NovaScale
T810 E1, T830 E1, R410 E1

User's Guide

NOVASCALE

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NovaScale T810 E1, T830 E1, R410 E1
User's Guide

Hardware

June 2008

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Table of Contents

Text Conventions

This guide uses the following text conventions.

Warnings, cautions, and notes have the following meanings:

⚠ Warning

Warnings alert you to situations that could result in serious personal injury or loss of life.

⚠ Caution

Cautions indicate situations that can damage the system hardware or software.

📑 **Notes**: *give important information about the material being described.*

■ Names of keyboard keys are printed as they appear on the keyboard. For example, **Ctrl**, **Alt**, or **Enter**.

■ Text or keystrokes that you enter appear as boldface type. For example, type **abc123** and press **ENTER**.

■ File names are printed in upper case letters. For example, AUTOEXEC.BAT.

Safety Notices

⚠ **Caution**

To reduce the risk of electric shock which could cause personal injury, follow all the safety notices.

Symbols are shown in your documentation and on your equipment to indicate safety hazards.

Regulatory Information

European Notice

Products with the CE marking comply with both the Electromagnetic Compatibility Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) - modified by the Directive 93/68/EEC - issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Standards:

■ EN55022: Radio Frequency Interference

■ EN55024 (1998+A1:2001): Immunity characteristics

■ EN6100-3-2: Limits for harmonic current emissions

■ EN6100-3-3: Limitation of voltage fluctuation and flicker in low-voltage supply system

■ EN60950-1 (2001): Product Safety

⚠ **Warning**

This is a Class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures (EN55022).

If your system includes a telecommunication network board, the input/output socket is classified as Telecommunication Network Voltage (TNV-3).

USA and Canada Notice

Products with UL marking comply with the following UL standards:

■ UL 1950 (3rd edition 1998)

Products with FCC marking comply with the following FCC standards

■ FCC part 15

The model type/ref. used for UL and FCC certification can be found on the regulatory labels stuck on your system.

The equipment has been tested and found to comply with the limits for a Class A or B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Modifications to the Product

CE and FCC Marking

We cannot be held responsible for modifications made by the User and the consequences thereof, which may alter the conformity of the product with the CE or FCC Marking.

Connections and Remote Earths

PELV (Protected Extra Low Voltage)

To ensure the extra-low voltage integrity of the equipment, only connect equipment with mains-protected electrically-compatible circuits to the external ports.

SELV (Safety Extra Low Voltage)

Every input and output of this product is classified as Safety Extra Low Voltage.

Remote Earths

To prevent electrical shock, connect all local (individual office) systems and system support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.

Building Supply

Only connect the equipment to a building supply that is in accordance with current wiring regulations in your country. In the U.K., those are the IEE regulations.

Power Supply and Cables

Power Supply

- The DC push-button on/off switch on the front panel does not turn off the system AC power. +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

- Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.

Cables

- In the U.S.A. and Canada, the power cord must be a UL-listed detachable power cord (in Canada, CSA-certified), type ST or SJT, 16 AWG, 3-conductor, provided with a moulded-on NEMA type 5-15 P plug cap at one end and a moulded-on cord connector body at the other end. The cord length must not exceed 9 feet (2.7 meters).

- Outside the U.S.A. and Canada, the plug must be rated for 250 VAC, 10 amp minimum, and must display an international agency approval marking. The cord must be suitable for use in the end-user country. Consult your dealer or the local electrical authorities if you are unsure of the type of power cord to use in your country. The voltage change occurs via a switch in the power supply.

- The detachable power supply cords are intended to serve as the disconnect devices.

- For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

- This equipment has a 3-wire, grounded power cords. To prevent electrical hazards, do not remove or defeat the ground prong on the power cords. Replace a power cord if it gets damaged. Contact your dealer for an exact replacement.

Batteries

Lithium batteries can be dangerous. Improper handling of lithium batteries may result in an explosion. Dispose of lithium batteries as required by local ordinance. Also *see "Product Disposal" on page 17*

Chassis Cover Removal and Replacement

When servicing your system, make sure to replace the chassis cover and secure it with the screws before plugging in the power cable and turning it on. The chassis cover ensures proper airflow and cooling.

Laser Compliance Statement

The optical devices are tested and certified to be compliant with International Electrotechnical Commission IEC60825-1 and European EN60825-1 standards for Class 1 laser products.

Class 1 laser products are not considered hazardous. The optical devices are designed such that there is never human access to laser radiation above a Class 1 level during normal operation or prescribed maintenance conditions.

The optical devices installed in your system are designed for use solely as a component of such electronic product and therefore do not comply with the appropriate requirements of Code of Federal Regulation Sec. 1040.10 and Sec. 1040.11 for **COMPLETE** laser products

Warning - Hazardous Voltage!

Hazardous voltage is present inside your system when it is connected to an AC supply even when the system's power switch is off. Exposure to Hazardous Voltage could cause personal injury. To reduce the risk of electric shock which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.

Warning -Avoid Electrostatic Discharge!

Circuit cards and integrated circuits can be easily damaged by static electricity. To reduce risk of damage, store them in protective packaging whenever they are not installed in your system.

Before you install or remove memory modules, video memory, disk drives, circuit cards or other devices, protect them from static electricity. To do so, make sure your system's power switch is **OFF**. Then, unplug the system's AC power cord(s). Wear an anti-static wrist strap (available at electronic supplies stores) to handle the device you want to install. Be sure to connect the wrist strap to an unpainted metal portion of the system chassis.

As an alternative, you can dissipate electrostatic buildup by touching an unpainted metal portion of the system chassis with one hand. Handle the device you are installing with the other hand, and maintain continuous contact with the unpainted portion of the chassis until it is installed in the system.

Product Disposal

The Waste Electrical and Electronic Equipment (WEEE) Directive requires that used electrical and electronic products must be disposed of separately from normal household waste in order to promote reuse, recycling and other forms of recovery and to reduce the quantity of waste to be eliminated with a view to reducing landfill. WEEE includes accessories such as keyboard, mouse, remote control, speakers, etc. When you dispose of such products, please follow the agreement made between you and us and/or your distributor.

System Features

This system is a highly flexible and reliable server designed to offer the highest levels of performance for the price range.

Its main features are:

■   The Intel® 3210 chipset.

■   The Intel® processor, either an Intel® Pentium® dual-core processor, a Dual-Core Intel® Xeon® processor, or a Quad-Core Intel® Xeon® processor.

■   The RAID technology, offering support for various RAID levels on Microsoft® Windows® and Linux operating systems.

■   Depending on your configuration:

  - A tower chassis that can also easily be installed into a standard EIA 19-inch rack cabinet (NovaScale T810 E1, NovaScale T830 E1).

  - A rack chassis (NovaScale R410 E1).

To get comfortable with your computer, we recommend you read this user guide. Keep it in a safe place for future reference.

Related Documents

In the ExpressBuilder disc in which you found this User's Guide, you can also find several other documents relevant to your system, options and accessories.

Some printed documents may also have been shipped with your system.

We recommend you read these additional documents as it becomes necessary when setting up, using or upgrading your system.

NovaScale T810 E1 System Chassis Features

Front View

The following figure shows the location of the front system features

Front View Detail
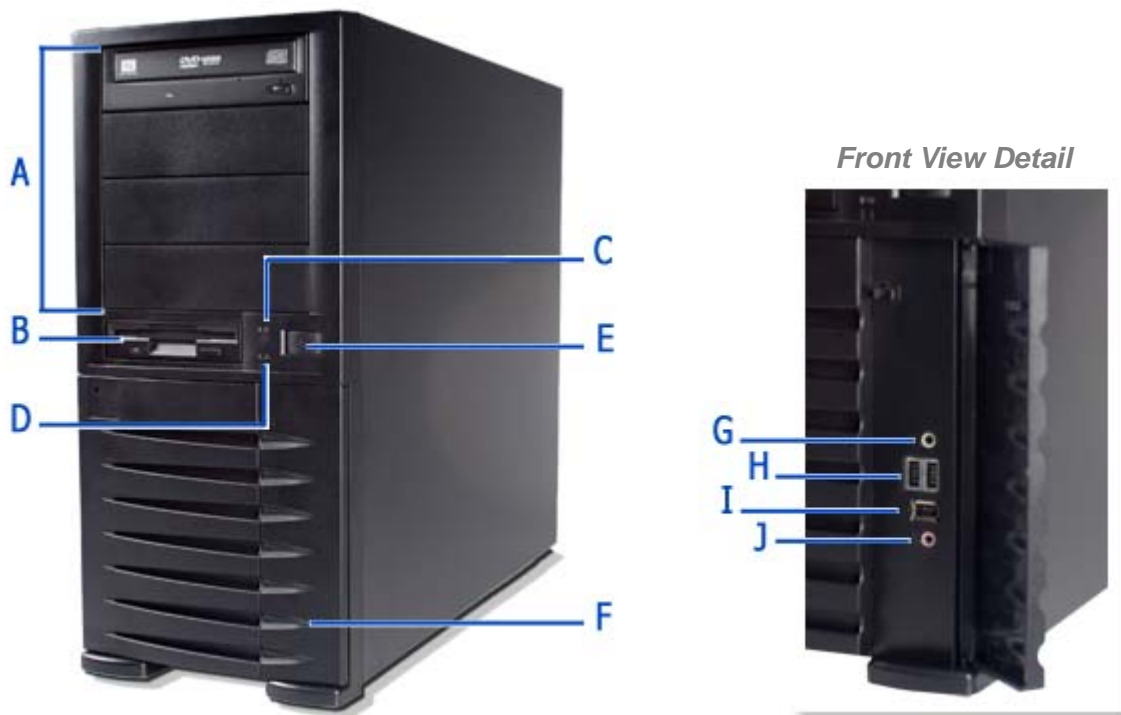
Figure 1: Front View

A   **5.25-inch bays**

Four 5.25-inch bays, one of which may include a DVD-ROM drive or DVD Writer drive.

B   **3.5-inch bay**

One 3.5-inch bay that may include a 3.5-inch floppy disk drive.

C   **Status lamp**

Indicates whether the computer is on or off. A steady green lamp indicates the computer is on. The lamp lights amber when the computer is in stand-by mode.

D   **Device lamp**

Lights up when a hard disk drive or an optical drive is active, reading or retrieving data.

E   **Power button**

Press this switch to turn on/off the power. Refer to the 'Powering On your System', 'Powering Off your System' and 'Forcing a Power Shutdown' sections hereafter for details.

F   **Front door**

Open the front door to access the headphone connector, the stereo microphone in connector and the USB ports.

G   **Headphone connector**

Not functional.

H   **USB ports**

Two Universal Serial Bus (USB) ports allow you to connect USB-equipped peripheral devices such as printers.

These connectors are not functional when an additional USB tape drive is installed.

I   **IEEE port**

Not functional.

J   **Stereo microphone in connector**

Not functional.

NovaScale T810 E1 Rear View
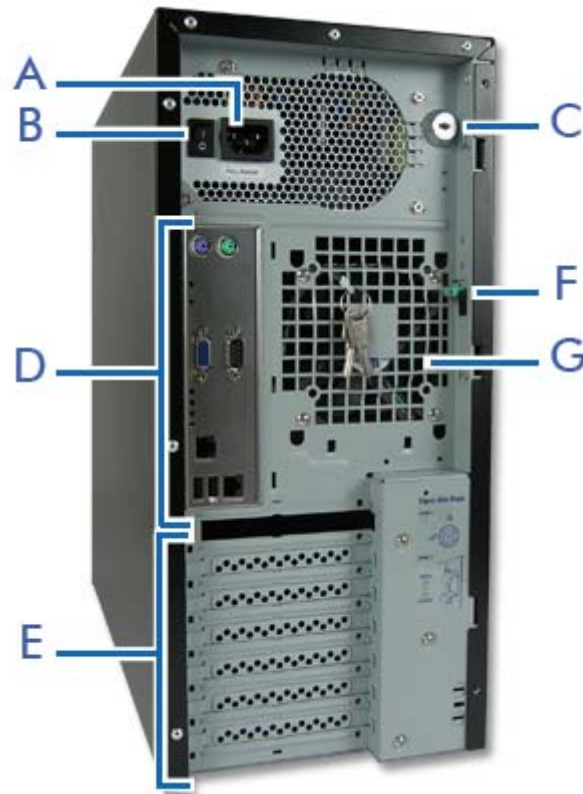
Figure 2: Rear View

A   **AC power connector**

Connect the power cord to this socket.

B   **Power switch**

C   **Key lock**

Security feature that allows you to open the right side door.

D   **Connectors**

Refer to "Motherboard" on page 34

E   **Expansion boards slots**

Refer to "Expansion Slots" on page 45

F   **Side cover latch**

Push the latch up to enable the right side door opening.

G   **Venting holes**

Keep the area near the venting holes clear for proper ventilation.

NovaScale T810 E1 Status Indicators

This section explains the indication and meanings of the server lamps.

Power Lamp

■ Lights green to indicate normal operation with the server powered on.

■ Remains off when the server is powered off.

■ Blinks green when the server is in a power-saving mode.

Access Lamp

Lights amber when one of the drives is being accessed.

⚠ Caution

To indicate the access states of the built-in hard disk drives when an optional board (e.g. disk mirroring controller or disk array controller) is installed, connect the LED cable provided with the server to the LED connector on the motherboard and the optional board.

LAN Connector Lamps

Refer to the back panel description for more details. See *"Back Panel Connectors" on page 39*.

