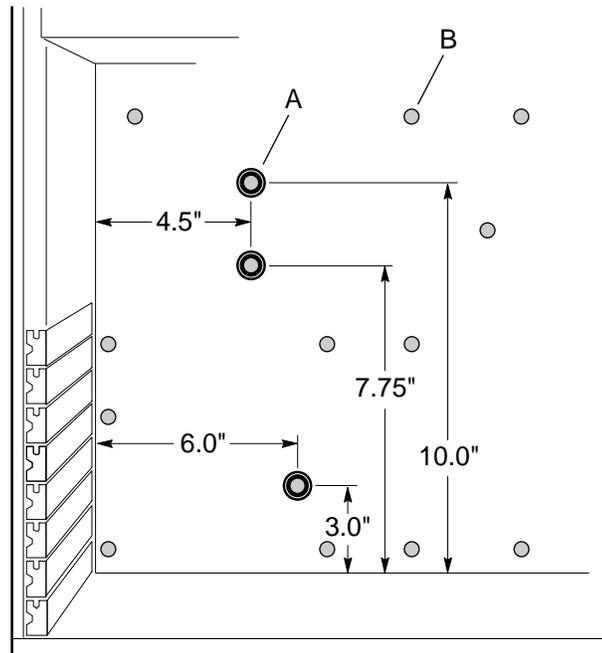
OM07019

Figure 9. Rubber Bumper and Standoff Clip Placement

B. Rubber bumper
C. Standoff clip location

I/O Shield

> An ATX 2.01-compliant I/O shield should be provided with your server board. The shield is required by Electromagnetic Interference (EMI) regulations. It minimizes EMI and ensures proper cooling of the server. If the shield does not fit the chassis, obtain a properly sized shield from the chassis supplier.

The shield fits the rectangular opening near the power supply in the back of the chassis. The shield has cutouts that match the external I/O connectors (e.g., keyboard and mouse).

1. Install the shield from inside the chassis. Orient the shield so that the cutouts align with the corresponding I/O connectors on the server board.
2. Position one edge so that the dotted groove (A) is outside the chassis wall, and the lip of the shield rests on the inner chassis wall.
3. Hold the shield in place, and push it into the opening until it is seated (B). Pressure holds the shield in place.
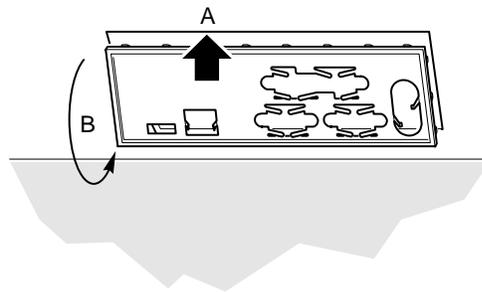
OM06332a

Figure 10. Installing the I/O Shield (typical shield shown)

Installing the Server Board

4. Position the board over the snap in standoff and threaded standoffs inside the chassis, and slide it carefully toward the rear of the system until the I/O connectors protrude through the back panel.
5. Press the board onto the snap in standoff, and insert one screw through one of the mounting holes of the board and into a threaded standoff. Do not tighten the screw until the next step.
6. Insert the remaining screws through the mounting holes and into the threaded standoffs. Make sure the board is properly seated, and then tighten all the screws. Take care to not tighten the screws more the 6 inch-pounds.
7. Install your processors and memory. See your server board manual for instructions.
8. Connect the power cable to the server board. See your server board manual for the location of the main power connector. Once it is firmly connected to the server board, bend the wires towards the front of the chassis. This will help when you install the hot-swap bay.

9. Connect the Front Panel cable from the top of the front panel to the server board. See your server board manual for the location of the front panel connector. The cable from the bottom of the front panel goes to the hot-swap backplane.

10. If you are going to install a diskette drive or any hard drives, attach the appropriate cables to the server board. See your server board manual for the locations of data cable connectors.
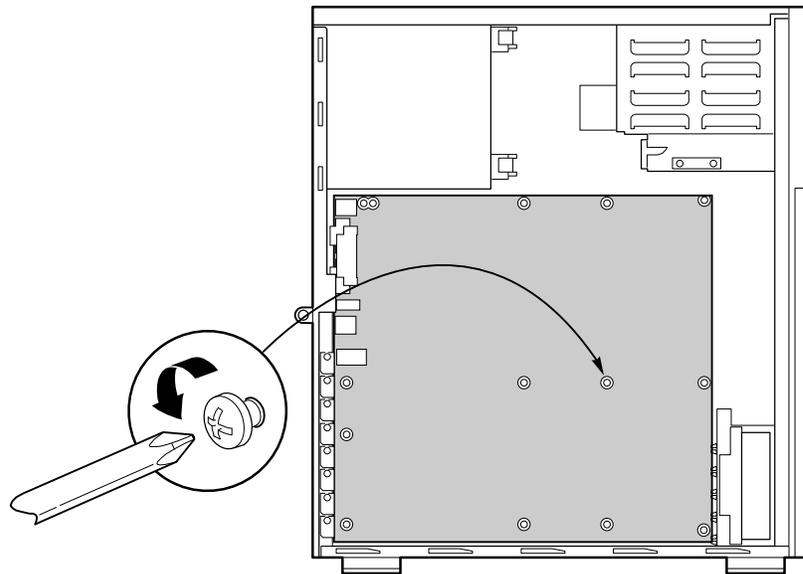
OM07048

Figure 11. Installing the Server Board (typical board shown)

Installing a Chassis Intrusion Switch

Your server board probably has a chassis intrusion connector on it. However, we recommend that you attach the chassis intrusion switch to the front panel.

1. Remove the side cover.
2. Remove the IDE drive bay.
3. Remove the hot-swap bay.
4. Position the switch so the screw hole lines up with the hole in the chassis.
5. Insert and tighten the screw.
6. There are three small holes in the sheet metal, two on the back and one in the top. Attach two of the plastic clips to the cable and route it along the back of the chassis. Insert the plastic clips into the holes along the back of the chassis. Attach the third clip to the cable and route the cable between the power supply and the IDE bay. Insert the third clip into the hole in the top sheet metal. Route the cable behind the 5.25-inch drive bay.
7. Connect the chassis intrusion switch cable to the front panel.
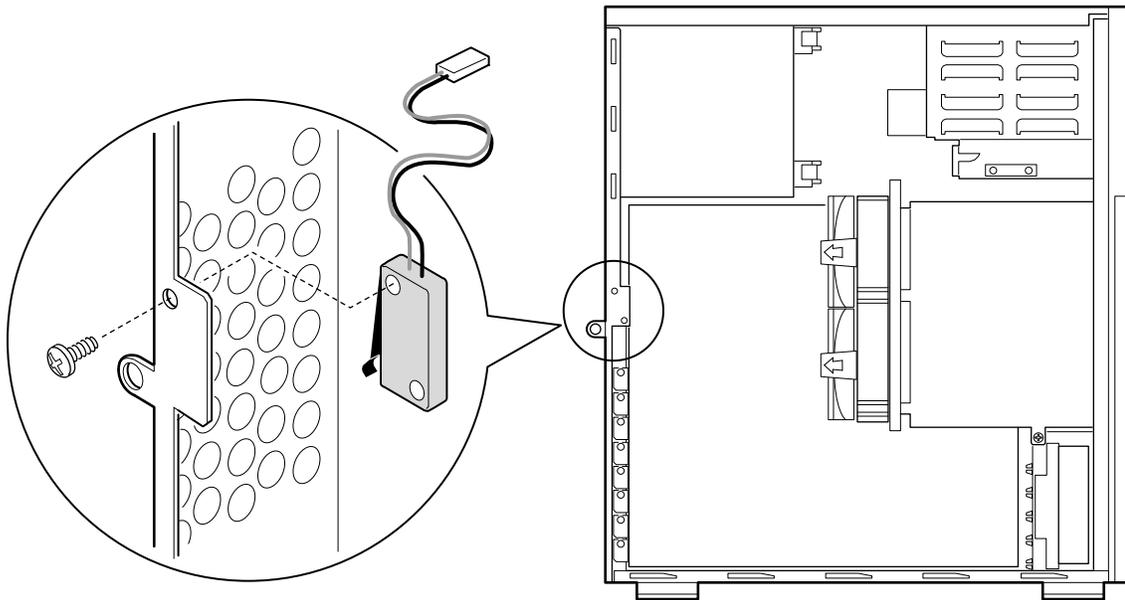
OM08475

Figure 12. Installing a Chassis Intrusion Switch

Removing the Front Cover

1. Remove side cover.
2. Squeeze the two plastic tabs inside the front cover, and push them through the chassis slots.
3. Pull the left side of the cover out slightly, about 15°, until the cover clears the power and reset buttons. Slide the cover to the right until the tabs disengage from the chassis slots. Set the cover aside.
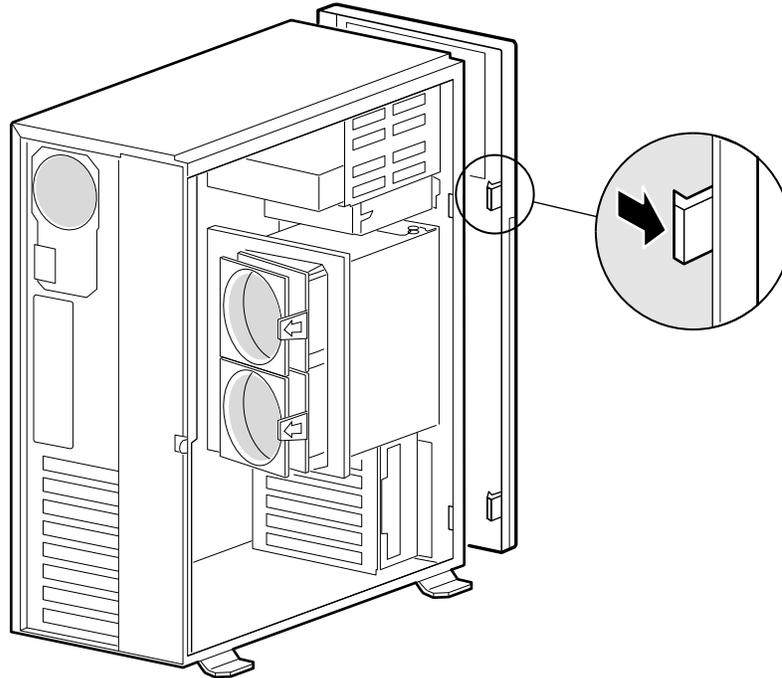
OM07097

Figure 13. Removing the Front Cover

Installing the Diskette Drive

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the new 3.5-inch diskette drive from its protective wrapper, and place it component side up on an antistatic surface. Record the drive model and serial numbers in your equipment log.
3. Set any jumpers or switches according to the drive manufacturer's instructions.
4. Slide the drive into the chassis.
5. Secure the drive to the 5.25-inch bay with the screws you removed earlier; tighten the screws firmly.
6. Connect the signal and power cables to the drive.