NovaScale T810 E1 Internal View

Figure 3: Internal View

A	**Power supply slot**
B	**Motherboard**
C	**5.25-inch devices slots**
D	**3.5-inch devices slot**
E	**Hard disk drives slots**

NovaScale R410 E1 System Chassis Features

Front View

The following figure shows the location of the front system features.
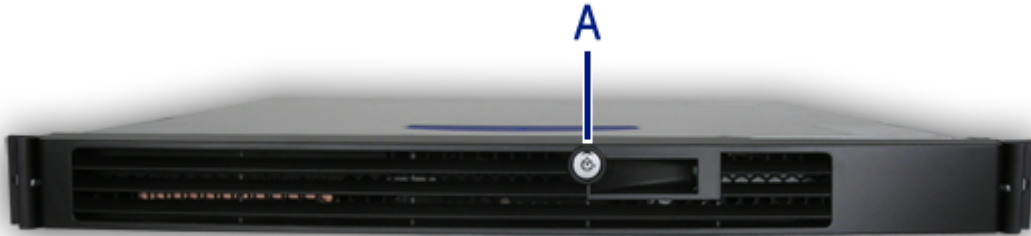
Figure 4: Front View (with Front Bezel)

A: Key Lock

Figure 5: Front View (without Front Bezel)

A: Control Panel
B: Optical Disc Drive Bay

Figure 6: Control Panel (Front View detail)

1. **USB Port.**

   One Universal Serial Bus (USB) port allows you to connect USB-equipped peripheral devices such as printers.

2. **Power button.**

   Press this switch to turn on/off the power. Refer to the 'Powering On your System', 'Powering Off your System' and 'Forcing a Power Shutdown' sections hereafter for details.

3. **Status lamp.**

   - Solid green indicates that the system is ready.
   - Blinking green indicates that either the processor or a memory slot is disabled.
   - Solid amber indicates a critical temperature, a voltage fault, or a missing CPU/terminator.
   - Blinking amber indicates a power fault, fan fault, or a non-critical temperature or voltage fault.
   - No light indicates a fatal error during POST.

4. **Power/Sleep lamp.**

   Indicates whether the computer is on or off.

   A steady green lamp indicates the system is on or in sleep state S0. An unlit lamp means that the system is in sleep state S5.

5. **Disk Access lamp.**

   Lights up when a hard disk drive is active, reading or retrieving data.

6. **Network Interface Card (NIC) 1 LED.**

   Shows the Local Area Network (LAN) 1 access status.

7. **Network Interface Card (NIC) 2 LED.**

   Shows the Local Area Network (LAN) 2 access status.

NovaScale R410 E1 Rear View
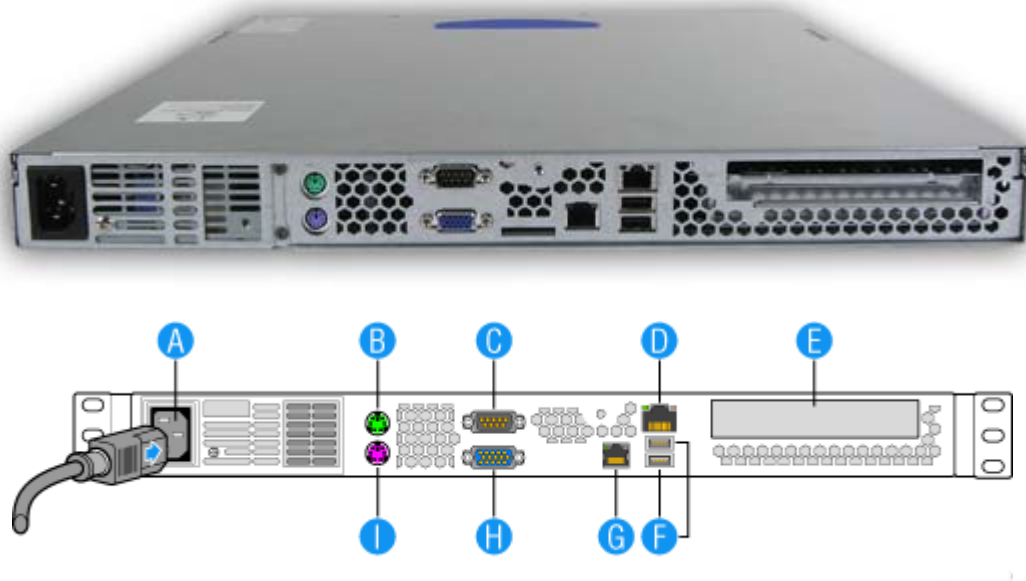
Figure 7: Rear View

A   **AC power connector**

Connect the power cord to this socket.

B   **Mouse Port**

Connect the mouse included with the system.

C   **Serial Port A**

Connect any peripheral with a serial interface.

D   **Network Interface Card (NIC) 1**

Connect the system to a LAN allowing the following transfer speeds: 1000BASE-T/ 100BASE-TX/10BASE-T.

E   **PCI Add-in card slot**

Additional ports are available if an optional card is installed.

F   **USB Ports**

Connect any peripherals with an USB interface.

G   **Network Interface Card (NIC) 2**

Connect the system to a LAN allowing the following transfer speeds: 1000BASE-T/ 100BASE-TX/10BASE-T.

H   **Video**

Connect a compatible monitor.

I   **Keyboard**

Connect the keyboard included with the system.

NovaScale R410 E1 Internal View
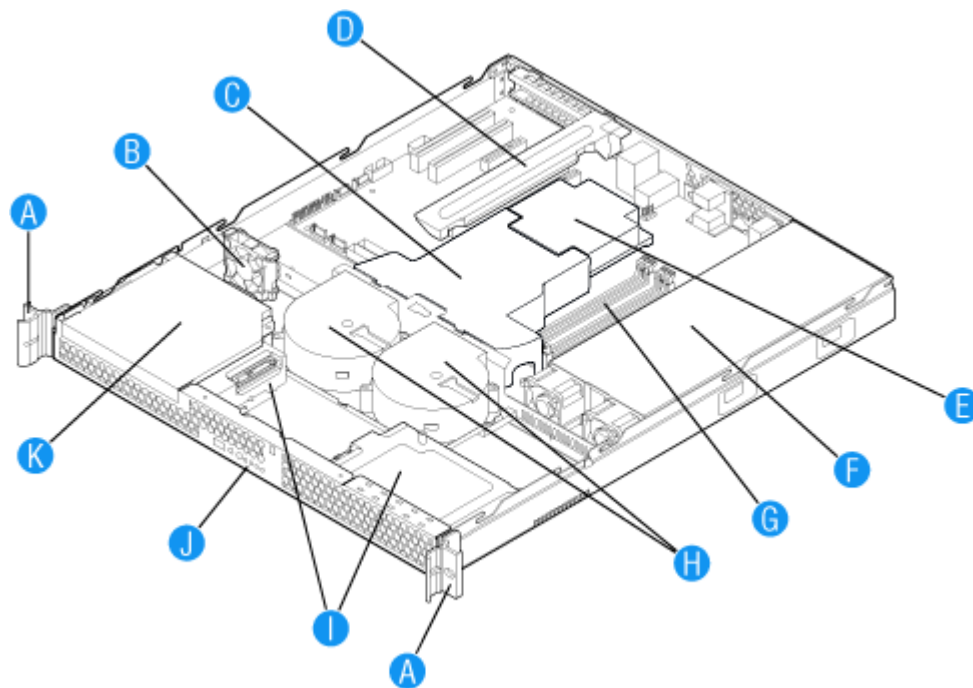
Figure 8: Internal View

A.	Rack Handles (two)	G.	System Memory DIMM Sockets
B.	PCI Cooling Fan	H.	System Blower Fans (two)
C.	Processor Air Duct	I.	Hard Drive Brackets (two)
D.	PCI Add-in Card Bracket	J.	Control Panel
E.	Processor and Heat Sink	K.	Slimline Optical Drive Bay
F.	Power Supply		

NovaScale T830 E1 System Chassis Features

Front View with Front Bezel

The following figure shows the location of the front system features
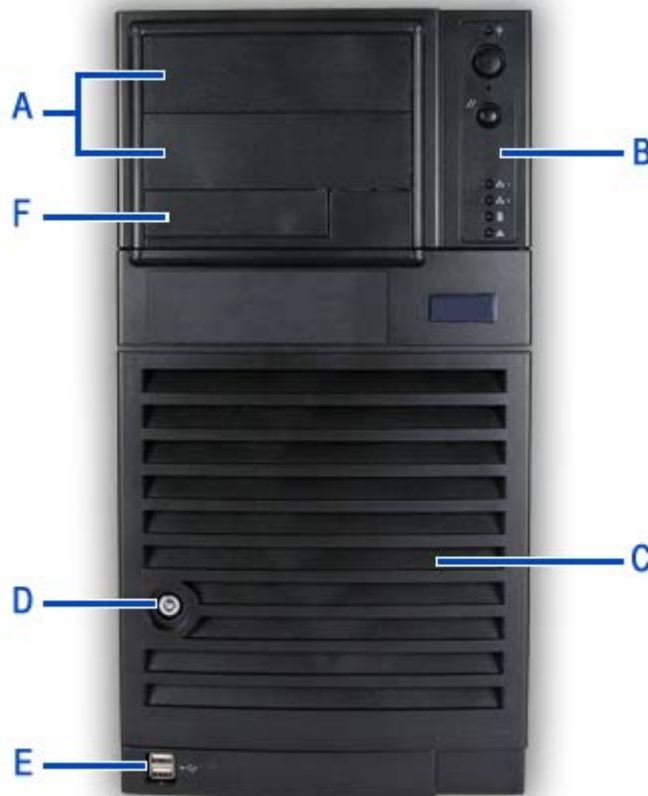
Figure 9: Front Viewl

A	**5.25-inch bays**		**B**	**Front panel**
	Two 5.25-inch bays, one of which may include a tape backup unit or optical disc drive.			Refer to "Front Panel" on page 31 for more information on the buttons and LEDs.
C	**Hard Disks cage**		**D**	**Drives bay access door and lock**
	Depending on your configuration, this cage either contains SATA or SAS drives, which can be fixed or hot-swappable.			Security feature that allows you to open the right side door.
E	**USB ports**		**F**	**3.5-inch bay**
				One 3.5-inch bay, that may be fitted with a floppy disk drive (optional).

Front View without Front Bezel
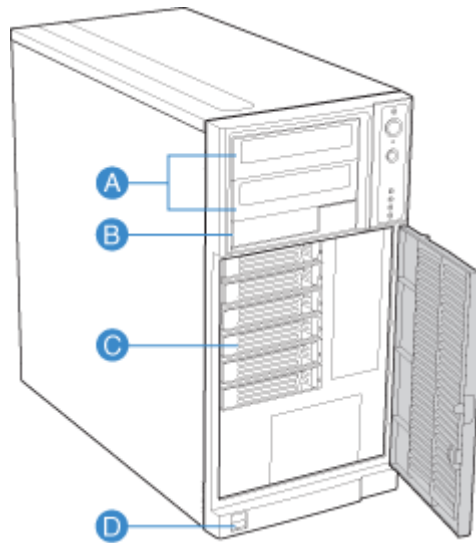
Figure 10: Front view without front bezel

A   5.25-inch bays

Two 5.25-inch bays, one of which may include a tape backup unit, CD-ROM drive, DVD-ROM drive, DVD-RW drive or COMBO DVD-ROM CD-RW drive.

C   Hard Disks cage

Depending on your configuration, this cage either contains hot-swappable SATA or SAS drives.

B   3.5-inch bay

One 3.5-inch bay, that may be fitted with a floppy disk drive (optional).

D   Front panel USB ports

NovaScale T830 E1 Rear View

TP00880
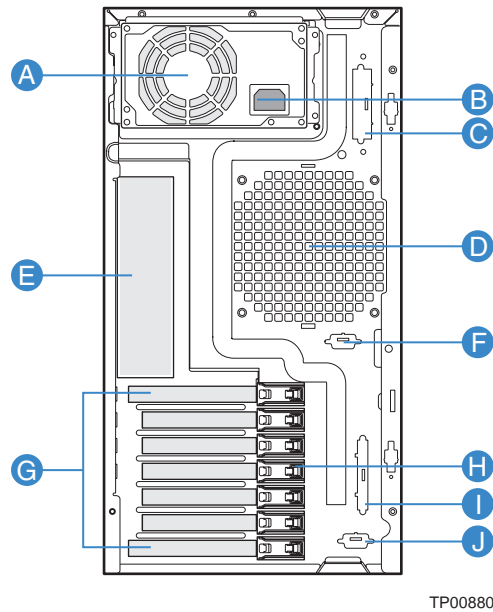
Figure 11: Rear View

A   Power supply bay

Depending on your configuration, it is fitted with a fixed power supply (shown in the picture), or one with hot-swappable power modules.

B   AC power connector

Connect the power cord to this socket.

C   Alternate SCSI knockout

D   System fan

Keep the area near the venting holes clear for proper ventilation.

E   Connectors

Refer to "Back Panel Connectors" on page 39 for details.

F   Alternate Serial B knockout

G   Expansion boards slots

Refer to the 'Expansion Boards Slots' section hererafter for details

H   PCI Tool-less card retention mechanism

I   External SCSI knockout

J   Serial B knockout

NovaScale T830 E1 Status Indicators

This section explains the indication and meanings of the system lamps located on the front and back panels of your system.

Front Panel
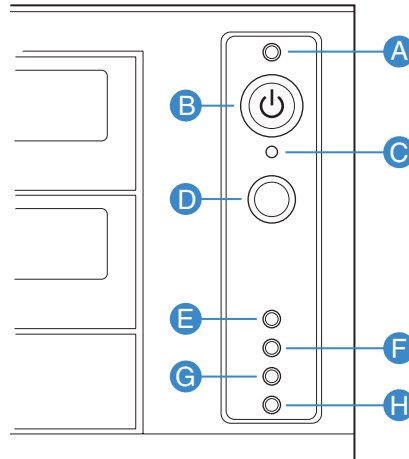
TP02346

Figure 12: Front panel (front view detail)

A   Power/Sleep LED

Continuous green light indicates the system has power applied to it.

Continuous amber light indicates the system is in S1 Sleep state.

No light indicates the power is off / or the system is in S4 Sleep state.

C   NMI Button

Used to force system halt and dump memory contents to screen or file.

E/F   NIC 1 Activity LED / NIC 2 Activity LED

Continuous green light indicates a link between system and network.

Blinking green light indicates network activity.

No light indicates the NIC is disconnected.

H   Status LED

Solid green indicates system ready.

Blinking green indicates processor or memory disabled.

Solid amber indicates a critical temperature or voltage fault, or a missing CPU/terminator.

Blinking amber indicates a power fault, fan fault, or a non-critical temperature or voltage fault.

No light indicates a fatal error during POST.

B   Power/Sleep LED

Powers the system off or on.

D   Reset Button

Reboots and initializes the system.

G   Hard Drive Activity LED

Random blinking green light indicates hard drive activity (SCSI or SAS/SATA).

Continous amber light indicates a hard drive fault.

No light indicates no hard disk drive activity.

Back Panel

Network Interface Card (NIC) Ports Activity Lamps

Refer to the back panel description for more details. See *"Back Panel Connectors" on page 39*.

Power Supply LEDs (Hot-Swap Power Supply Only)

Please refer to *"Power Supply LEDs" on page 109* for more information.

Diagnostic LEDs

Please refer to *"Diagnostic LEDs" on page 284* for more information.

NovaScale T830 E1 Internal View
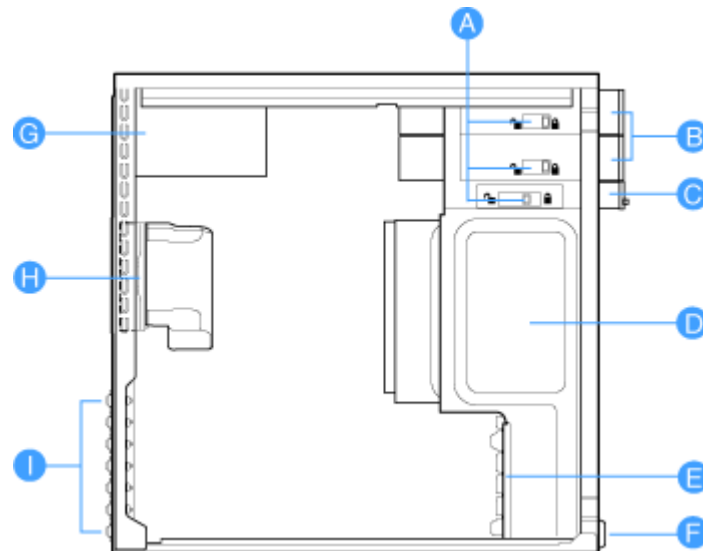
Figure 13: Internal View

A	Tool-less Device Bay Locks
B	5.25-in Device Bays
C	3.5-in Device Bay
D	Hard Disk Drive Bay
E	Drive Cage Retention Mechanism
F	PCI Add-in Card Guide
G	Power Supply
H	Fan Duct / System Fan Assembly
I	Rear Tool-less PCI Retention Mechanisms

Motherboard

Motherboard Layout
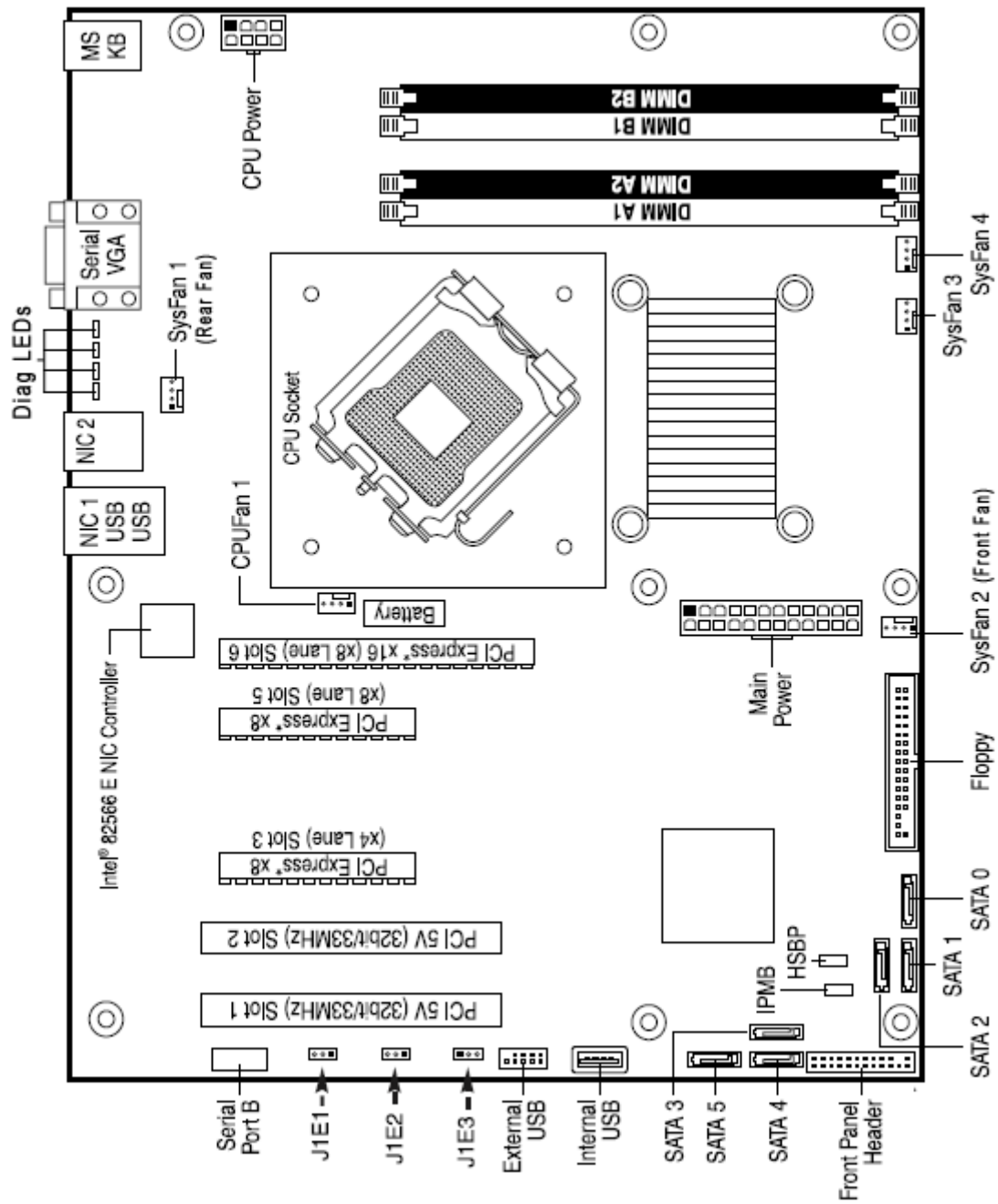
Figure 14: Motherboard Layout

Connecting the LSI 8708EM2 SAS/SATA RAID Controller (if applicable)

If you purchased the LSI 8708EM2 separately, we recommend you also connect the included LED cable to the motherboard. This will ensure that the HDD access LED on the Front Panel lights when there is hard disk drive access.
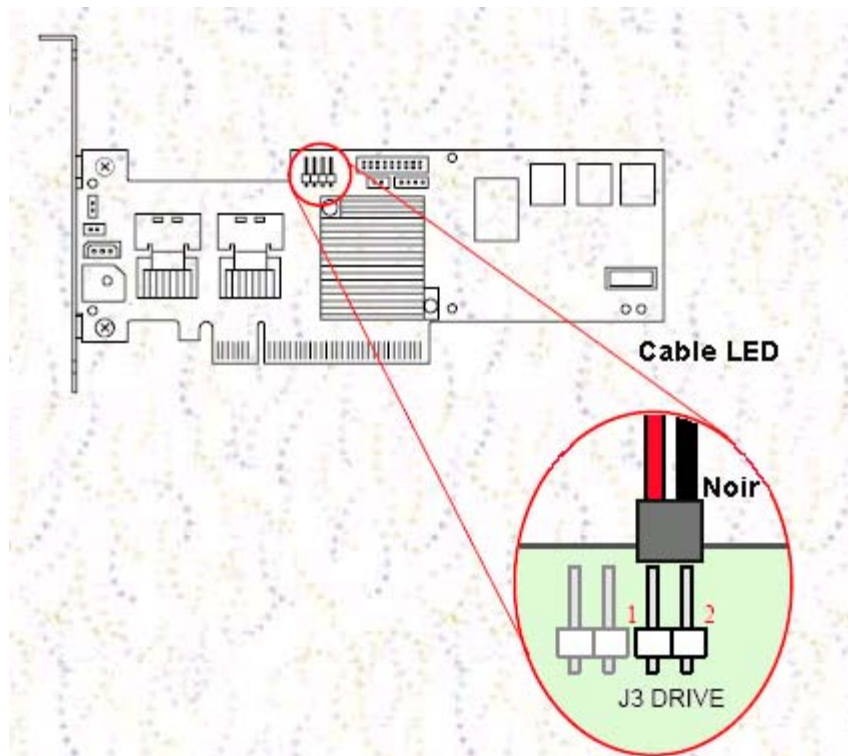
Figure 15: HDD header on the LSI 8708EM2
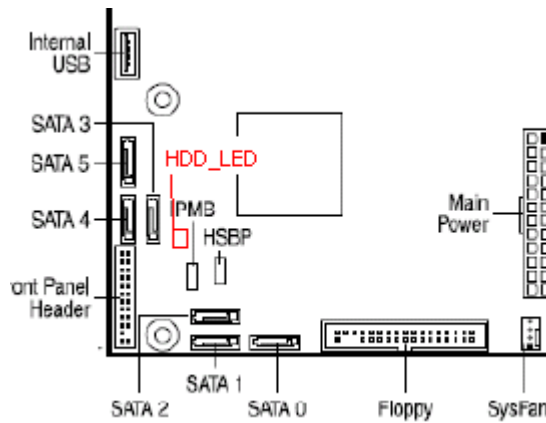
Figure 16: HDD header on the motherboard

Motherboard Jumpers
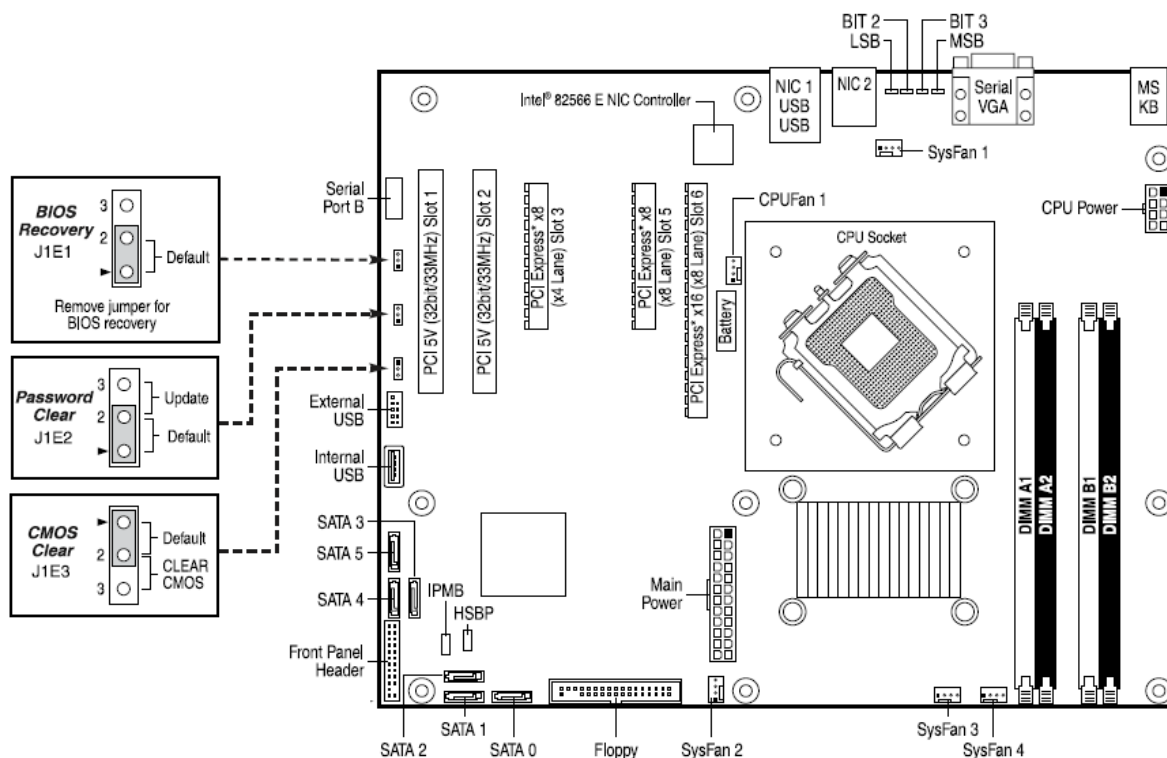
Figure 17: Motherboard Jumpers

Table 1: Motherboard Jumpers Description

Jumper Name	Jumper Purpose
RCRY MODE	In the normal position (pins 1-2), allows normal system operation with correct BIOS settings. The system will POST normally. Remove the jumper to recover from a corrupted BIOS. A bootable media with a valid BIOS ROM required.
PASSWD CLR	In the normal position (pins 1-2), allows normal system operation with current password settings. The system will POST normally. In the clear position (pins 2-3), the system clears the password settings following the POST. If necessary, reset a password in the BIOS Setup utility.
CMOS CLR	In the normal position (pins 1-2), allows normal system operation with correct BIOS settings. The system will POST normally. In the clear position (pins 2-3), the system initiates a clearing of the NVRAM following the POST. A system message confirms that the operation was successful. This setting enforces the default BIOS settings, which can be changed in the BIOS Setup utility.