OM07052
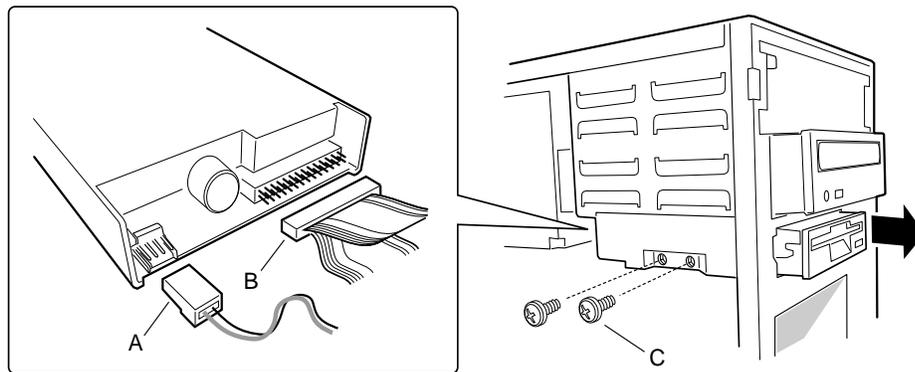
Figure 14. Installing the Diskette Drive

A. Power cable
B. Signal cable
C. Chassis screws

Removing the Diskette Drive

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the side cover.
3. Remove the front cover.
4. Disconnect the power cable and signal cable from the diskette drive.
5. Remove and save the screws that secure the diskette drive to the 5.25-inch drive bay.
6. Slide the drive forward and out of the system and place it component side up on an antistatic surface. If not reinstalling the same drive, place it in an antistatic protective wrapper.

Hard Drives

Drive Cabling Considerations

The number of devices you can install depends on:

- The number supported by the bus
- The number of physical drive bays available
- The combination of SCSI and IDE devices

You should route cables to minimize airflow disruption. Air flows from the front to the rear of the chassis. You should route IDE and diskette drive cables behind the hot-swap bay.

IDE Requirements

An 18-inch long IDE cable that supports two drives is standard in the system.

For proper IDE operation, note the cable length specified in the following figure. If no drives are present on an IDE channel, the cable must be removed. If only one drive is installed, it must be connected at the end of the cable.

OM05093
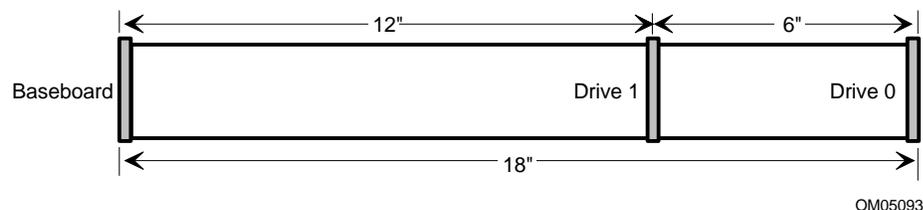
Figure 15. IDE Cable Dimensions

SCSI Requirements

All SCSI devices must be unterminated except the peripheral at the end of the SCSI cable. Hard drives usually provide an active termination, while CD-ROM drives do not. The SCSI controller on the server board is actively terminated. The SCSI hot-swap backplane provides termination and SCSI IDs for drives connected to it.

Installing a Hard Drive into the IDE drive bay

The IDE drive bay provides space for two 1-inch high hard drives.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the IDE drive bay from the chassis.
3. Remove the drive from its protective wrapper, and place it on an antistatic surface.
4. Record the drive model and serial numbers in your equipment log.
5. Set any jumpers and/or switches on the drive according to the drive manufacturer's instructions.
6. Slide the drive into the drive bay so the screw holes in the drive and the bay line up. For the best cooling, the component side of the drive should face away from the plate of the drive bay.

7. Insert and tighten four screws (gold colored screws with washers are provided).
8. Install the IDE drive bay into the chassis.
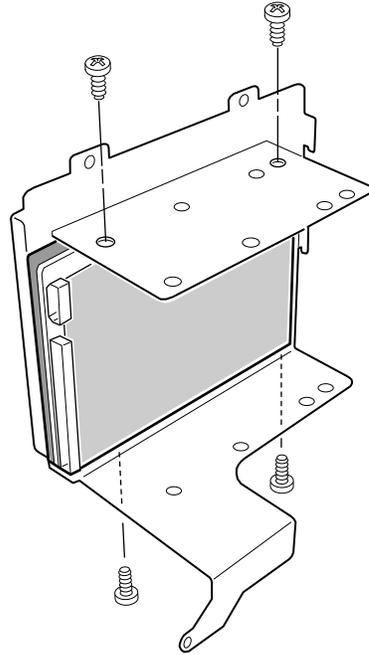
OM07562

Figure 16. IDE Hard Drive

Removing a Hard Drive from the IDE Drive Bay

1. Observe the safety and ESD precautions at the beginning of this chapter. Also see the cabling considerations on page 27.
2. Remove the IDE drive bay from the chassis.
3. Remove the four screws holding the hard drive in the bay.
4. Slide the hard drive out of the bay.
5. Reinstall the hard drive bay.

Installing the IDE Drive Bay

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Place the drive bay into the chassis so its hinges are in their slots.
3. Move the drive bay down until the screw holes in the bay and the chassis line up.
4. Replace the two screws on the top of the bay (see Figure 17, C).
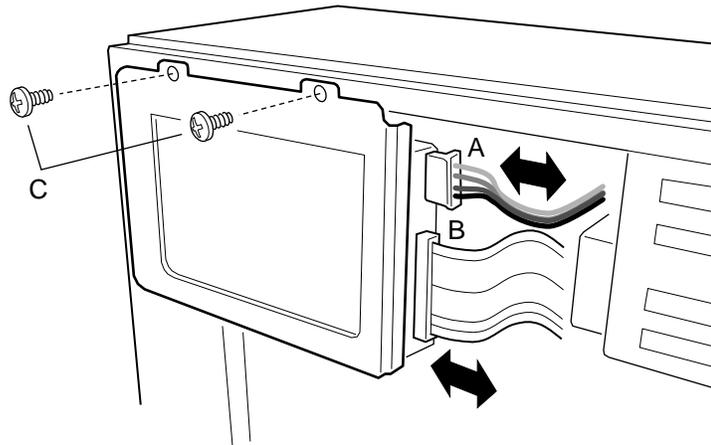
OM07560

Figure 17. Disconnect Cables and Remove Screws

A. Power cable
B. Data cable
C. Screws

5. Replace the screw in the flange at the bottom of the drive bay (see Figure 8, A, on page 20).
6. Connect data and power cables to any drives in the bay.

Installing a 5.25-inch Peripheral Device

Two 5.25-inch half-height bays provide space for tape backup, CD-ROM, or other removable media drives.

⚠ CAUTION

For several reasons, we recommend that you do NOT install hard drives in the 5.25-inch bays: the drives cannot be properly cooled in this location; a hard drive generates EMI and is more susceptible to ESD in this location.

⇒ NOTES

System EMI integrity and cooling are both protected by having drives installed in the bays or filler panels and EMI shields covering the bays. When you install a drive, save the panel and shield to reinstall in case you should later remove the drive and not reinstall one in the same bay.

It is important that your cabling and connections meet the SCSI bus specification. Otherwise, the bus could be unreliable and data corruption could occur or devices may not work at all. The SCSI bus needs to be terminated at the end of the cable, and this is usually provided by the last SCSI device on the cable.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the side and front system covers. Place the front cover on a flat surface.
3. Remove filler panel from the bay and set it aside.
4. Push the tab on the left side of the EMI metal shield to the right to disengage it from the chassis. Save the shield.
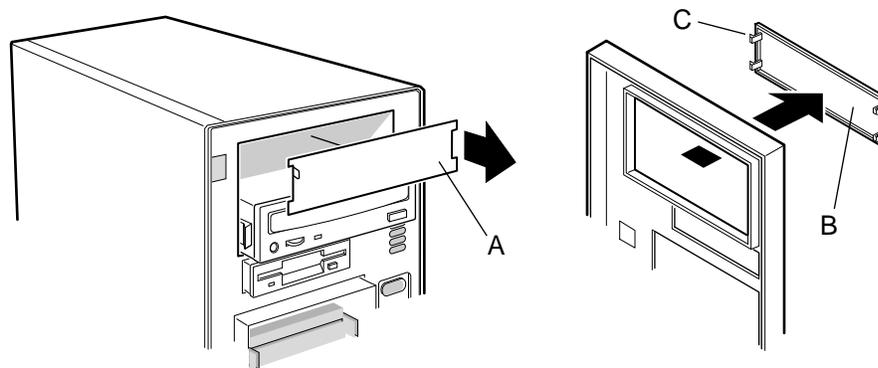
OM07099

Figure 18. Remove Filler Panels and EMI Shields

A. EMI shield
B. Filler panel
C. Tab

5. Remove the drive from its protective wrapper, and place it on an antistatic surface.
6. Record the drive model and serial numbers in your equipment log.
7. Set any jumpers and/or switches on the drive according to the drive manufacturer's instructions.
8. Using two screws (silver screws without washers are provided), attach each plastic slide rail with its metal grounding plate to the drive.
9. Position the drive so the plastic slide rails engage in the bay guide rails. Push the drive into the bay until the slide rails lock in place.
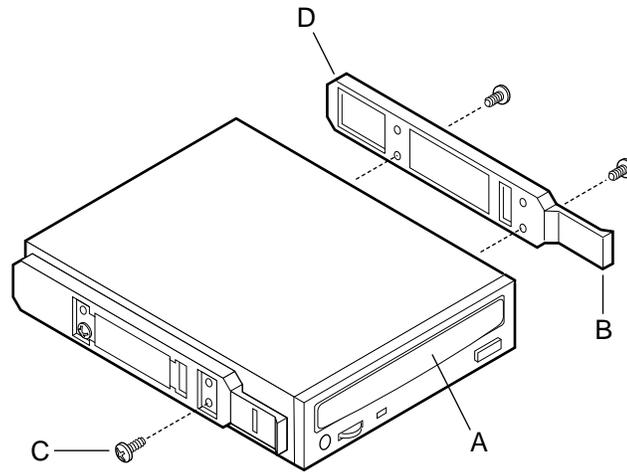
OM07046

Figure 19. Snap-in Plastic Slide Rails

A. CD-ROM or other removable media device
B. Tab on slide rail
C. Screws (4)
D. Slide rails (2)

10. Connect a power cable to the drive.
11. Connect a signal cable to the drive.
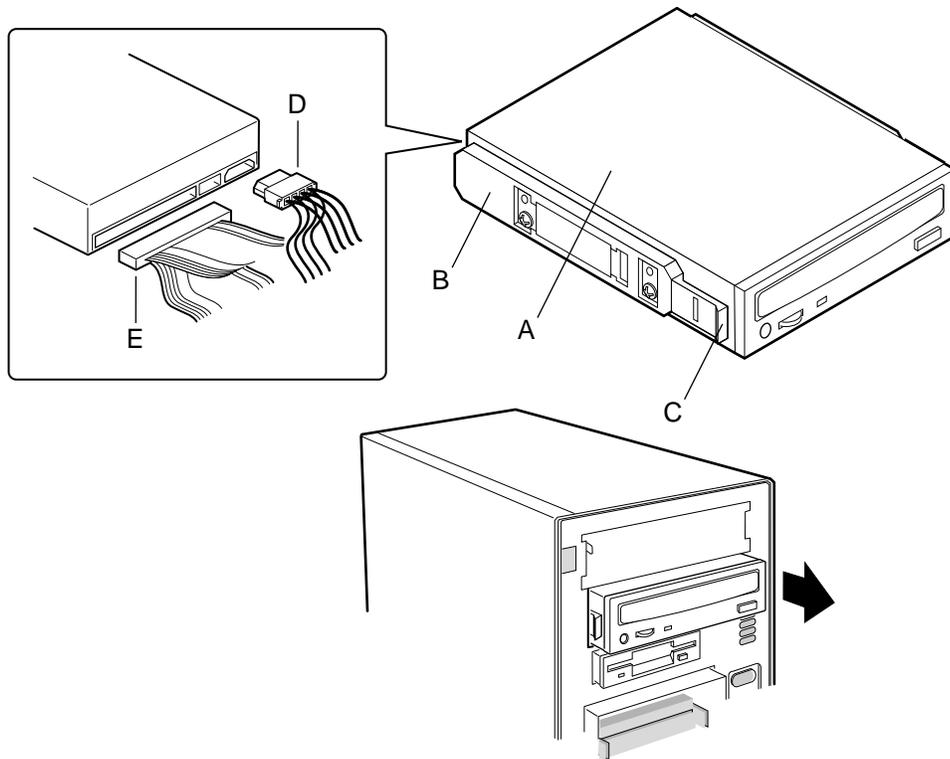
OM07036

Figure 20. Installing a Removable Media Device

- A. Removable media device
- B. Drive rail
- C. Rail tab
- D. Power cable
- E. Typical SCSI signal cable

Removing a 5.25-inch Peripheral Device

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Disconnect the power and signal cables from the drive.
3. The drive has two protruding plastic, snap in rails attached. Squeeze the rail tabs toward each other as you carefully slide the drive forward out of the bay, and place it on an antistatic surface.
4. Remove and save the four screws and two slide rails.
5. If you leave the bay empty, install a stainless steel EMI shield on the bay and a filler panel on the front cover for proper cooling and airflow.
6. If you do not replace the device with another SCSI device, and it was installed at the end of the SCSI signal cable, modify the cable and termination arrangement so that a proper termination exists at the end of the cable (it can be a termination device only, not necessarily a SCSI peripheral).

Installing the Front Cover

1. Insert the plastic tabs on the front cover into the slots on the right of the chassis. Squeeze the front panel and chassis together along the left side until the plastic tabs snap into their slots.

Installing the Hot-swap Bay

1. Tilt the bay into the chassis.
2. Connect the power and data cables to the SCSI backplane.
3. Install and tighten the three screws holding the bay to the chassis.
4. Install the side cover.

Installing an Add-in Board

⚠ **CAUTIONS**

> Do not overload the server board by installing add-in boards that draw excessive current.
>
> Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the server board, place it component side up on a grounded, static free surface or conductive foam pad—if available. Do not slide the board over any surface.

1. Remove side cover.
2. Remove and save the expansion slot screw and cover.
3. Remove add-in board from its protective wrapper. Be careful not to touch the components or gold edge connectors. Place board component side up on an antistatic surface.
4. Record the type and serial number of the add-in board in your equipment log.
5. Set jumpers or switches according to the manufacturer's instructions.
6. Hold board by its top edge or upper corners. Firmly press it into an expansion slot on the server board. The tapered foot of the board retaining bracket must fit into the mating slot in the expansion slot frame.
   - Install an ISA board component side UP.
   - Install a PCI board component side DOWN.
7. Align the rounded notch in the retaining bracket with the threaded hole in the frame. The bracket fits the space that was occupied by the slot cover.
8. Use the screw removed earlier. Insert it into the threaded hole, and push the rounded notch against the screw. Tighten it firmly to prevent the bracket from interfering with adjacent brackets. Attach cables if necessary.
9. Reinstall the side cover.
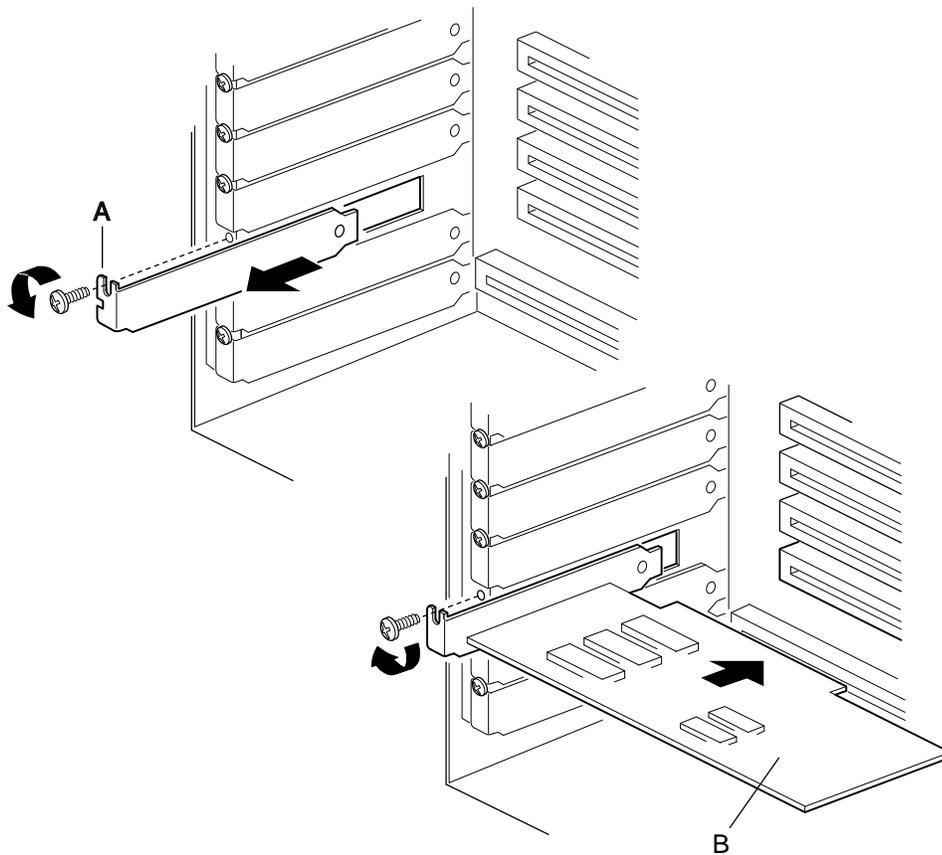
OM06425

Figure 21. Installing an Add-in Board

    A.   Expansion slot cover and screw
    B.   Add-in board, use same screw

Removing an Add-in Board

⚠ CAUTION

Slot covers must be installed on all vacant expansion slots. This maintains
the electromagnetic emissions characteristics of the system and ensures
proper cooling of system components.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Disconnect any cables attached to the board you are removing.
3. Remove and save the screw from the board retaining bracket.
4. Holding the board by its top edge or upper corners, carefully pull it out. Do not scrape the board against other components.
5. Store board in an antistatic protective wrapper.
6. If you are not reinstalling a board in the same slot, install a slot cover over the vacant slot. The tapered foot of the cover must fit into the mating slot in the expansion slot frame.
7. Use the screw removed earlier. Insert it into the threaded hole, and push the rounded notch against screw. Tighten it firmly to prevent the bracket from interfering with adjacent brackets.

Installing the Side Cover

⚠ CAUTION

When you install the side cover, do not damage the EMI gaskets mounted on the cover. Replace any damaged strips, or your system may not meet EMI requirements.

1. Before replacing a side cover, check that you have not left loose tools or parts inside the system.
2. Check that cables, add-in boards, and other components are properly installed.
3. Position the cover over the chassis so that the top row of tabs aligns with slots in the top of the chassis. Slide the cover toward the front of the system until the cover tabs firmly engage in the chassis.
4. Attach the cover to the chassis with the three screws you removed earlier, and tighten them firmly.
5. To prevent unauthorized access inside the system, insert and lock a padlock through the metal loop protruding through the slot in the back of the side cover.
6. Connect all external cables and the power cord to the system.

Hot-swap Bay

The plastic front door covers a removable metal EMI cover that is hinged at the bottom. Plastic drive carriers for 3.5-inch wide by 1-inch high drives allow easy hot-swapping of drives without shutting down the system.

The backplane uses industry-standard 80-pin SCA2 connectors to support up to five industry-standard Ultra2/LVD SCA2 SCSI hard disk drives. The bays accept peripherals that consume up to 17 watts of power and run at a maximum ambient temperature of 50 °C.

SCSI Hard Disk Drives

The system supports a variety of single ended or LVD (low voltage differential) SCSI SCA2 devices. Visit the support website for your server board for a list of approved single ended SCSI SCA2 devices. http://support.intel.com/support/motherboards\server\

⚠ WARNING

The Ultra2/LVD SCSI hot-swap backplane requires installing LVD or single ended SCSI devices in your system. Installing high voltage differential (HVD) SCSI drive types can result in electrical damage to the server board and the peripherals.