Clearing the CMOS

If you are not able to access the BIOS setup screens, the CMOS Clear jumper will need to be used to reset the configuration RAM.

1. Power down the system and disconnect the AC power.
2. Open the server.
3. Move the jumper (CMOS CLR) from the normal operation position (pins 1 and 2) to pins 2 and 3 (Clear CMOS position).
4. Reconnect the AC power, power up the system.
5. When the system begins beeping, power it down and disconnect the AC power.
6. Replace the jumper on pins 1 and 2.
7. Close the server chassis.
8. Reconnect the AC power and power up the system.

Recovering the BIOS

This jumper is used to select the BIOS image from which the system will boot.

Table 2: BIOS Recovery Jumper Descriptions

Pins	Jumper Purpose
1-2	System is configured for normal operation (Default).
No jumper	Allows the BIOS recovery.

> *Note: for more information on the BIOS Update process, please refer to .*

BMC jumpers

■ J1B1 = IBMC Force Update Mode

Jumper Position:

1-2: Normal (Default)

2-3: Force Update Mode

■ J1C2 = IBMC Boot Block Write Protection

Jumper Position:

1-2: Unprotect

2-3: Protected (Default)
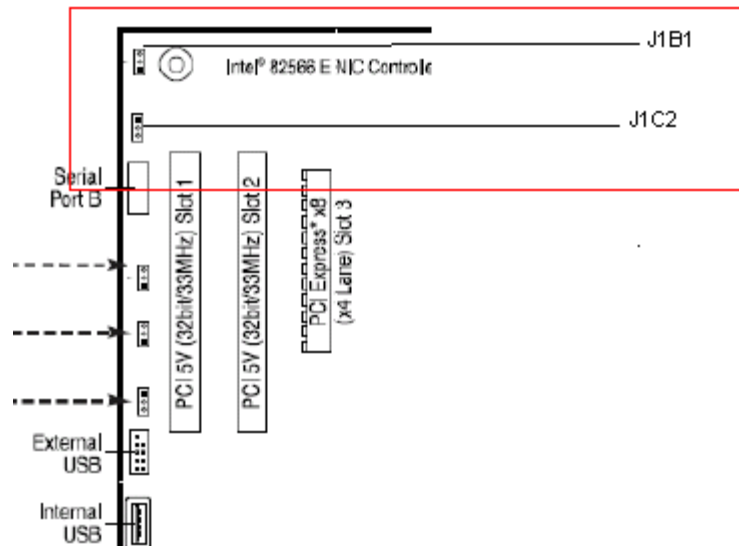
Back Panel Connectors
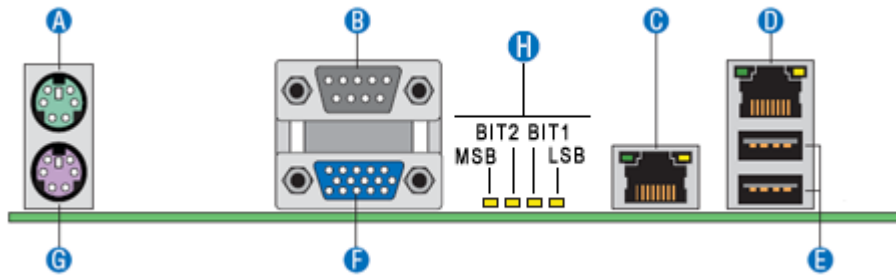
Figure 18: Back Panel Connectors

Table 3: Back Panel Connectors

A: Mouse	B: Serial Port A
C: NIC 2 (10/100/1000 Mb)	D: NIC 1 (10/100/1000 Mb)
E: USB 0-1	F: Video
G: Keyboard	H: Diagnostic LEDs

The NIC (Network Interface Card) LEDs at the right and left of each NIC provide the following information.

Table 4: NIC1 LED Descriptions

LED	Color	LED State	Description
Left	Green	Off	No network connection
		On	Network connection in place
		Blinking	Transmit/receive activity
Right	N/A	Off	10 Mbps connection (if left LED is on or blinking)
	Green	On	100 Mbps connection
	Yellow	On	1000 Mbps connection

.

Table 5: NIC2 LED Descriptions

LED	Color	LED State	Description
Left	N/A	Off	10 Mbps connection (if left LED is on or blinking)
	Green	On	100 Mbps connection
	Yellow	On	1000 Mbps connection
Right	Green	Off	No network connection
		On	Network connection in place
		Blinking	Transmit/receive activity

Memory Configuration

The server board provides four DIMM sockets across two channels, Channel A and Channel B.

- Channel A consists of DIMM sockets A1 and A2.

- Channel B consists of DIMM sockets B1 and B2.

DIMM Population Rules

To ensure the dual channel operating mode, install either:

■   two modules, in the slots DIMM_A1 and DIMM_B1,

■   or four modules.

📑 *Note:*

■ *The installation of three modules is not supported.*

■ *The motherboard BIOS supports single DIMM mode operation although this is generally not recommended for "performance" applications. This configuration is only supported with a 1 GB DIMM installed in DIMM slot A1.*

Use DIMMs of identical size and speed.

Supported memory

DIMMs must meet the following requirements:

- Use only DIMMs with DDR2 DRAM technology.

- Use only DDR2-800 stacked DIMM modules.

BMC Controller

The Integrated Baseboard Management Controller (iBMC) is a highly integrated single-chip solution, which contains the following integrated subsystems and features.

Server Class Super I/O functionality includes

- Keyboard style/BT interface for BMC support

- Two Fully Functional Serial Ports, compatible with the 16C550

- Serial IRQ Support

- SMI/SCI/PME Support

- ACPI Compliant

- Up to 16 Shared GPIO ports

- Programmable Wake-up Event Support

- Plug and Play Register Set

- Power Supply Control

- Watchdog timer compliant with Microsoft* SHDG

- LPC to SPI bridge for system BIOS support

- Real Time Clock module with the external RTC interface

Baseboard Management Controller

- IPMI 2.0 Compliant

- Integrated 250Mhz 32-bit ARM9 processor

- Six I2C SMBus Modules with Master-Slave support

- Two independent 10/100 Ethernet Controllers with RMII support

- LPC Master interface for non-volatile code storage

- SPI Flash interface

- Three UART for ICMB support

- DDR-II 16bit up to 667 MHz memory interface

- Sixteen Mailbox Registers for communication between the host and the BMC

- Watchdog timer

- Three General Purpose Timers

- Dedicated Real Time Clock for BMC

- Up to 16 direct and 64 Serial GPIO ports

- Ability to maintain text and graphics controller history

- 12 10-bit Analog to Digital Converters

- Three Diode Inputs for Temperature measurements

- Eight Fan Tach Inputs

- Four Pulse Width Modulators (PWM)

- Chassis Intrusion Logic with battery backed general purpose register

- LED support with programmable blink rate control

- Programmable IO Port snooping, can be used to snoop on Port 80h

- Unique Chip ID for each part, burned at the time production testing

- Hardware 32-bit Random Number generator

- JTAG Master interface

- On-Chip Test Infrastructure for testing BMC firmware

Remote KVMS Features

- USB 2.0 interface for Keyboard, Mouse and Remote storage such as CD/DVD ROM and floppy

- USB 1.1 interface for PS2 to USB bridging, remote Keyboard and Mouse

- Hardware Based Video Compression and Redirection Logic

- Supports both text and Graphics redirection

- Hardware assisted Video redirection using the Frame Processing Engine

- Direct interface to the Integrated Graphics Controller registers and Frame buffer

- Hardware based encryption engine

Graphics Controller Subsystem

- Integrated Matrix Graphics Core

- 2D Hardware Graphics Acceleration

- DDR-2 memory interface supports up to 128Mbytes of memory

- Supports all display resolutions up to 1600 x 1200 16bpp @ 75Hz

- High speed Integrated 24-bit RAMDAC

- Single lane PCI Express* host interface

Standard Features

Processor

The system board can accommodate one of the following:

- an Intel® Pentium® dual-core processor,

- a Dual-Core Intel® Xeon® processor,

- or a Quad-Core Intel® Xeon® processor.

Memory

The system board provides four 240-pins DIMM slots each supporting DDR2 800 ECC memory. You may install a minimum of 1 GB and as much as 8 GB (4 x 2 GB).

Your system supports dual-channel memory architecture. Refer to *"Memory Configuration" on page 40* for details.

Video

The motherboard features an integrated VGA Graphics Accelerator Matrox® G200e.

Network Controller

> 📄 **Note:** *To ensure EMC product regulation compliance, the system must be used with a shielded STP/FTP LAN cable.*

The motherboard features two controllers for 10/100/1000 Mbit/s Ethernet LAN connectivity:

- Intel® 82566DM dual port controller.

- Intel® 82541PI port controller (Pro/1000 MT).

RAID Support

The motherboard features one onboard controller providing two RAID ROM support for S-ATA configurations.

■ Intel RAID ROM

- RAID0, RAID1, RAID5, and RAID10 support.

- Microsoft Windows support.

- Set-up with the Intel Matrix Storage Manager configuration utility. Refer to *"RAID Configuration using Intel Matrix Storage Manager" on page 122*.

■ LSI RAID ROM

- RAID0, RAID1 and RAID10 support.

- For Linux applications.

- Set-up with the Intel Embedded RAID configuration utility. Refer to *"RAID Configuration using the Intel® Embedded Server RAID BIOS Configuration Utility" on page 125*.

Refer to the *"Advanced Menu" on page 291* for more information on how to select the controller that will be active in your system.

ACPI

The motherboard supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 2.0 specifications. An ACPI aware operating system can put the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, the power supply will still be on and the processors will still be dissipating some power, so the power supply fans will still run.

The system board supports sleep states s0, s1, s4, and s5:

■ s0: Normal running state.

■ s1: Processor sleep state. No context will be lost in this state and the processor caches will maintain coherency.

■ s4: Hibernate. Your working environment is Saved To Disk

■ s5: Shutdown.

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible.

NovaScale T810 E1 Specific Features

Power Supply

The system contains one auto-sensing 400-watt power supply at an operating frequency of 50/60 Hz.

The power supply is designed to comply with existing emission standards and provide sufficient power for a fully loaded system configuration.

Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

■ One 3.5-inch file bay to install a 3.5-inch floppy disk drive (supports 1.44MB floppy disk media) or an optional file device.

■ Four 5.25-inch file bays to install half-height 5.25-inch peripheral devices such as optional tape drives (An optical drive is factory-installed).

■ The hard disk drive bays to install up to four SATA2 or SAS hard disk drives.

Expansion Slots

■ Two 32-bit/33MHz, 3V PCI connectors.

■ One x8 PCI Express connector (x4 lane).

■ One physical x8 PCI Express connector (x8 lane).

■ One physical x16 PCI Express connector (x8 lane).

NovaScale R410 E1 Specific Features

Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

■ One slimline 5.25-inch file bay for the installation of an optical drive.

■ Two hard disk drive bays for the installation of SATA drives.
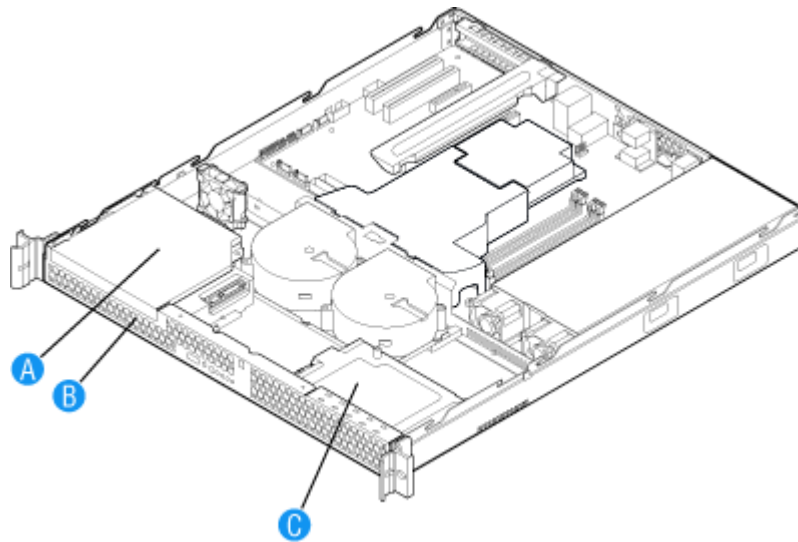
Figure 19: Peripheral Bays

A: Slimline Optical Drive Bay
B: Hard Disk Drive Bay HDD0
C: Hard Disk Drive Bay HDD1

Expansion Slot

The system provides one full-length x16 PCI Express riser board (x8 lane).