⚠ CAUTION

ESD can damage disk drives, add-in boards, and other components. This server can withstand normal levels of environmental ESD while SCSI hard disk drives are being swapped. However, we recommend doing all procedures in this manual only at an ESD workstation. If one is not available, you can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground of the server—any unpainted metal surface—when handling components.

For proper air flow and hard drive cooling, make sure that the paper baffles included with the chassis are installed in any drive carriers that do not contain drives. Fold the ends of the paper baffle up along the dotted lines.

Mounting a SCSI SCA2 Hard Disk Drive in a Plastic Carrier

1. Record the drive model and serial number in your equipment log.
2. Orient the drive so the connector is near the top surface of the drive, and place it on an antistatic surface.
3. Place the plastic carrier on top of the drive.
4. Using four screws (silver screws with washers are supplied), attach the carrier to the drive.
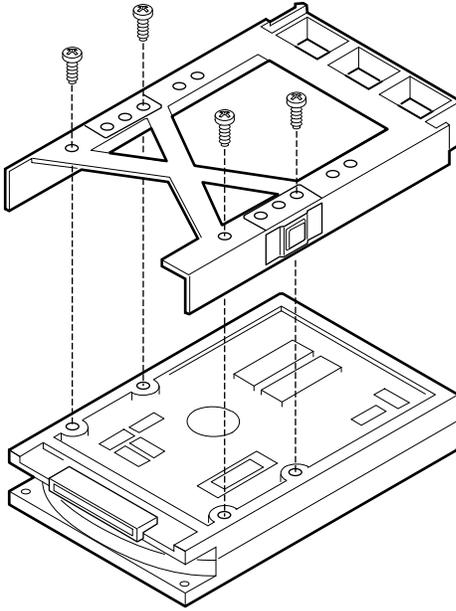
OM07035

Figure 22. Hard Disk Drive and Plastic Carrier

Installing a SCSI SCA2 Hard Disk Drive in the Hot-swap Bay

1. Open the plastic front door.
2. If there is a padlock installed on the metal EMI cover, remove it.
3. Pull the top of the metal EMI cover away from the chassis.
4. Position the drive/carrier assembly, locking tab to the left, so it engages the hot-swap bay guide rails.
5. Gently push the assembly into the bay until it docks with the backplane connector and snaps into place.
6. Close the metal EMI cover.
7. Close the plastic front door.
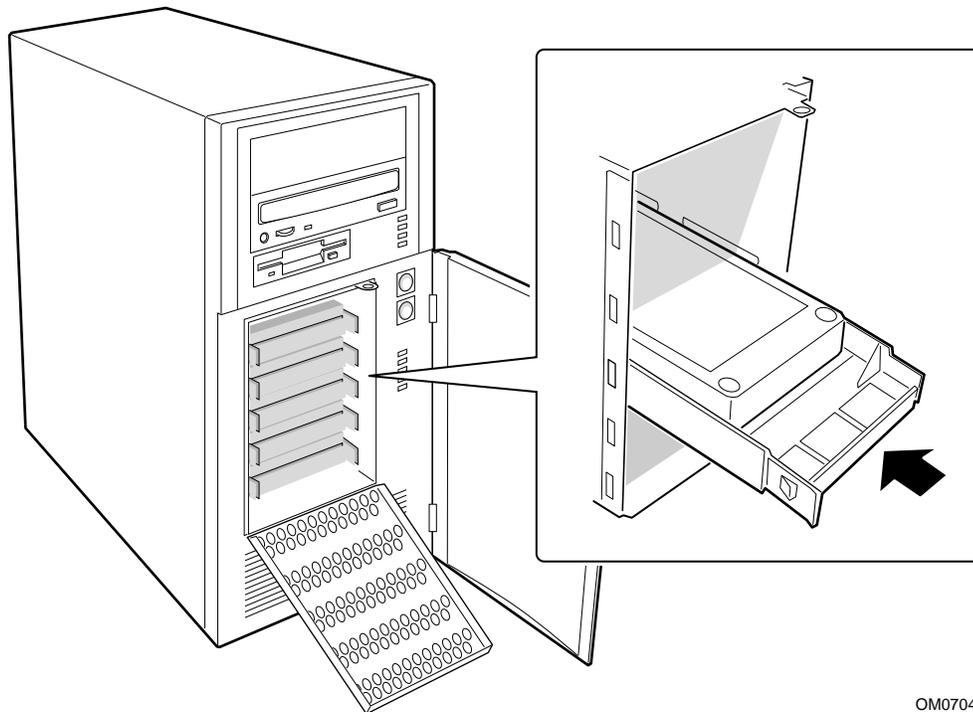
OM07049

Figure 23. Installing a Hard Disk Drive

Hot-swapping a SCSI SCA2 Hard Disk Drive

A bank of five yellow LEDs on the front panel monitors the drive status of each drive in the hot-swap bay. When a yellow LED is on continuously, it is okay to hot-swap (replace) a bad drive with a good one. You *do not* need to shut the system down to hot-swap a drive.

1. Open the plastic front door of the system.
2. Pull the top of the metal EMI cover away from the chassis.
3. Check the bank of yellow LEDs on the front panel to determine which drive is bad. Grasp that drive's plastic drive carrier, squeeze the tab on the carrier, and carefully slide the bad drive out of the bay. Place the drive on an antistatic surface.
4. Position the new plastic carrier and drive assembly so that it engages the bay guide rails.
5. Gently push the drive into the bay until it docks with the backplane connector and snaps into place.
6. Close the metal door.
7. Close the plastic front door.

Fans

For cooling and airflow, the system contains three removable chassis fans to cool the boards and removable media drives. The integrated power supply fan provides more cooling and airflow.

⇒ **NOTE**

> The fan has two connectors on its cable. One is labeled "N440BX" and should only be connected a system fan connector on the Intel N440BX Server Board. The other connector is label "ATX" and can be connected to any ATX compliant board.

Table 2.   Fan Cable Connector Pinout

Pin	ATX signal	N440BX Signal	Wire Color
1	Ground	Ground	Black
2	+12V	SPEED	Yellow
3	Speed	+12 V	red

Removing the Front Fan

1. Observe the safety and ESD precautions at the beginning this chapter.
2. Remove the side cover.
3. Disconnect the fan power cable connector from the fan header on the server board.
4. Remove the screw holding the fan bracket to the chassis.
5. Pull the fan bracket out of the chassis.
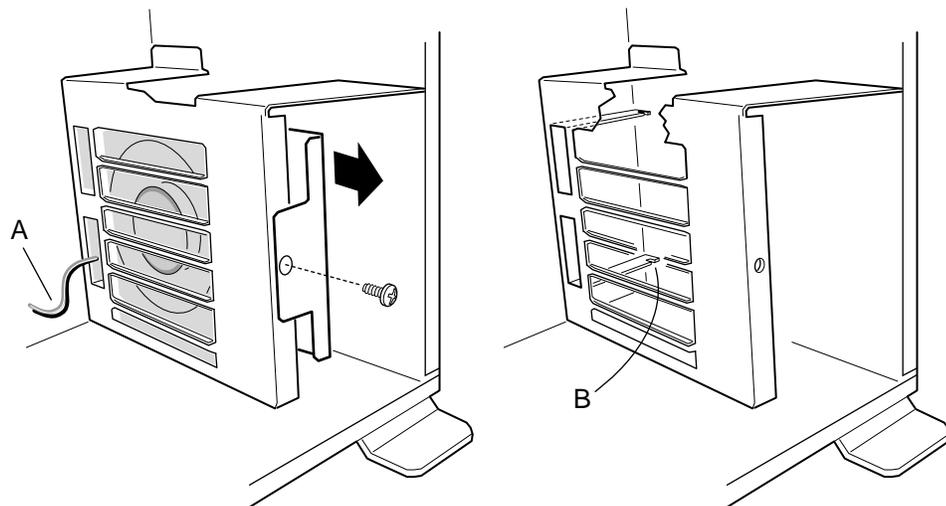
OM07050

Figure 24. Removing the Fan Bracket

A.   Fan power cable
B.   Notched metal tabs

Installing the Front Fan

⇒ **NOTE**

The removable fan pulls air from in front of the chassis so that it flows across the boards and out the back. Thus, the fan must be oriented for the correct airflow direction. If you place the fan so the label faces the back of the chassis, this should provide the correct orientation. You can confirm this by checking the embossed arrows on the side of the fan as you place it in its bracket:

⇒   Arrow points horizontally toward back of chassis

⇑   Arrow points vertically up

Replace a failed fan with the same type as the one removed, with a tachometer signal, or an approved fan. For a list of approved fans, contact your distributor or customer service representative.
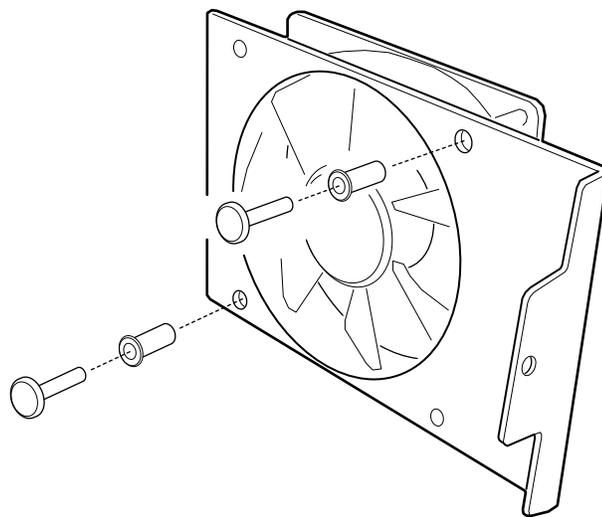
OM07564

Figure 25. Installing the Front Fan

1. Attach the fan to the bracket with two snap rivets.
2. Feed the fan's power cable through the hole in the card guide.
3. Slide the fan bracket into the chassis. Make sure that the bottom of the bracket is set into the notches on the metal tab.
4. Install and tighten the screw that holds the bracket to the chassis.

Removing a Hot-swap Bay Fan
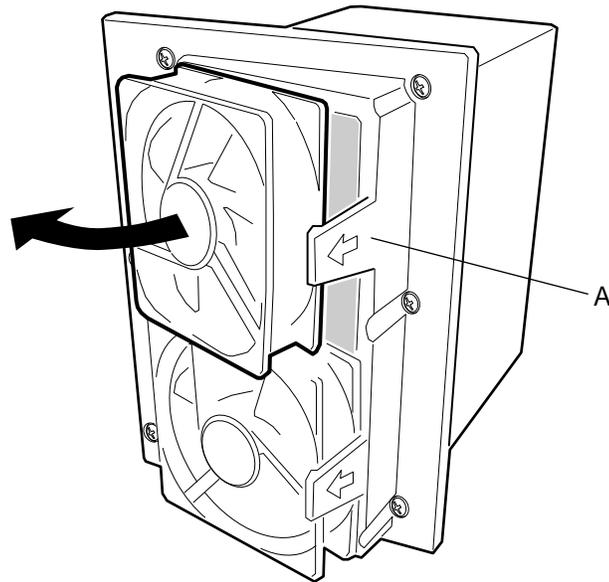
OM07042

Figure 26. Removing the Hot-swap Bay Fan Bracket

1. Observe the safety and ESD precautions at the beginning this chapter.
2. Remove the side cover.
3. Disconnect the fan's power cable from the SCSI backplane.
4. Snap the fan out of the plastic shroud.

Installing a Hot-swap Bay Fan

1. Position the fan, label side facing away from the hot-swap bay, and snap it into the shroud.
2. Connect the fan's power cable to the SCSI backplane (a fan in the bottom of the shroud connects to the Fan 1 header; a fan in the top of the shroud connects to Fan 0 header).
3. Reinstall the side cover.

Hot-swap Backplane

Removing the SCSI Backplane

1. Remove any hard drives installed in the hot-swap bay.
2. Remove the hot-swap bay from the chassis.
3. Remove the hot-swap bay fans.
4. Remove the four corner screws holding the plastic shroud and SCSI backplane to the hot-swap bay. Do not remove the two center screws.
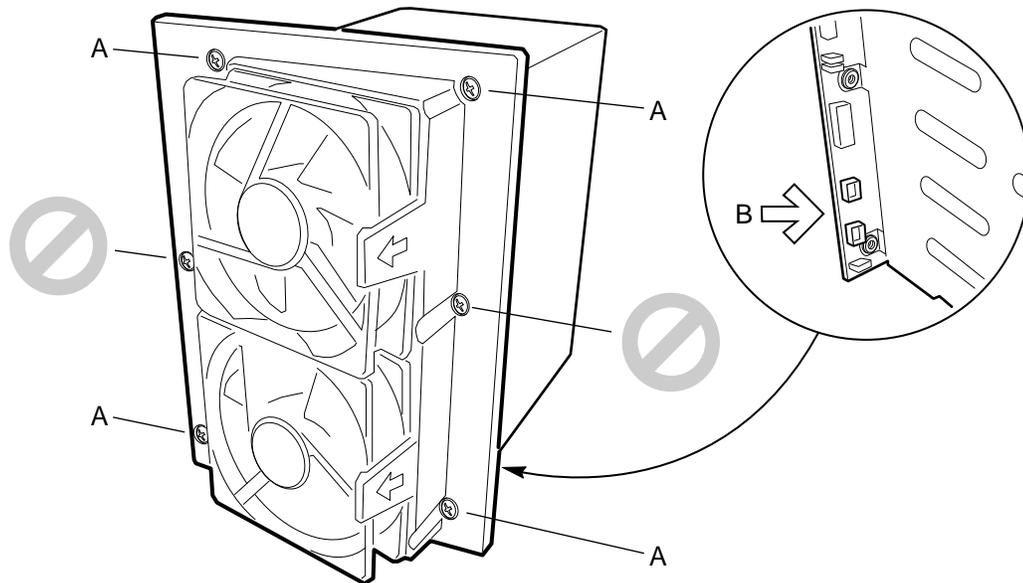
OM07042A

Figure 27. Removing the Plastic Shroud

A. Screws
B. Threaded tabs on hot-swap bay

5. Remove the plastic shroud and set it aside.
6. Remove the two center screws holding the SCSI backplane to the hot-swap bay.
7. Remove the SCSI backplane, and place it component side up on a nonconductive, static free surface or in an antistatic bag.
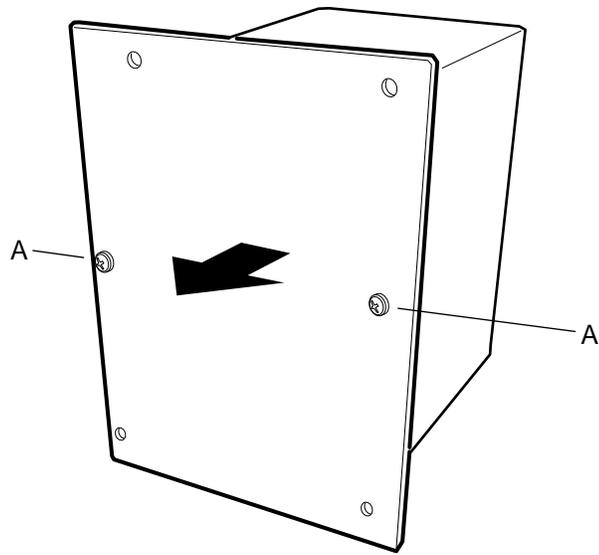
OM07053

Figure 28. Removing the SCSI Backplane

A.   Screws

Installing the SCSI Backplane

1.   Place the SCSI backplane component side to the hot-swap bay.
2.   Insert and tighten the two center screws that hold the backplane to the hot-swap bay.
3.   Place the plastic shroud on the back of the backplane.
4.   Insert and tighten the four corner screws holding the plastic shroud and SCSI backplane to the hot-swap bay.
5.   Install two hot-swap bay fans.

Front Panel Board

Removing the Front Panel Board

The front panel board contains the system controls and indicators. The board is mounted on a snap on standoff and a threaded standoff inside the chassis.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the side cover.
3. Remove the hot-swap bay.
4. Remove and save the snap rivets holding the front panel board to the chassis.
5. Disconnect the data cables from the front panel.
6. Remove the front panel board from the system, and place it on an antistatic foam pad or a grounded workstation.
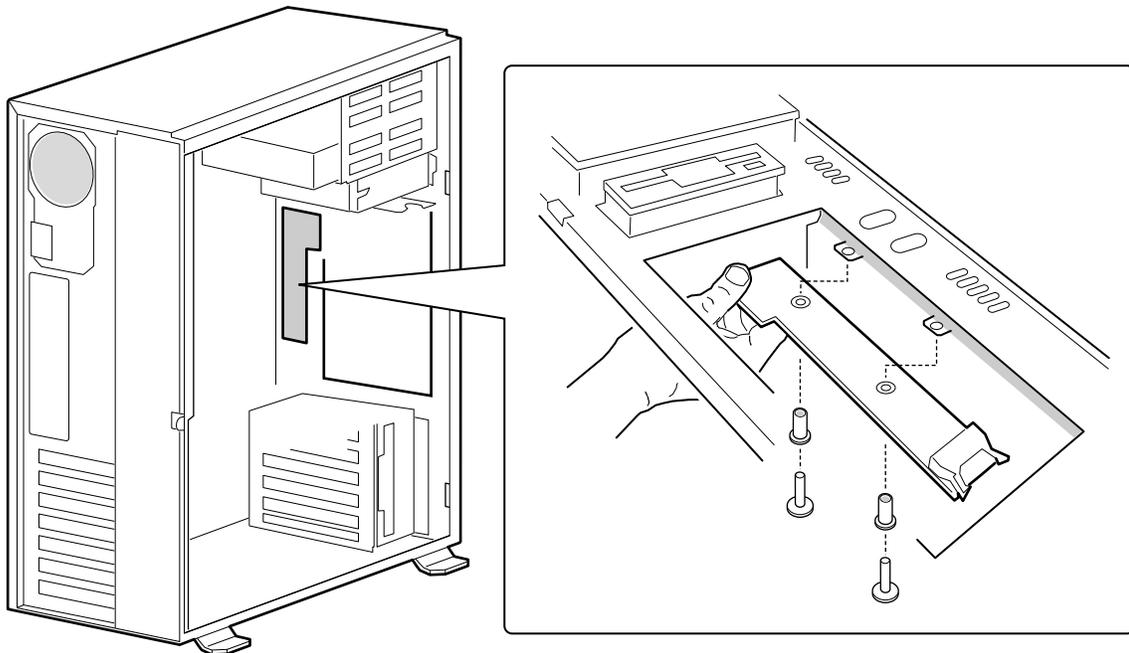
OM07098

Figure 29. Removing the Front Panel Board

Installing the Front Panel Board

1. Position the front panel board over the tabs inside the chassis.
2. Reconnect the data cables to the front panel board.
3. Insert the snap rivets from the bottom, through the tabs and the front panel.
4. Reinstall the hot-swap bay.
5. Reinstall the side cover.

3   Technical Reference

Power Supply Specifications

Input Voltages

The 300 watt power supply, designed to minimize EMI, provides sufficient power for a maximum configuration of the server. The input voltage ranges are:

- 100-120 V~ at 50/60 Hz; 4.6 A maximum current
- 200-240 V~ at 50/60 Hz; 2.3 A maximum current

If a system is integrated to a fully configured condition, checking the input current rating will provide an indication of whether the system is overloaded or not. The input current rating should not exceed 4.6 amperes (for 100-120Vac) or 2.3 amperes (for 200-240Vac).

Output Voltages

The table below lists the total watts available for each voltage. Adjust your loads so that the combined total wattage for your system configuration is less than 300 watts. For information about calculating the power usage for your system configuration, see page 59.

Table 3.   Power Supply Output Voltages

Voltage	Maximum Continuous Current	Peak Current	Watts
+3.3 V	16.0 A		52.8 W
+5.0 V	26.0 A		130.0 W
–5.0 V	0.25 A		1.25 W
+5V Standby	0.8 A		4.0 W
+12.0 V	10.0 A	13.0 A	120.0 W
–12.0 V	0.5 A		6.0 W

⚠ **CAUTION**

> Do not exceed a combined power output of 167 watts for the +5 V and +3.3 V outputs. Exceeding a combined 167 watts will overload the power supply and may cause the power supply to overheat and malfunction.

The ISA slot(s) on the system board are rated at a maximum of 4.5 amperes per slot. The ISA specification recommends supporting an average of 2.0 amperes per slot. The average current usage should not exceed 3.0 amperes per slot; that is, 15 watts.

The PCI slots on the system board are rated at a maximum of 5 amperes per slot. The maximum power allowed for each slot is 20 watts at +5 volts. The average current usage per slot should not exceed 3.0 amperes per slot; that is, 15 watts.