RAID Support

Although your motherboard includes support for several RAID levels, only the RAID levels 0 and 1 are available on your system (limited to 2 hard disk drives).

NovaScale T830 E1 Specific Features

Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

■ Two 5.25-inch file bays for installing half-height 5.25-inch peripheral devices such as optional tape drives (An optical drive is factory-installed).
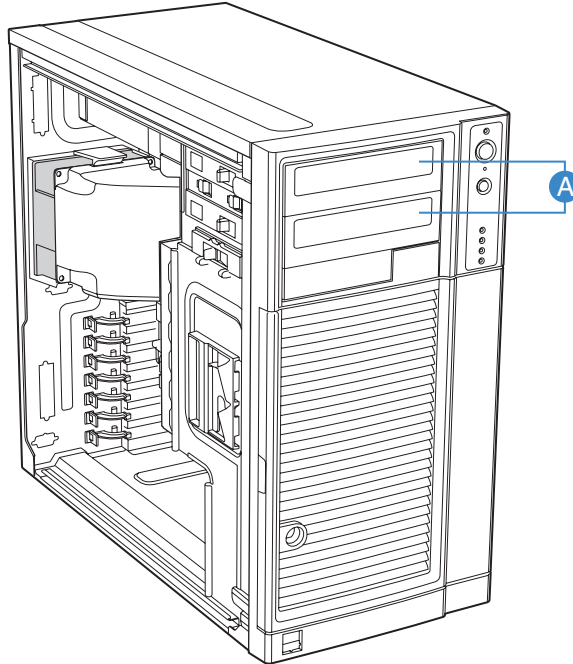
■ One 3.5-inch bay.

■ The hard disk drive cage in which S-ATA or SAS hard disk drives can be installed.

Expansion Slots

■ Two 32-bit/33MHz, 3V PCI connectors.

■ One x8 PCI Express connector (x4 lane).

■ One physical x8 PCI Express connector (x8 lane).

■ One physical x16 PCI Express connector (x8 lane).

These slots enable you to install additional LAN boards. Refer to *"Optional Features" on page 48* for details about the components that may be installed in the expansion slots.

RAID Support

Although your motherboard features onboard RAID support, an additional controller (factory-installed) is mandatory to take advantage of the hard disk drives hot-swappability.

Refer to *"LSI 8708EM2 SAS/SATA RAID Controller" on page 58* for more information.

Optional Features

You will find hereafter information about the optional components that may be installed in your system.

This is not an exhaustive list, some options may not be available any more, others may have been added.

DVD-ROM Drive

Features

- DVD read speed: 16X max

- SMART-X Smart Monitoring & Adjusting Read-speed Technology for eXtraction

- ABS® (Auto Balance System) mechanism to reduce vibration & noise while high speed rotating

- Plug & Play with emergency manual eject

- Belt Tray Loading Mechanism

Specifications

- Speed (max):

    - CD-ROM: 48x (7200 KB/s)

    - DVD-ROM: 16x (21600 KB/s)

- Buffer size: 1.8MB

- Access time: 120 ms (CD family), 120 to 150 ms (DVD family)

- Compatibility: ATAPI / E-IDE Half-Height internal DVD+R / DVD+R9 / DVD+RW / DVD-R / DVD-RW / DVD-ROM / DVD-RAM / CD-R / CD-RW / CD-ROM combination drive

DVD Writer Combination Drive

Features

■ ATAPI / E-IDE Half-Height internal DVD+R / DVD+RW / DVD-R / DVD-RW / DVD+R DL / DVD-R DL / DVD-ROM / CD-R / CD-RW / CD-ROM combination drive.

■ Support Double Layer DVD +/- DL Recording Function.

■ SMART-BURN avoiding Buffer Under RunError, automatically adjusting writing strategy and running OPC to provide the best burning quality.

■ SMART-X function adjusts CD-DA / VCD / DVD data extraction to a fastest allowable speed according to both the data request rate from the host and the disk quality.

■ ABS® system to reduce vibration and noise during recording and reading.

■ Supports Fixed Packet, Variable Packet, TAO, SAO, DAO, Raw Mode Burning & Over-Burn.

■ DVD read compliant : DVD single/dual layer (PTP / OTP), DVD-R (3.9 GB / 4.7 GB), DVD-R multi-borders, DVD+R, DVD+R multi-sessions, DVD-RW, and DVD+RW.

■ CD read compliant : CD-DA, CD-ROM, CD-ROM / XA, Photo-CD, Multi-session, Karaoke-CD, Video-CD, CD-I FMV, CD Extra, CD Plus, CD-R, and CD-RW.

■ Supports both 8 cm and 12 cm CD and DVD discs.

■ Supports Fixed packet, Variable packet, Disc-at-once, Session-at-once and Track-at-once.

■ Transfer modes: PIO mode 4, DMA mode 2 and Ultra DMA mode 4.

Specifications

■ Speed
  - DVD+R: 16x max (write)
  - DVD+R: 16x max (write)
  - DVD-R: 16x max (write)
  - DVD+R DL: 8x max (write)
  - DVD+RW: 8x max (re-write)
  - DVD-RW: 6x max (re-write)
  - CD-R: 48x max (write)
  - CD-RW: 32x max (re-write)

■ Buffer size: 2 MB

■ Access time: 160ms

■ Power requirements:
  - +5v +/-5% and less than 100 mVp-p ripple voltage
  - +12v +/-10% and less than 200 mVp-p ripple voltage

DAT72 Tape Backup Unit (USB)

Please refer to the documentation on the *Tape Online CD* for more information.

DLT-V4 Tape Backup Unit (SATA)

> ▤ **Note**: *The DLT-V4 is plugged on a PCI SATA controller card. Do not plug it directly on the motherboard.*

Please refer to the documentation on the *Tape Online CD* for more information.

DLT-V4 Tape Backup Unit (SATA)

DAT160 Tape Backup Unit (USB)

Please refer to the documentation on the *Tape Online CD* for more information.

DAT160 Tape Backup Unit (USB)

GoVault Backup Unit (SATA)

Please refer to the documentation on the *Tape Online CD* for more information.

SAS Hard Disk Drive

■ Capacity: 73GB minimum

■ 15000 RPM

■ RAID support

SAS Hard Disk Drive

S-ATA Hard Disk Drive

- ■ SATA II specification.

- ■ Capacity: 80GB minimum

- ■ 7200 or 10k rpm

- ■ RAID support

Adaptec SCSI Card 29320LPE

This card is a PCIe x1 Ultra320 SCSI controller that is ideal as a SCSI tape drive connection solution thanks to its unparalleled PCIe connectivity, and the reliability and stability of a single-channel I/O interface.

> 📰 **Note**: refer to the Card User Guide for more information.

■ Interface: PCIe x1

■ Data transfer rate: up to 320Mbyte/sec.

■ Connectors:

- Internal: One 68-pin VHDCI

- External: One 68-pin Ultra320

■ Physical Specifications

- Size: 16,8cm x 6,5cm

> 📰 **Note**: no internal SCSI tape drive is qualified for your system. This card is used only to connect to external storage devices.

LSI 8708EM2 SAS/SATA RAID Controller

Features

- 8 SAS/SATA compatible ports

- Optional battery backup module

- Optional RAID5/6 key activation

- Connect up to 16 intermixed SAS and SATA devices within the same array

- Auto-resume on array rebuild

- Auto resume array reconstruction

- Online Capacity Expansion

- Comprehensive management tools

- Audible alarm circuit

Specifications

- Hardware Specifications:

  - LSI SAS 1078 RAID Chip

  - PCI Express compliant.

    - 3 Gb/s per lane.
    - x8 lane width.

  - Cache memory of 128MB or 256MB DDRII 667MHz SDRAM (depending on your configuration).

- RAID Support:

  - RAID Levels 0, 1, 10.

  - RAID Levels 0, 1, 10, 5, and 6 with the optional activation key.

- Configuration software: MegaRAID Management Suite. Refer to *"RAID Configuration using the MegaRAID Configuration Utility" on page 126*.

  - Online: MegaRAID Storage Manager Software.

  - Pre-Boot: MegaRAID BIOS Configuration Utility (WebBIOS).

📝 **Notes***:*

For more information, refer to the documentation included on the ExpressBuilder DVD-ROM.

Setting Up Your System

This chapter describes how to select a site, unpack the system, make cable connections, and power on the system units. Information on front and rear panel features, switches and LEDs are also included in this chapter.

Unpacking the System

When you receive your system, inspect the shipping containers prior to unpacking. If the shipping boxes are damaged, note the damage, and if possible, photograph it for reference.

Remove the contents of the containers, and keep the cartons and the packing materials.

If the contents appear damaged when you unpack the boxes, file a damage claim with the carrier immediately.

The carton contains various accessories, as well as the system itself. If you find any component missing or damaged, contact your service representative.

Store the provided accessories in a designated place for your convenience. You will need them to install an optional device or troubleshoot your system, as well as to set it up.

Make a backup copy of each provided discs, if any. Store the original disc as the master disc in a designated place, and use its copy.

Improper use of any provided disc may alter your system environment. If you find anything unclear, immediately ask your service representative for help.

Setting Up Your Server (Rack)

Setup Flow.

Select a suitable site for the server. Assemble the 19-inch rack assembly.

Unpack the server and accessories from the shipping carton box.

Install the server into the rack assembly.

Connect the peripheral devices to the server.

Connect the power cord to the server.

Power on the server to start software setups. Setups depend on the optional internal devices installed and the peripheral devices connected.

If no operating system was factory-installed, install one to the server.

Install the utilities in the provided ExpressBuilder disc.

After all the system setup procedures are completed, make backup copies of system information. System information is required for recovering the server from trouble or after replacing the system board.

Selecting Server Site

To use the server, install it in a standard EIA 19-inch rack assembly.

Refer to the documentation attached to the rack or contact your sales agent for more information about setting up the rack.

⚠ **Warning**

Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injury. See "General Safety Information" on page 132 for details.

■ Do not use the server in any unapproved place.

■ Do not connect the ground line to a gas pipe.

⚠ **Caution**

Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See "General Safety Information" on page 132 for details.

■ Do not carry or install the server on your own.

■ Do not concentrate the load in the rack.

■ Do not pull out a device from the rack if the rack is unstable.

■ Do not pull out more than one device at a time from the rack.

■ Do not exceed the rating power of the cables.

Do not install the rack in the places listed below. Installing the rack or mounting the server in the rack installed in such places may cause some malfunctions to occur.

■ Narrow space from which the devices cannot be pulled out from the rack completely.

■ Place that cannot bear the total weight of the rack and devices mounted on the rack.

■ Place where the stabilizers cannot be installed or where the rack can be installed only after the practice of proper earthquake-resistant construction.

■ Place of uneven or slanting floor.

■ Place enduring drastic temperature changes (near a heater, air conditioner, or refrigerator).

■ Place where intense vibrations may be generated.

■ Place where corrosive gazes are generated, chemicals are nearby, or chemicals may be accidentally sprayed over.

■   Place where a carpet that is not anti-static is laid.

■   Place where some objects may fall on the rack

■   Place near a device generating intense magnetic fields (such as a TV, radio, broadcast/communication antenna, power transmission wire, and electromagnetic crane) is placed. If it cannot be avoided, contact your sales agent to request proper shielding measures.

■   Place where the power cord of the server must be connected to an AC outlet that shares the outlet of another device with large power consumption.

■   Place near equipment that generates power noise (e.g., contact spark at power-on/ power-off of commercial power supply through a relay). If you must install the server close to such equipment, request separate power cabling or noise filter installation from your sales agent.

NovaScale T810 E1 Rack Installation Kit Assembly

This section provides the assembly instructions for mounting the server into a standard 19-inch rack cabinet.
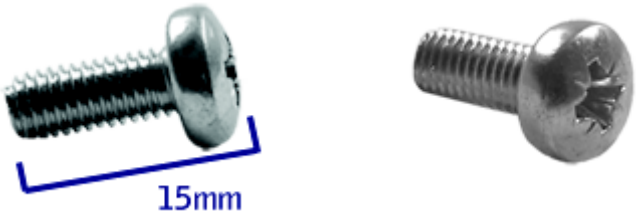
> 📄**Note:** *The server shown in the pictures may be slightly different from your server system.*

Unpacking the Rack Installation Kit

Although the rack installation kit is inspected and carefully packaged at the factory, damage may occur during shipping. Follow these steps for unpacking.

1. Visually inspect the shipping containers; notify your carrier immediately of any damage.
2. Carefully remove the rack mounting hardware and verify the parts.