Environmental Specifications

Table 4.   Environmental Specifications

Temperature	
Nonoperating	–40° to 70 °C (–55° to 150 °F)
Operating	10° to 35 °C (41° to 95 °F); derated 0.5 °C for every 1000 ft (305 m)
Humidity	
Nonoperating	95% relative humidity (noncondensing) at 30 °C (86 °F)
Operating wet bulb	Not to exceed 33 °C (91.4 °F) (with diskette drive or hard disk drive)
Shock	
Operating	2.0 g, 11 msec, 1/2 sine
Acoustic noise	Typically <45 dBA at 18° to 24 °C (65° to 75 °F) with five internal hard disk drives (measured at 1 meter from the system with the peripherals idle). The noise of the variable speed system fan will increase with temperature and power load**. Your selection of peripherals may change the noise level.**
Electrostatic discharge (ESD)	Tested to 20 kilovolts (kV); no component damage
AC Input Power	
100-120 V~	100-120 V~, 4.6 A, 50/60 Hz
200-240 V~	200-240 V~, 2.3 A, 50/60 Hz

SCSI Hot-swap Backplane Connectors

Ultra2/LVD SCSI 16-Bit Connector

1

68   OM03878
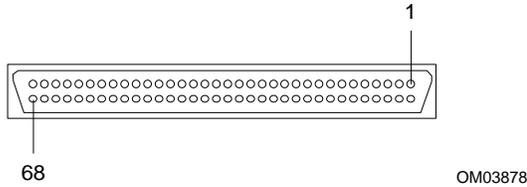
Table 5.   Wide/Fast SCSI 16-Bit Connector Pinout

Pin	Signal	Pin	Signal
1-16	GND (ground)	49-50	GND (ground)
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	RESERVED	53	RESERVED
20-34	GND (ground)	54	GND (ground)
35	DB12_L	55	ATN_L
36	DB13_L	56	GND (ground)
37	DB14_L	57	BSY_L
38	DB15_L	58	ACK_L
39	DBP1_L	59	RST_L
40	DB0_L	60	MSG_L
41	DB1_L	61	SEL_L
42	DB2_L	62	CD_L
43	DB3_L	63	REQ_L
44	DB4_L	64	I/O_L
45	DB5_L	65	DB8_L
46	DB6_L	66	DB9_L
47	DB7_L	67	DB10_L
48	DBP_L	68	DB11_L

Ultra2/LVD SCA2 SCSI 16-Bit Connectors

OM04855
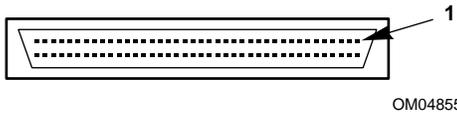
Table 6.   Wide/Fast SCA2 SCSI 16-Bit Connector Pinout

Pin	Signal	Pin	Signal
1-4	+12 V	25	DB 3_L
5–6	NC	26	DB 2_L
7	DB 11_L	27	DB 1_L
8	DB 10_L	28	DB 0_L
9	DB 9_L	29	DB P_L
10	DB 8_L	30	DB 15_L
11	I/O_L	31	DB 14_L
12	REQ_L	32	DB 13_L
13	C/D_L	33	DB 12_L
14	SEL_L	34-36	+5 V
15	MSG_L	37	SYNC
16	RST_L	38	MTRON_L
17	ACK_L	39	ID0_L
18	BSY_L	40	ID2_L
19	ATN_L	41	DRV PRES_L
20	DB P_L	42–76	GND
21	DB 7_L	77	LEDC, DRV ACT_L
22	DB 6_L	78	DLYDST_L
23	DB 5_L	79	ID1_L
24	DB 4_L	80	ID3_L

Power Connectors

The backplane power connectors are 4-pin shrouded plastic connectors with mechanical keying.

OM04656
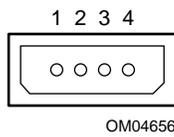
Table 7. Power Connector Pinout

Pin	Signal
1	+12 V
2	Ground
3	Ground
4	+5 V

Backplane Fan Connector

This connector provides power to the fan.

OM05211
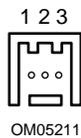
Table 8. Backplane Fan Connector Pinout

Pin	Signal
1	GND (ground)
2	SPEED
3	+12 V

Front Panel Cable Connector

The front panel connector and cable provide the chassis wide IMB bus and the electrical path between the drive fault indicators (LEDs) and the SCSI backplane that controls them.
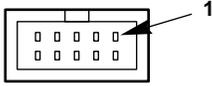
OM04669

Table 9.   Front Panel Connector Pinout

Pin	Name	Description
1	GND	Electrical ground (0V)
2	I2C_SDA	I^{2}C SDA (Serial Data)
3	NC	No Connect
4	I2C_SCL	I^{2}C Serial Clock
5	PRI_SEC_L	Primary Secondary Backplane
6	FAULT1_L	Fault signal for drive 1 (logical drive 0)
7	FAULT2_L	Fault signal for drive 2 (logical drive 1)
8	FAULT3_L	Fault signal for drive 3 (logical drive 2)
9	FAULT4_L	Fault signal for drive 4 (logical drive 3)
10	FAULT5_L	Fault signal for drive 5 (logical drive 4)

4 Regulatory Information

⚠️ WARNING

You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product regulations. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing of the product, will most likely void other compliance markings provided, and may result in noncompliance with product regulations in the region(s) in which the product is sold.

Regulatory Compliance

This subassembly, when correctly integrated per this guide, complies with the following safety and electromagnetic compatibility (EMC) regulations.

Safety Compliance

UL 1950 - CSA 950-95, 3rd Edition, July 28, 1995

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (USA and Canada). This product has been evaluated and complies to UL1950 – CSA 950-95 3rd Edition. However, if a UL1950 2nd Edition modem telecommunications add-in card is used, the system will be deemed to comply with UL 1950 2nd Edition/CSA950-93.

EN 60 950, 2nd Edition, 1992 (with Amendments 1, 2, and 3)

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (European Union)

IEC60 950, 2nd edition, 1991 (with Amendments 1, 2, 3 and 4)

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (International)

EMKO-TSE (74-SEC) 207/94

Summary of Nordic deviations to EN 60 950. (Norway, Sweden, Denmark, and Finland)

EMC Compliance

FCC Class B

Title 47 of the Code of Federal Regulations, Parts 2 and 15, Subpart B, pertaining to unintentional radiators. (USA)

CISPR 22, 2nd Edition, 1993, Amendment 1, 1995

Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (International)

EN 55 022, 1995

Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (Europe)

EN 50 082-1, 1992

Generic Immunity Standard. Currently, compliance is determined via testing to IEC 801-2, -3 and -4. (Europe)

VCCI Class B (ITE)

Implementation Regulations for Voluntary Control of Radio Interference by Data Processing Equipment and Electronic Office Machines. (Japan)

ICES-003, Issue 2

Interference Causing Equipment Standard, Digital Apparatus. (Canada)

Australian Communication Authority (ACA)

Australian C-tick mark, limits and methods of measurement radio interference characteristics of information technology equipment to ASNZS 3548 (Australian requirements based on CISPR 22 requirements).

New Zealand Ministry of Commerce

Australian C-tick mark, limits and methods of measurement radio interference characteristics of information technology equipment to ASNZS 3548 (New Zealand requirements based on CISPR 22 requirements). New Zealand authorities accept ACA C-Tick Compliance Mark.

Regulatory Compliance Markings

This Astor II chassis subassembly is provided with the following Product Certification Markings.

- UL and cUL Listing Marks
- CE Mark
- Australian C-Tick Mark
- German GS Mark
- The CE marking on this product indicates that it is in compliance with the European community's EMC (89/336/EEC) and low voltage directives (73/23/EEC)
- NEMKO Mark
- FCC, Class B (Declaration of Conformity)
- ICES-003 (Canada Compliance Marking)
- VCCI Class B

Electromagnetic Compatibility Notice (USA)

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 the 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 the receiver.
- Connect the equipment into 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.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals, that are not shielded and grounded may result in interference to radio and TV reception.

⇒ **NOTE**

> If a Class A device is installed within this system, then the system is to be considered a Class A system. In this configuration, operation of this equipment in a residential area is likely to cause harmful interference.

FCC Declaration of Conformity

Product Type: AST2

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

Intel Corporation
5200 N.E. Elam Young Parkway
Hillsboro, OR 97124-6497
Phone: 1-800-628-8686

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadian des Communications.

(English translation of the notice above) This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference causing equipment standard entitled "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

Electromagnetic Compatibility Notices (International)

　この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
　取扱説明書に従って正しい取り扱いをして下さい。

(English translation of the notice above) This is a Class B product based on the standard of the Voluntary Control Council For Interference (VCCI) from Information Technology Equipment. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

This equipment has been tested for radio frequency emissions and has been verified to meet CISPR 22 Class B.

Installation Safety Instructions

⚠ **CAUTION**

> Integration of this assembly shall be done only by technically qualified personnel.
>
> Follow these guidelines to meet and maintain safety and product regulatory requirements when integrating this Astor II chassis subassembly.
>
> Read and adhere to all of these instructions and the instructions supplied with this assembly. If you do not follow these instructions, the UL listing will be void, and the product will most likely be noncompliant with other regional product laws and regulations.

The following warning is provided on the server board configuration label, which is provided with the Intel server board boxed product. There is insufficient space on the server board to place this label. Therefore, the label must be placed permanently on the inside of the chassis, as close to the battery as possible.

⚠ **WARNING**

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

⚠ **ADVARSEL!**

> **Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.**

⚠ **ADVARSEL!**

> **Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.**

⚠ **VARNING**

> **Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.**

⚠ **VAROITUS**

> **Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.**

Use Only for Intended Applications

This product was evaluated as Information Technology Equipment (ITE) that may be installed in offices, homes, schools, computer rooms and similar locations. The suitability of this product for other Product Categories and Environments other than ITE applications, (such as medical, industrial, alarm systems, and test equipment) may require further evaluation.

When you integrate this subassembly, observe all warnings and cautions in the Installation Guide.

To avoid injury, be careful of:

* Sharp pins on connectors
* Sharp pins on printed circuit assemblies
* Rough edges and sharp corners on the chassis
* Hot components (like processors, voltage regulators, and heat sinks)
* Damage to wires that could cause a short circuit

⚠ **WARNING**

> **Do not open the power supply. Risk of electric shock and burns from high voltage and rapid overheating. Refer servicing of the power supply to qualified technical personnel.**

To maintain the UL listing and compliance to other regulatory certifications and/or declarations, the following regulated components must be used, and conditions adhered to. Information for system configurations can be found through Intel's web address (http://www.intel.com). If you do not have access to Intel's web address please contact your local Intel representative.

* **Astor II chassis** (chassis is provided with power supply and fans)—UL listed.
* **Server board**—you must use an Intel UL Recognized Server board.
* **Add-in boards**—must have a printed wiring board flammability rating of minimum UL94V-1. Add-in boards containing external power connectors and/or lithium batteries must be UL Recognized or UL Listed. Add-in boards containing modem telecommunication circuitry must be UL Listed.
* **Peripheral storage devices**—must be UL recognized or UL listed accessory and TUV or VDE licensed. Maximum capacity for this chassis is 8 devices; maximum of any one device is 17W. Total system configuration is not to exceed maximum loading conditions of power supply.
    — When using a UL Recognized Peripheral Storage Device, the plastic bezel must be made of a UL recognized plastic with a flammability rating of 5V.

A   Equipment Log and Worksheets

Equipment Log

Use the blank equipment log provided here to record information about your system. You will need some of this information when you run the SSU.

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
Chassis			
Server board			
Processor speed and cache			
Video display			
Video Controller			
Keyboard			
Mouse			
Diskette drive A			
Diskette drive B			
Tape drive			
CD-ROM drive			
SCSI disk drive 1			
SCSI disk drive 2			
SCSI disk drive 3			
SCSI disk drive 4			
SCSI disk drive 5			

Equipment Log (continued)

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
IDE disk drive 1			
IDE disk drive 2			

Current Usage

As an overall current usage limitation on the power supply, do not exceed a combined power output of 167 watts for the +5 V and +3.3 V outputs.

Calculating Power Usage

The total combined wattage for the system configuration **must be less than 300 watts.** Use the two worksheets in this section to calculate the total used by your system. For current and voltage requirements of add-in boards and peripherals, see your vendor documents.

Worksheet, Calculating DC Power Usage

1. List the current for each board and device in the appropriate voltage level column.
2. Add the currents in each column. Then go to the next worksheet.

Table 10.   Power Usage Worksheet 1

Device	Current (maximum) at voltage level:				
	+3.3 V	+5 V	−5 V	+12 V	−12 V
Boards, processors, and memory (get totals from your board manual)					
SCSI backplane					
Front panel board					
3.5-inch diskette drive					
CD-ROM drive					
Second 5.25-inch device					
1st hot-swap hard drive					
2nd hot-swap hard drive					
3rd hot-swap hard drive					
4th hot-swap hard drive					
5th hot-swap hard drive					
1st IDE hard drive					
2nd IDE hard drive					
Cooling fan 1, 92 mm				0.4 A	
Cooling fan 2, 92 mm				0.4 A	
Cooling fan 3, 92 mm				0.4 A	
Total Current					
Maximum Ratings (for comparison)	16.0 A	26.0 A	0.25 A	10.0 A	0.5 A

Worksheet, Total Combined Power Used by the System

1. From the previous worksheet, enter the total current for each column.
2. Multiply the voltage by the total current to get the total wattage for each voltage level.
3. Add the total wattage for each voltage level to arrive at a total combined power usage on the power supply.

Table 11.   Power Usage Worksheet 2

Voltage level and total current (V X A = W)	Total Watts for each voltage level
(+3.3 V) X (_____ A)	_____ W
(+5 V) X (_____ A)	_____ W
(–5 V) X (_____ A)	_____ W
(+12 V) X (_____ A)	_____ W
(–12 V) X (_____ A)	_____ W
Total Combined Wattage	_____ **W**

⚠ **CAUTION**

As an overall current usage limitation on the power supply, do not exceed a combined power output of 167 watts for the +5 V and +3.3 V outputs.

B Warnings

WARNING: English (US)

AVERTISSEMENT: Français

WARNUNG: Deutsch

AVVERTENZA: Italiano

ADVERTENCIAS: Español

WARNING: English (US)
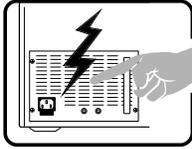
The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.
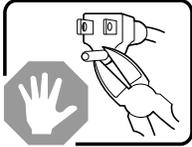
Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.
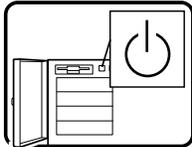
The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.
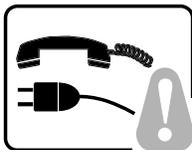
SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button.
3. Unplug all AC power cords from the system or from wall outlets.
4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
6. Do not operate the system with the chassis covers removed.
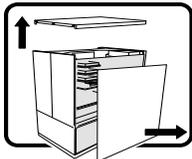
After you have completed the six SAFETY steps above, you can remove the system covers. To do this:

1. Unlock and remove the padlock from the back of the system if a padlock has been installed.
2. Remove and save all screws from the covers.
3. Remove the covers.
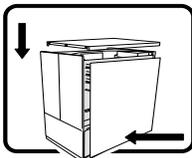
For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

1. Check first to make sure you have not left loose tools or parts inside the system.
2. Check that cables, add-in boards, and other components are properly installed.
3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly.
4. Insert and lock the padlock to the system to prevent unauthorized access inside the system.
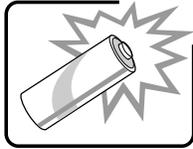5. Connect all external cables and the AC power cord(s) to the system.
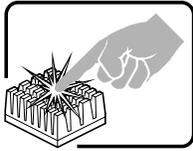
A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.
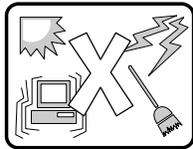
The system is designed to operate in a typical office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppresser and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power supply cords, because they serve as the product's main power disconnect.

AVERTISSEMENT: Français
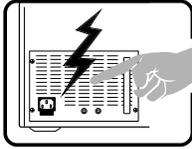
Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.
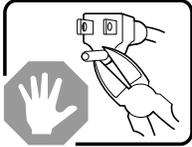
Ne pas essayer d'utiliser ni modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Le nombre de câbles d'alimentation CA fournis correspond au nombre de blocs d'alimentation du produit.
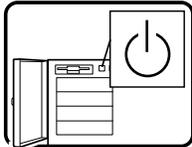
Notez que le commutateur CC de mise sous tension /hors tension du panneau avant n'éteint pas l'alimentation CA du système. Pour mettre le système hors tension, vous devez débrancher chaque câble d'alimentation de sa prise.
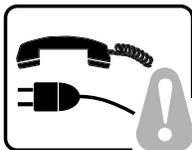
CONSIGNES DE SÉCURITÉ - Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes :

1. Mettez hors tension tous les périphériques connectés au système.
2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir).
3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales.
4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système.
5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).
6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.
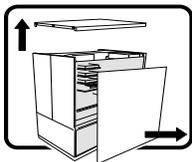
Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit :

1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le.
2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr.
3. Retirez les panneaux.
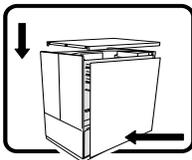
Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit :

1. Assurez-vous de ne pas avoir oublié d'outils ou de pièces démontées dans le système.
2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés.
3. Revissez solidement les panneaux du boîtier avec les vis retirées plus tôt.
4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l'intérieur du système.
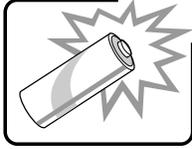5. Rebranchez tous les cordons d'alimentation c. a. et câbles externes au système.

AVERTISSEMENT: **Français** (suite)
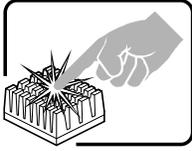
Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.

Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.
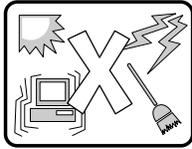
Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être :

- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de vibrations.
- Isolé de forts champs électromagnétiques géenérés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.
- Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).

WARNUNG: Deutsch
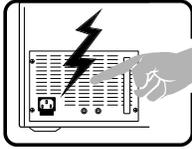
Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.
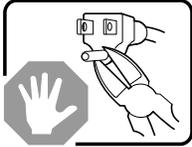
Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht genau um den erforderlichen Typ handelt. Ein Produkt mit mehreren Netzgeräten hat für jedes Netzgerät ein eigenes Netzkabel.
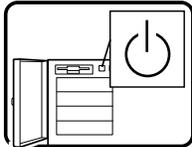
Der Wechselstrom des Systems wird durch den Ein-/Aus-Schalter für Gleichstrom nicht ausgeschaltet. Ziehen Sie jedes Wechselstrom-Netzkabel aus der Steckdose bzw. dem Netzgerät, um den Stromanschluß des Systems zu unterbrechen.
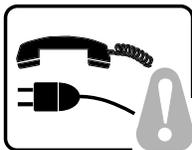
SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:

1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus.
2. Schalten Sie das System mit dem Hauptschalter aus.
3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose.
4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab.
5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden.
6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.
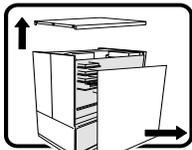
Nachdem Sie die oben erwähnten ersten sechs SICHERHEITSSCHRITTE durchgeführt haben, können Sie die Abdeckung abnehmen, indem Sie:

1. Öffnen und entfernen Sie die Verschlußeinrichtung (Padlock) auf der Rückseite des Systems, falls eine Verschlußeinrichtung installiert ist.
2. Entfernen Sie alle Schrauben der Gehäuseabdeckung.
3. Nehmen Sie die Abdeckung ab.
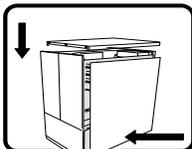
Zur ordnungsgemäßen Kühlung und Lüftung muß die Gehäuseabdeckung immer wieder vor dem Einschalten installiert werden. Ein Betrieb des Systems ohne angebrachte Abdeckung kann Ihrem System oder Teile darin beschädigen. Um die Abdeckung wieder anzubringen:

1. Vergewissern Sie sich, daß Sie keine Werkzeuge oder Teile im Innern des Systems zurückgelassen haben.
2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf ordnungsgemäßen Sitz und Installation.
3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an.
4. Bringen Sie die Verschlußeinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern.
5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.
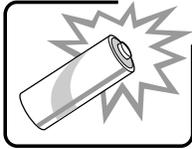
Fortsetzung
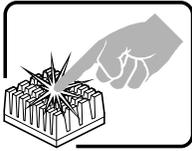
Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.

Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.
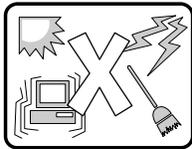
Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte:

- sauber und staubfrei sein (Hausstaub ausgenommen);
- gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung);
- keinen Erschütterungen ausgesetzt sein;
- keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen;
- in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen;
- mit einer geerdeten Wechselstromsteckdose ausgerüstet sein;
- über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird.