> 📄**Note:** *The quantities noted below are subject to change without notice.*

2 sets of support rail assemblies (1 front and 1 rear part for each)	*Figure 20: Rail assembly front and rear parts (right side shown)*
6 (minimum) self-tapping screws (TCB M5) for support rails front and rear parts assembling	15mm *Figure 21: Self-tapping screws*

6 (minimum) washers, to be used with the 6 self-tapping screws (*"Figure 21: Self-tapping screws"*)	Figure 22: Washers for the self-tapping screws
8 (minimum) flange head screws (M5x12) used to fix the support rail assemblies to the rack	Figure 23: Flange head screws
4 washer plates, to be used with the flange head screws (*"Figure 23: Flange head screws"*)	Figure 24: Washer plates
Rack mounting frame	Figure 25: Rack-mounting frame (A)
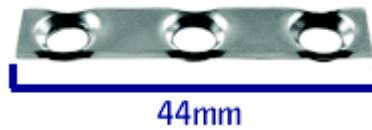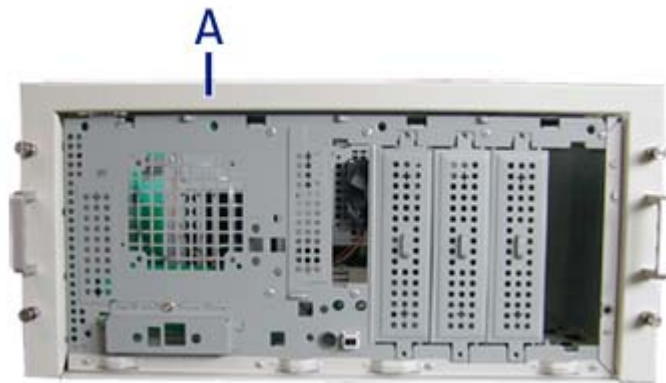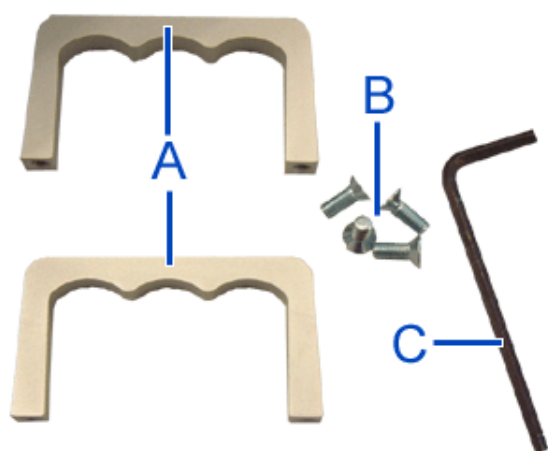
2 Handles (A)	
4 Handles fixing screws (B)	
1 Hex key for frame grub-screws (C)	
	Figure 26: Handles (A), screws (B) and hex key (C)

If some of the parts listed above are missing or if the hardware is damaged, notify your server representative.

Additional Parts for Future Use

8 (minimum) screws (TCB M5)	
	Figure 27: Screws
8 (minimum) washers	
	Figure 28: Washers

Before You Begin

Before you begin, please review the following cautions, warnings, and general guidelines.

⚠ Warning

Be sure that power to the system is turned off and unplugged. All voltage is removed only when the power cords are unplugged.

■ Avoid excessive vibration and shock. Dropping an electronic component can cause serious damage.

■ Do not disconnect or remove parts other than those specified in the procedure.

■ Do not touch I/O connector pins.

■ All screws are Phillips-head, unless otherwise specified.

■ On completion of any assembly or reassembly, perform a power-on test. If a fault occurs, verify that the assembly or reassembly was performed correctly. If the problem persists, *see "Solving Problems" on page 264*.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Assembly

The following subsection describes how to assemble your rack-mount server into a standard 19-inch rack cabinet.

Before you begin select an appropriate location in your rack cabinet for the rack-mount server. To improve rack stability, mount heavier items towards the bottom of the rack cabinet. If the rack is a stand-alone unit and the rack is more than 75% filled with components, consider installing an optional stabilizer kit.

Note: When planning your system configuration for the rack cabinet you should consider the length of the cables that interconnect system components.

⚠ Warning

■ ANCHOR THE EQUIPMENT RACK: The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of it on slide assemblies. The anchors must be able to withstand a force of up to 113 kg (250 lbs). You must also consider the weight of any other device installed in the rack.

■ MAIN AC POWER DISCONNECT: You are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labelled as controlling power to the entire unit, not just to the server(s).

■ GROUNDING THE RACK INSTALLATION: To avoid the potential for an electrical shock hazard, you must include a third wire safety grounding conductor with the rack installation. If a

server power cord is plugged into an AC outlet that is part of the rack, then you must provide proper grounding for the rack itself. If server power cords are plugged into wall AC outlets, the safety grounding conductor in each power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

⚠ Caution

Temperature: The operating temperature of the server, when installed in an equipment rack, must not go below 5 °C or rise above 35 °C. Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 4,100 Btu's per hour for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

Note: For vertical reference, every three screw holes on the rack vertical mounting rail are equal to 1U (1.75 inches).

Mounting holes in the vertical rails of equipment racks are commonly spaced in a 5/8 x 5/8 x 1/2-inch sequence. Perform the following steps carefully; brackets must be mounted with precision to allow room for the next server you install in a rack.

Assembling the Front and Rear Parts of Support Rails

The support rails are made of a front and a rear part. Those two parts may be adjusted to fit the distance between the front and rear vertical rails of the rack.

1. Assemble the front (A) and rear (B) parts of the right support rail with 3 self tapping screws (C) and 3 flat washers (D).

Note: When using self-tapping screws, we recommend you tighten the screw for 3 quarters of a turn, and loosen for 1 quarter. Repeat this cycle until the screw is completely tightened.

2. Adjust the total length to fit the distance between the front and rear vertical rails of the rack before securing the screws.

Figure 29: Right support rail front and rear parts, fixing screws and washers

3. Assemble the left support rail the same way.

Installing the Support Rails

1. Install the right support rail (A) as shown in illustration.

2. Secure the rail to the front (B) and rear (C) vertical mounting rails with two flange head screws (D) and the washer plate (E).
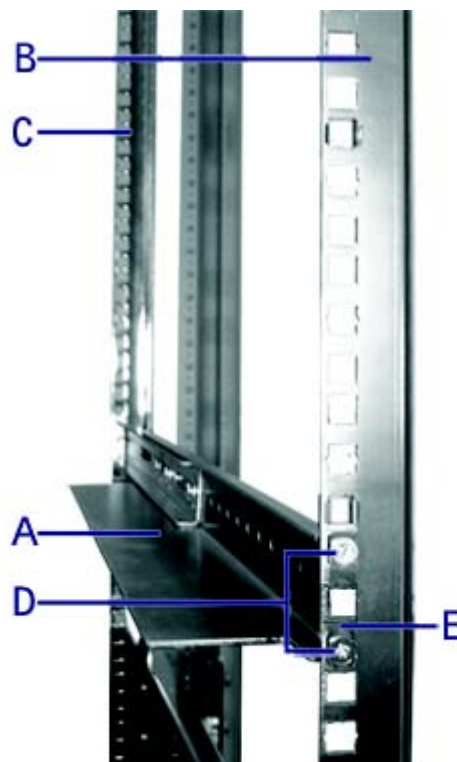
Figure 30: Installing the right support rail

3. Depending on your configuration, insert one or several caged nuts in the holes that will allow you to secure the system on the vertical rails.

Insert the caged nuts in the front mounting rail as follows (<u>*see "Figure 31: Inserting a caged nut"*</u>):

    a.   Position the caged nut on the inside of the front vertical mounting rails.

    b.   Hook the side lip of a caged nut into the square hole in the rail.

    c.   Push the other side lip of the caged nut into the square hole in the rail until it is secured.

    d.   Repeat for each caged nut.
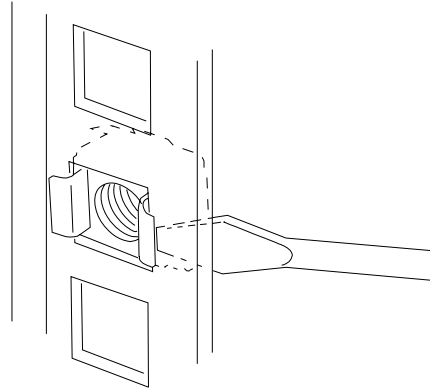
Figure 31: Inserting a caged nut

4.   Repeat steps 1 to 3 for the left support rail.

Attaching the Handles to the Rack Mounting Frame

Two handles are attached to the rack mounting frame. The handles are used to easily slide the server in and out of the rack.

⚠ **Warning**

The handles are only used to slide the server in and out of the rack. **DO NOT** use these handles to carry the server.

Attach the handles *(A in "Figure 26: Handles (A), screws (B) and hex key (C)")* to the rack mounting frame with two screws *(B in "Figure 26: Handles (A), screws (B) and hex key (C)")*.

Installing the Rack Mounting Frame on the Server

Install the rack mounting frame on the server as follows:

1.   Remove the right side door as described in .

2.   Remove the front panel as described in .

3. Install the rack mounting frame *(A)* on the server *(B)* as shown in the figure below.
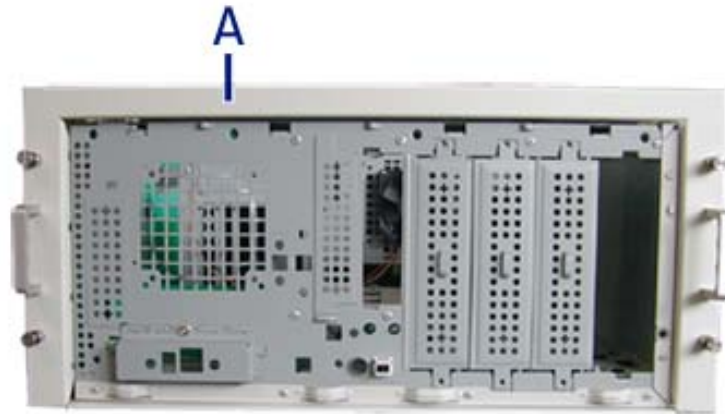
Figure 32: Installing the rack mounting frame on the server

4. Slide the rack mounting frame on the server until the front of the server protrude a little from the frame.
5. Replace the front panel.
6. Replace the right side door.
7. Align the rack mounting frame (A in the figure above) with the front panel (B).
8. Secure the frame with the grubscrews (C in the figure below, four on each side) using the hex key *(C in "Figure 26: Handles (A), screws (B) and hex key (C)")*. Tighten the screws to fix the frame to the server, but do not overtighten in order to prevent damage to the server case.
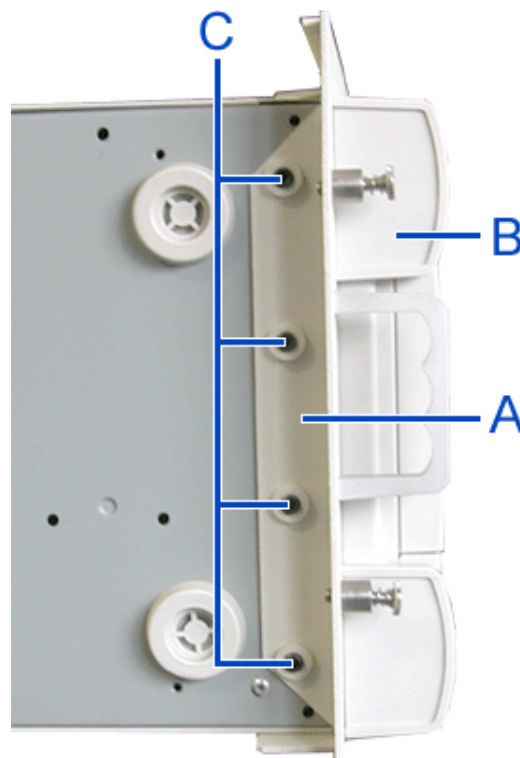
Figure 33: Securing the rack mounting frame

Installing the Server in the Rack Cabinet

⚠ Warning

The system can weigh up to 23.5 kg. If it contains numerous optional boards and peripheral devices, it will weigh more. To avoid personal injury, make sure you have at least one person help you lift or move the system.

Do not use the handles of the rack mounting frame to lift the server.

1. Lift the server onto the support rails and slide it toward the rear of the cabinet.
2. Secure the server to the vertical mounting rails with the four thumbscrews (A in the figure below).

Figure 34: Securing the server to the rack cabinet

Installing the Server in the Rack Cabinet

NovaScale R410 E1 Rack Installation Kit Assembly

This section provides the assembly instructions for mounting the server into a standard 19-inch rack cabinet.

Two rack-mount kits are available for your server:

- Rack-mount kit with short rails (standard).

- Rack-mount kit with long rails (optional). A cable arm can be installed when these sliding rails are fitted.

Read the general information on installing a system into a rack, and then jump to the installation instructions for the kit you have at your disposal.

Before You Begin

Before you begin, please review the following cautions, warnings, and general guidelines.

⚠ Warning

Be sure that power to the system is turned off and unplugged. All voltage is removed only when the power cords are unplugged.

■ Avoid excessive vibration and shock. Dropping an electronic component can cause serious damage.

■ Do not disconnect or remove parts other than those specified in the procedure.

■ Do not touch I/O connector pins.

■ All screws are Phillips-head, unless otherwise specified.

■ On completion of any assembly or reassembly, perform a power-on test. If a fault occurs, verify that the assembly or reassembly was performed correctly. If the problem persists, *see "Solving Problems" on page 264*.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Inserting a System into a Rack

Before you begin, select an appropriate location in your rack cabinet for the rack-mount server. To improve rack stability, mount heavier items towards the bottom of the rack cabinet.

> *Note: When planning your system configuration for the rack cabinet you should consider the length of the cables that interconnect system components.*

⚠ Warning

■ ANCHOR THE EQUIPMENT RACK: The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of it on slide assemblies. You must also consider the weight of any other device installed in the rack.

■ MAIN AC POWER DISCONNECT: You are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labelled as controlling power to the entire unit, not just to the server(s).

■ GROUNDING THE RACK INSTALLATION: To avoid the potential for an electrical shock hazard, you must include a third wire safety grounding conductor with the rack installation. If a server power cord is plugged into an AC outlet that is part of the rack, then you must provide proper grounding for the rack itself. If server power cords are plugged into wall AC outlets, the safety grounding conductor in each power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Inserting a System into a Rack

⚠ **Caution**

Temperature: The operating temperature of the server, when installed in an equipment rack, must not go below 5 °C or rise above 35 °C. Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust the total sum of the Btu's per hour for the servers installed in the rack. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

Note: For vertical reference, every three screw holes on the vertical mounting rail are equal to 1U (1.75 inches).
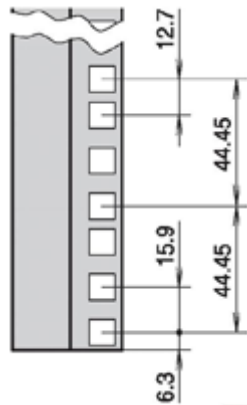
Figure 35: 1U specifications (in millimeters)

Mounting holes in the vertical mounting rails of equipment racks are commonly spaced in a 5/8 x 5/8 x 1/2-inch sequence. Perform the following steps carefully; brackets must be mounted with precision to allow room for the next server you install in a rack.

Installing and Removing the Rack Handles

Installing the Rack Handles

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. If applicable, disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Attach the rack handle to the server system with two screws as shown in the figure below.
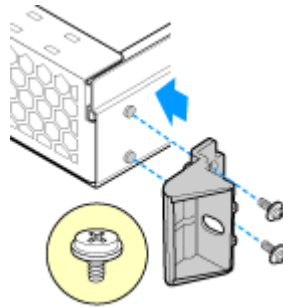
Figure 36: Installing the Rack Handle

4. Repeat step 3 on the opposite side of the server.

5. Plug all peripheral devices and the AC power cable into the server.

Removing the Rack Handles

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. If applicable, disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the two screws holding the rack handle in place, and remove the rack handle from the server system as shown in the figure below.
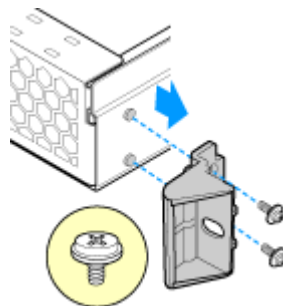
Figure 37: Removing the Rack Handle

4. Repeat step 3 on the opposite side of the server.

5. Plug all peripheral devices and the AC power cable into the server.

Installing a Rack Mount Kit with the Basic Rails

Kit Contents

Each rack mount kit contains the following:

- Outer rail slide assembly (2) - letter "A" on the picture below.

- Inner rail slide (2) - letter "B" on the picture below.

- Rail safety stop (one each on inner slides) - letter "C" on the picture below.

- Outer slide rail screws (8 #10-32 x 1/2), inner slide rail screws (8 #6-32 x 1/4), and rack screws (2 #10-32 x 3/4) - letter "D" on the picture below.
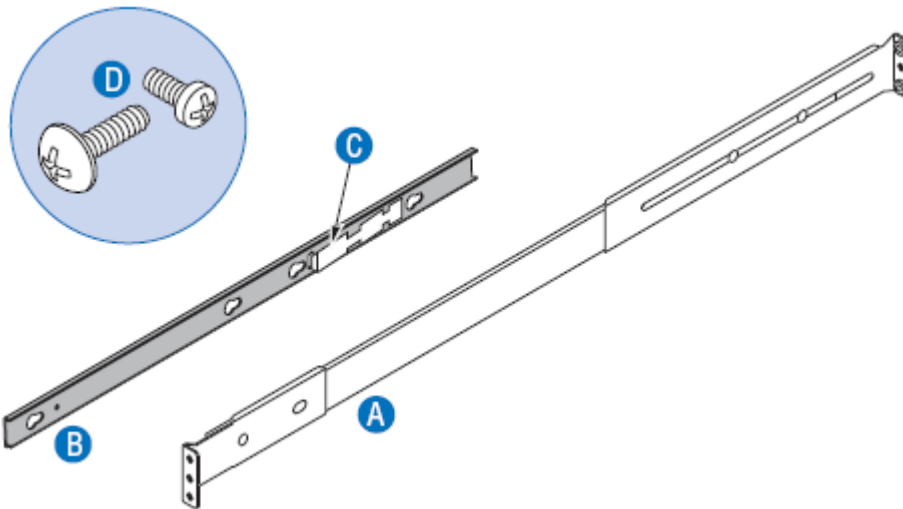
Figure 38: Rack Mount Kit Contents

- Rail extensions (2), to be used if the rack depth is superior to 765 mm.

Figure 39: Rails Extensions

- Washerplates (4), to be used with M5 screws (8).

Installing a Rack Mount Kit with the Basic Rails
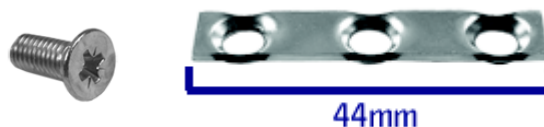
Assembly

1. Power down the server and unplug all peripheral devices and the AC power cable.

2. Remove the inner rail from the rail assembly.

   a.   Extend the inner rail until it locks (letter "A").

   b.   Depress the spring safety lock to release the inner rail (letter "B").

   c.   Remove the inner rail from the rail assembly (letter "C").
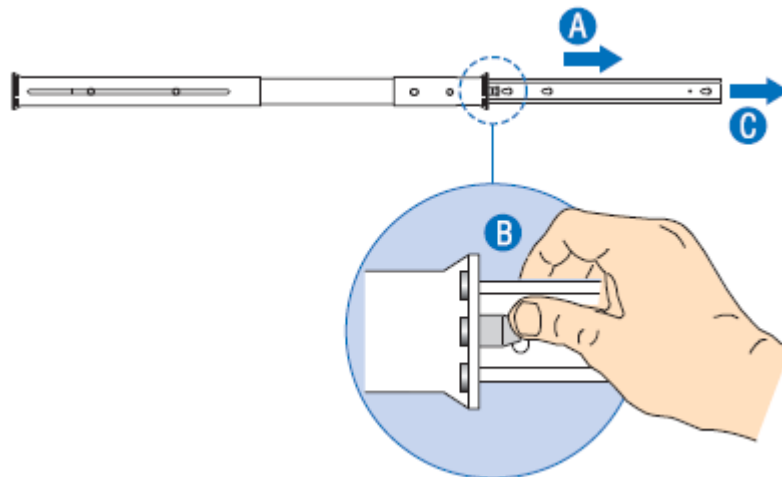
Figure 40: Removing the Inner Rail from the Rail Assembly

3. Optional: fix an extension to the rear of each slide rail.

   📰**Note:** *Use extensions only if the rack depth is superior to 765 mm.*

   Attach the bracket with square holes (see letter "B") to the rear of the outer rail using two 10-32 x 1/2 screws.
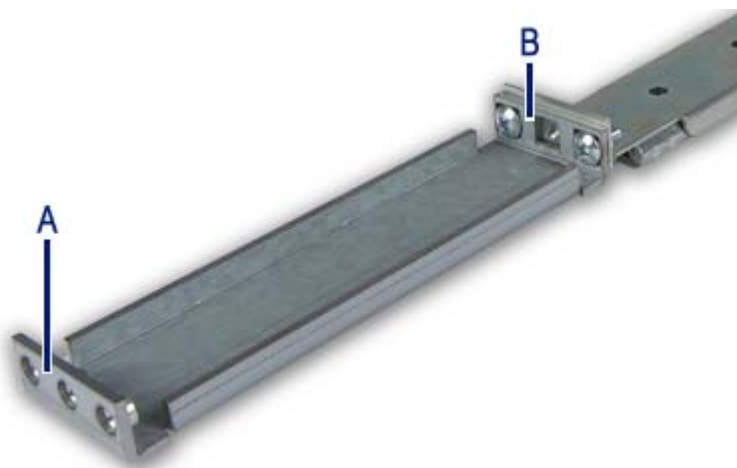
Figure 41: Attaching the Extension to the Rail

A: Bracket with square holes
B: Bracket with round holes

4. Determine the position in which you wish to install the system into the rack.

5. Attach the outer rail slides to the vertical mounting rails using:

    -   two #10-32 x 1/2 screws at the front mounting rails,

    -   two M5 screws and one washerplate (it only fits one way) at the rear mounting rails.

📝**Note:** *The rail flanges mount to the inside of each post.*
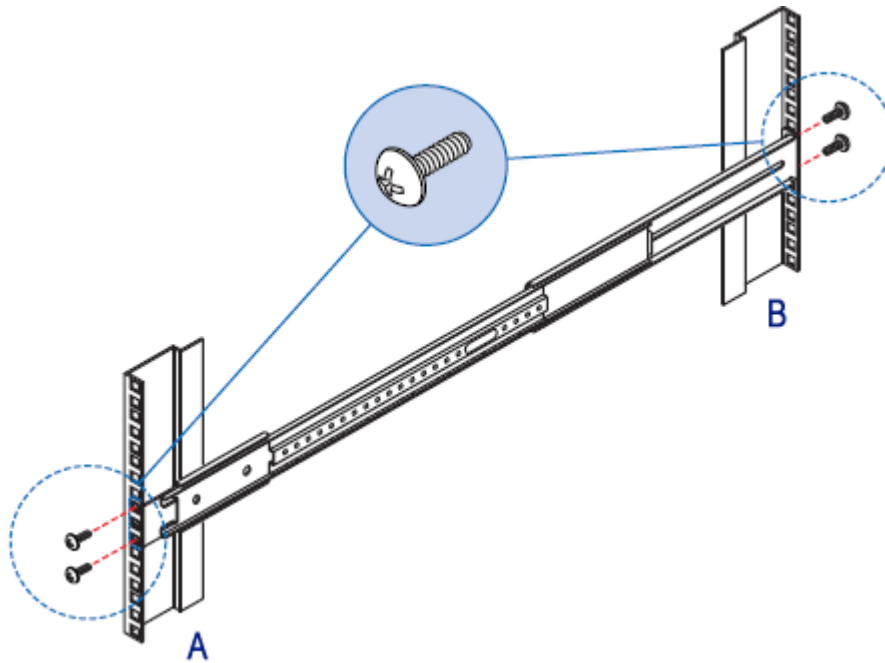
Figure 42: Installing the Outer Rail to the Mounting Rails

A: Front of the rack
B: Rear of the rack

6. Attach the inner rails to the server chassis sidewalls

    a.   Insert the inner rails over the server chassis sidewall studs (letter "A").

    b.   Slide the inner rails toward the front of the server chassis (letter "B").

    c.   Secure the inner rails with one #6-32 x 1/4 screw for each rail (letter "C").
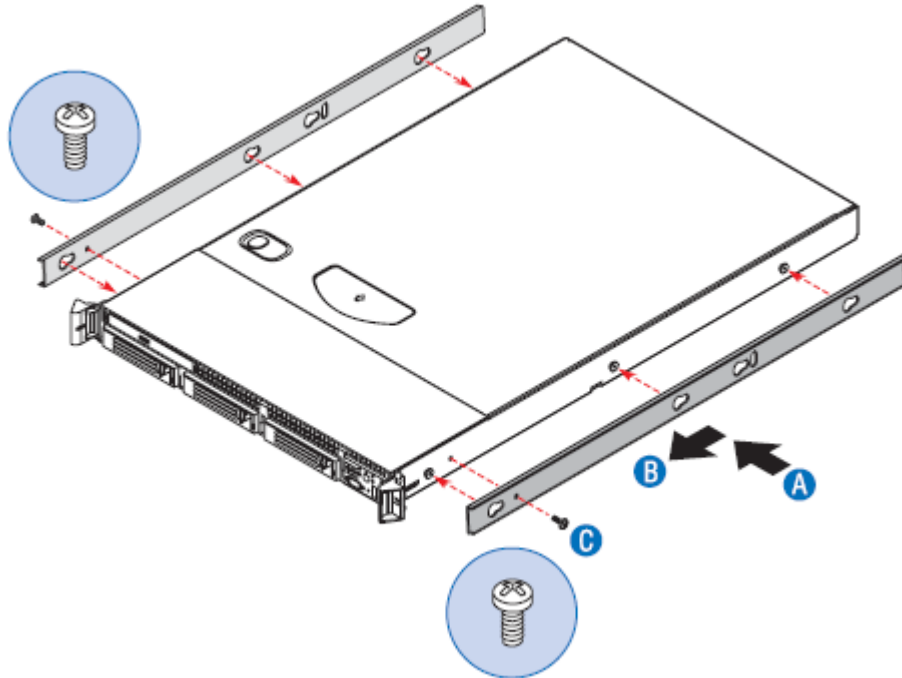
Figure 43: Attaching the Inner Rails to the Chassis

7. Install the server chassis into the rack.

    a. Align the inner rails (attached to the server chassis) with the outer rail assemblies (attached to the rack). See letter "A".