AVVERTENZA: Italiano
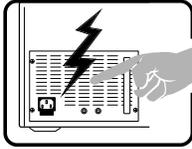
Rivolgersi ad un tecnico specializzato per la riparazione dei componenti dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.
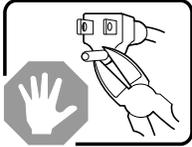
Non modificare o utilizzare il cavo di alimentazione in c.a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto. Ad ogni fonte di alimentazione corrisponde un cavo di alimentazione in c.a. separato.
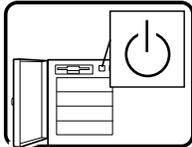
L'interruttore attivato/disattivato nel pannello anteriore non interrompe l'alimentazione in c.a. del sistema. Per interromperla, è necessario scollegare tutti i cavi di alimentazione in c.a. dalle prese a muro o dall'alimentazione di corrente.
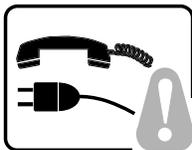
PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:

1. Spegnere tutti i dispositivi periferici collegati al sistema.
2. Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema.
3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche.
4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema.
5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema – qualsiasi superficie non dipinta – .
6. Non far operare il sistema quando il telaio è senza le coperture.
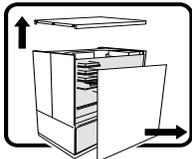
Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come seque:

1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato.
2. Togliere e mettere in un posto sicuro tutte le viti delle coperture.
3. Togliere le coperture.
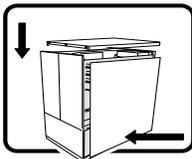
Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio:

1. Controllare prima che non si siano lasciati degli attrezzi o dei componenti dentro il sistema.
2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente.
3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente.
4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema.
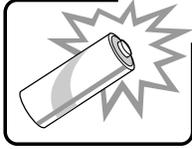5. Ricollegare tutti i cavi esterni e le prolunghe AC del sistema.
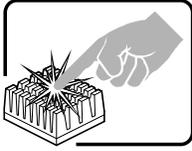
Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.

Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.
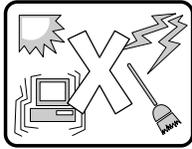
Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).

- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.

- Al riparo da urti e lontana da fonti di vibrazione.

- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.

- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.

- Dotata di una presa a muro correttamente installata.

- Dotata di spazio sufficiente ad accedere ai cavi di alimentazione, i quali rappresentano il mezzo principale di scollegamento del sistema.

ADVERTENCIAS: Español
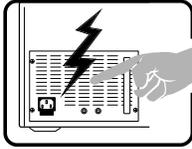
El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación.
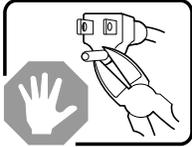
No intente modificar ni usar el cable de alimentación de corriente alterna, si no corresponde exactamente con el tipo requerido.

El número de cables suministrados se corresponden con el número de fuentes de alimentación de corriente alterna que tenga el producto.
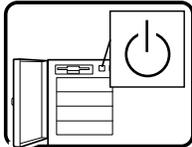
Nótese que el interruptor activado/desactivado en el panel frontal no desconecta la corriente alterna del sistema. Para desconectarla, deberá desenchufar todos los cables de corriente alterna de la pared o desconectar la fuente de alimentación.
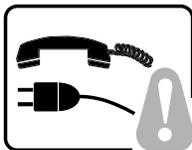
INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones:

1.   Apague todos los dispositivos periféricos conectados al sistema.
2.   Apague el sistema presionando el interruptor encendido/apagado.
3.   Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna.
4.   Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema.
5.   Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis — o a cualquier tipo de superficie de metal sin pintar.
6.   No ponga en marcha el sistema si se han extraído las tapas del chasis.
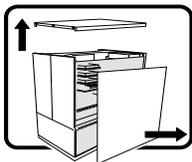
Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello:

1.   Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno.
2.   Extraiga y guarde todos los tornillos de las tapas.
3.   Extraiga las tapas.
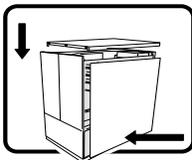
Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas:

1.   Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema.
2.   Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente.
3.   Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente.
4.   Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización.
5.   Conecte todos los cables externos y los cables de alimentación CA al sistema.

ADVERTENCIAS: **Español** (continúa)
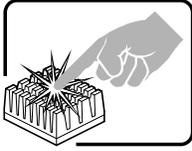
Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.

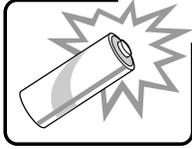Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.
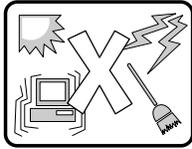
El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:

- Limpio y libre de partículas en suspensión (salvo el polvo normal).
- Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa.
- Alejado de fuentes de vibración.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltaje y desconectar el módem de las líneas de telecomunicación durante las tormentas.
- Provisto de una toma de tierra correctamente instalada.
- Provisto de espacio suficiente como para acceder a los cables de alimentación, ya que éstos hacen de medio principal de desconexión del sistema.

C Warranty

Limited Warranty for Intel® Server Chassis Subassembly Products

Intel warrants that the Products (defined herein as the Intel® chassis subassembly and all of its various components and software delivered with or as part of the Products) to be delivered hereunder, if properly used and installed, will be free from defects in material and workmanship and will substantially conform to Intel's publicly available specifications for a period of three (3) years after the date the Product was purchased from an Intel authorized distributor. Software of any kind delivered with or as part of products is expressly provided "as is" unless specifically provided for otherwise in any software license accompanying the software.

If any Product furnished by Intel which is the subject of this Limited Warranty fails during the warranty period for reasons covered by this Limited Warranty, Intel, at its option, will:

- **REPAIR** the Product by means of hardware and/or software; OR
- **REPLACE** the Product with another Product; OR
- **REFUND** the then-current value of the Product if Intel is unable to repair or replace the Product.

If such Product is defective, transportation charges for the return of Product to buyer within the USA will be paid by Intel. For all other locations, the warranty excludes all costs of shipping, customs clearance, and other related charges. Intel will have a reasonable time to make repairs or to replace Product or to refund the then-current value of the Product.

In no event will Intel be liable for any other costs associated with the replacement or repair of Product, including labor, installation or other costs incurred by buyer.

This Limited Warranty, and any implied warranties that may exist under state law, apply only to the original purchaser of the Product.

Extent of Limited Warranty

Intel does not warrant that Products to be delivered hereunder, whether delivered stand-alone or integrated with other Products, including without limitation semiconductor components, will be free from design defects or errors known as "errata". Current characterized errata are available upon request.

This Limited Warranty does not cover damages due to external causes, including accident, problems with electrical power, usage not in accordance with product instructions, misuse, neglect, alteration, repair, improper installation, or improper testing.

Warranty Limitations and Exclusions

These warranties replace all other warranties, expressed or implied including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Intel makes no expressed warranties beyond those stated here. Intel disclaims all other warranties, expressed or implied including, without limitation, implied warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not allow the exclusion of implied warranties, so this limitation may not apply.

All expressed and implied warranties are limited in duration to the limited warranty period. No warranties apply after that period. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

Limitations of Liability

Intel's responsibility under this, or any other warranty, implied or expressed, is limited to repair, replacement or refund, as set forth above. These remedies are the sole and exclusive remedies for any breach of warranty. Intel is not responsible for direct, special, incidental, or consequential damages resulting from any breach of warranty under another legal theory including, but not limited to, lost profits, downtime, goodwill, damage to or replacement of equipment and property, and any costs of recovering, reprogramming, or reproducing any program or data stored in or used with a system containing this product. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This limited warranty gives you specific legal rights, and you may also have other rights that vary from jurisdiction to jurisdiction.

Any and all disputes arising under or related to this Limited Warranty shall be adjudicated in the following forums and governed by the following laws: for the United States of America, Canada, North America and South America, the forum shall be Santa Clara, California, USA and the applicable law shall be that of the State of California, USA; for the Asia Pacific region, the forum shall be Singapore and the applicable law shall be that of Singapore; for Europe and the rest of the world, the forum shall be London and the applicable law shall be that of the United Kingdom.

In the event of any conflict between the English language version and any other translated version(s) of this Limited Warranty, the English language version shall control.

How to Obtain Warranty Service

To obtain warranty service for this Product, you may contact Intel or your authorized distributor.

North America—Call Intel at 1-800-628-8686 during the warranty period during normal business hours (pacific time), excluding holidays. Please be prepared to provide: (1) your name, address, and telephone numbers; (2) model name and serial number of the Product; (3) an explanation of the problem. The customer service representative may need additional information from you depending on the nature of the problem.

In Europe, Asia, or South America—Contact your original authorized distributor for warranty service.

Any replacement Product is warranted under this written warranty and is subject to the same limitations and exclusions for the remainder of the original warranty period.

Telephone Support

If you can't find the information you need on Intel's World Wide Web site (http://www.intel.com), call your local distributor or an Intel Customer Support representative.

Country	Customer Support Telephone Number	Hours (Monday-Friday)	Billing
United States	1-900-555-5800	7:00 - 17:00	$2.50/minute
United States & Canada	1-800-404-2284	7:00 - 17:00 PST	Credit card calls $25.00/incident
European Community English: Francaise: Deutsch: Italiano:	+44-131-458-6847 +44-131-458-6848 +44-131-458-6954 +44-131-458-6951	UK time 8:00 - 17:00 (M, Th, F) 8:00 - 16:00 (Tues - W)	Credit Card Calls $25.00/incident Levied in local currency at the applicable credit card exchange rate plus applicable VAT
Asia-Pacific Australia: Hong Kong: Korea: Manila: PRC: Singapore: Taiwan:	+1-800-649-931 +852-2-844-4456 +822-767-2595 +886-2-718-9915 +852-2-844-4456 +65-831-1311 +886-2-718-9915	Singapore local time Oct-April: 6:00 - 16:00 April-Oct: 5:00 - 16:00	Credit card calls $25.00/incident
Everywhere else	+916-377-7000	7:00 - 17:00 PST	Credit card calls $25.00/incident

Returning a Defective Product

Before returning any product, call your authorized dealer/distribution authority.

- From Europe:
  — in English   +44 1793 431144
  — in French   +44 1793 421777
  — in German   +44 1793 421333
- All other locations: +(503) 264-7000

If the customer support group verifies that your product is defective, you will receive a Return Material Authorization (RMA) number to place on the outer package of the product. Intel can not accept any product without an RMA number on the package.