> **Note:** The inner slides must be positioned all the way forward in the rails to ensure proper installation of the server.

    b. Engage the matching rails and slide the server chassis into the rack (letter "B") until the two safety stops lock into position (letter "C").
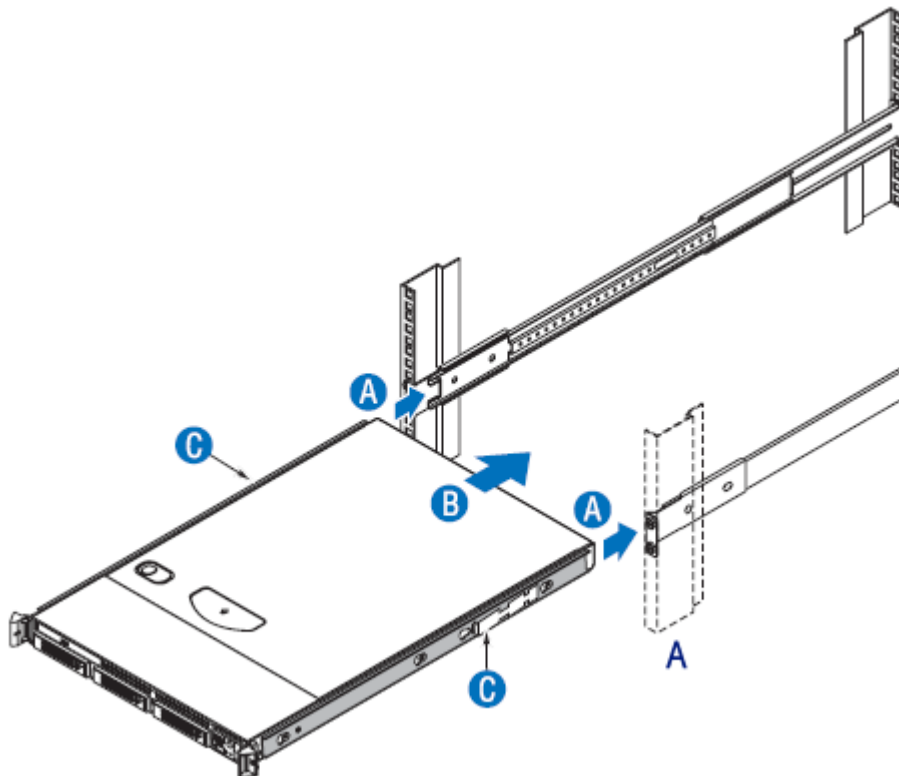
Figure 44: Installing the Server Chassis into the Rack (step 1)

A: Front of the rack

c. Depress the two safety locks -one on each side- (letter "A").

d. Slide the server chassis all the way into the rack (letter "B").

e. Use the rack screws (#10-32 x 3/4) to secure the chassis and rack handles into the rack (letter "C").
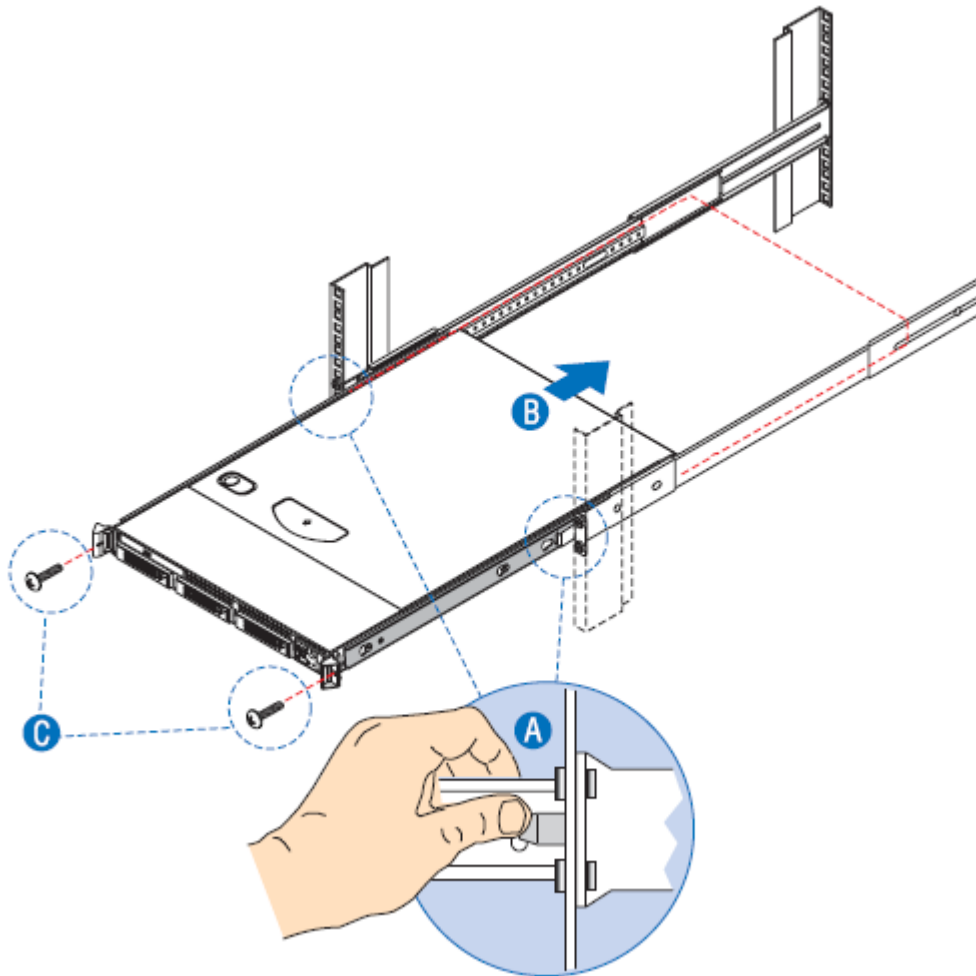
Figure 45: Installing the Server Chassis into the Rack (step 2)

Installing a Rack Mount Kit with Sliding Rails (option)

Kit Contents

Each rack mount kit contains the following:

- Slide rail assemblies (2)
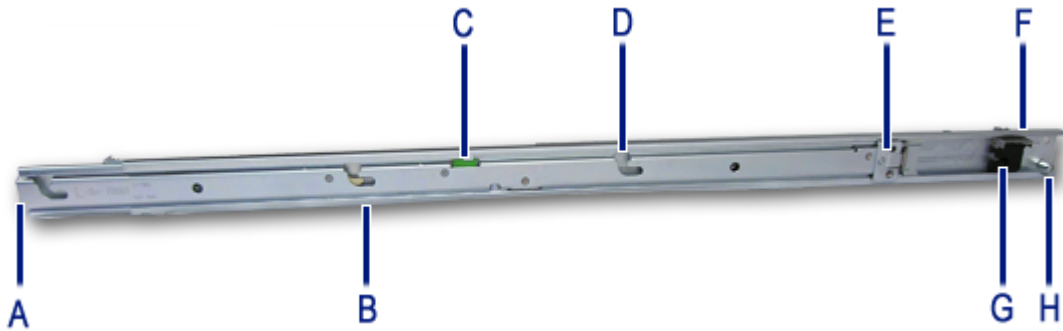
Figure 46: Slide Rail Description

A: Front multi-pin adapter and bracket
B: Component release lever
C: Slide extension release lever
D: Component mounting channel (3 per rail)
E: Front (sliding) cable arm mount
F: Rear multi-pin adapter and bracket
G: Anti-sag bar slider
H: Rear (fixed) cable arm mount

- Rail extensions (2), to be used if the rack depth is superior to 760 mm.

Figure 47: Rail Extensions

- Washerplates (4), to be used with M5 screws (8).

44mm

- Cabling straps (6)

- Spacer block (1)

Figure 48: Spacer Block

- Screws (not used)

Figure 49: Screws

- Extensions 2 x 2 (not used)

Figure 50: Extensions

Assembly

1. Power down the server and unplug all peripheral devices and the AC power cable.

2. Set the multi-pin adapter for the rack-type.

Figure 51: Front Multi-Pin Adapter and Bracket

(set with square pins)

The multi-pin adapters allow the slide rails to be used in racks that have square or round mounting holes.

> *Note: The sliding rails are shipped with the multi-pin adapters set for square holes. If you are equipped with an NEC rack or another rack with square mounting holes, skip this step.*

Reverse the multi-pin adapter position to match the rack mounting hole type (if necessary) as described in the following steps:

a.   Rotate the swivel lock to the "up" position (letter "A").

b.   Press the mounting pins together, and then pull completely out the multi-pin adapter from the multi-pin bracket (letter "B").
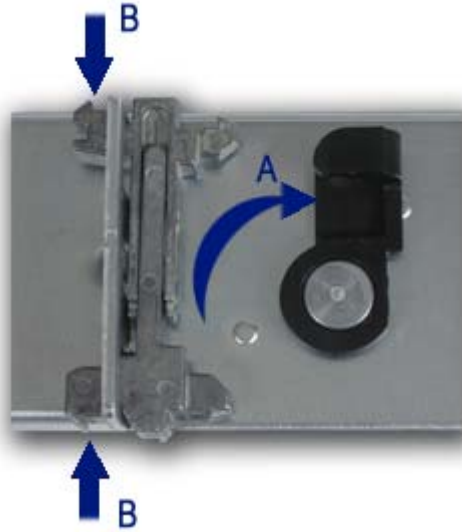
Figure 52: Changing the Adapter Pins Set

c.   Install the multi-pin adapter with the round pins facing out. Press the pins together while inserting the adapter into the bracket.

📝 **Note:** *the multi-pin adapter is keyed to prevent incorrect insertion. Turn it around if it does not squarely fit.*

⚠ **Caution**

The multi-pin adapter must be fully locked in the bracket. Make certain both mounting pins on the multi-pin adapters are fully engaged in the multi-pin bracket.

d.   Lock the multi-pin adapter in place using the swivel lock.

e.   Repeat steps a through d for both ends of each slide rail.

3.   Optional: fix an extension to the rear of each slide rail.

📝 **Note:** *Use extensions only if the rack depth is superior to 760 mm.*
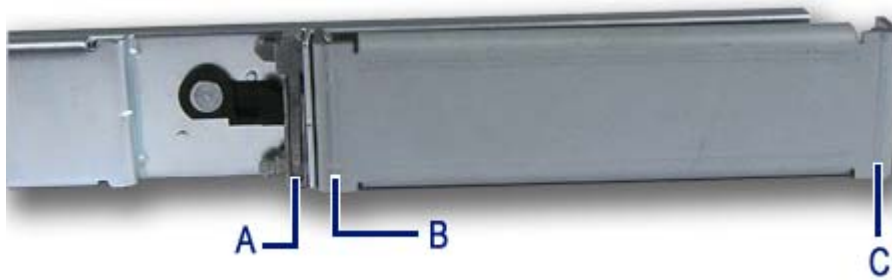
Figure 53: Attaching the Extension to the Rail

A: Multi-pin adapter
B: Bracket with square holes
C: Bracket with round holes

    a.   Press together the round pins of the multi-pin adapter and insert the bracket with the square holes on the round pins.

    b.   Release the round pins of the multi-adapter.

4. Determine the position in which you wish to install the system into the rack.

5. Align the left slide rail with its mounting holes.

6. Hold the slide rail in the desired rack-mounting position.

7. Depending on whether you are using, or not, the extensions:

    ■ With the extensions: use a washerplate and 2 M5 screws (it only fits one way) to secure the rear bracket of the rail to the mounting rail.

    ■ Without the extensions: press the multi-pin adapter mounting pins (see Figure 51) together and secure the rear bracket of the rail to the mounting rail.

> 📄**Note:** *Ensure the slide rail is level.*

8. Fully extend the slide rail to its fully extended (locked) position.

9. Press the slide extension release levers to release the lock.

10. Move the slide rail in and out throughout its entire range of motion and make certain it does not bind.

⚠ Caution

If you notice any binding, recheck the mounting positions.

11. Repeat steps 5 through 10 for the right slide rail, ensuring that it is parallel and level with the left slide rail.

12. If you wish to install a cable arm, follow the instructions in *"Installing a Cable Arm (with Sliding Rails Only)" on page 89* before going to step 13

13. Extend both slide rails into the fully extended (locked) position.

14. Align the mounting studs with the component mounting channels on the slide rails.

15. Carefully place the component mounting studs in the component mounting channels on the slide rails.

Allow the component mounting studs to fully seat in the component mounting channels (letter "D" on Figure 46). The component release levers (one on each slide rails) pivot out of the way and then back in place whent the studs are fully engaged in the mounting channels.

Ensure that the component release levers are in locked position.
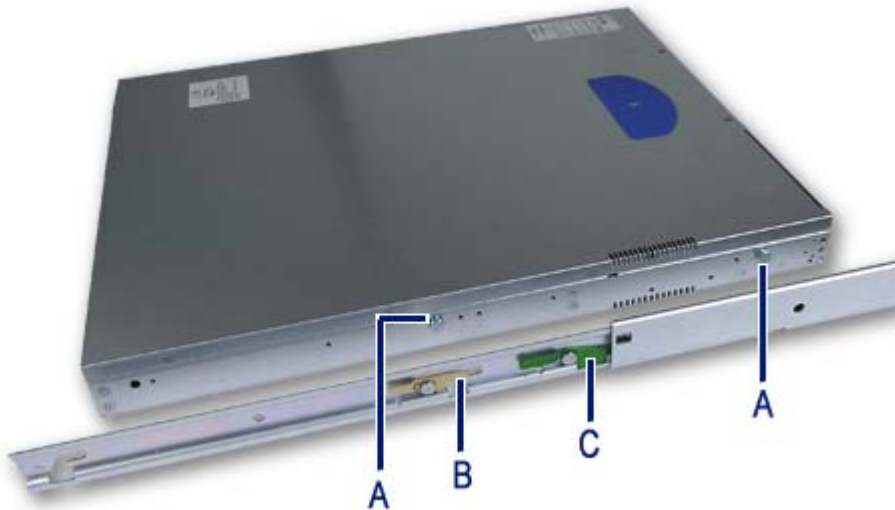
Figure 54: Placing the System on the Rails

A: Mounting studs
B: Slide extension release lever
C: Component release lever

16. Use two rack screws (#10-32 x 3/4) to secure the chassis and rack handles into the rack.

17. Press and hold the left and right slide extension release levers and slowly slide the component and side rails into the fully retracted position.

Installing a Cable Arm (with Sliding Rails Only)

Description

The cable arm pivots at its rear mounting position, and slides along its front mounting position with the sliding rail track.
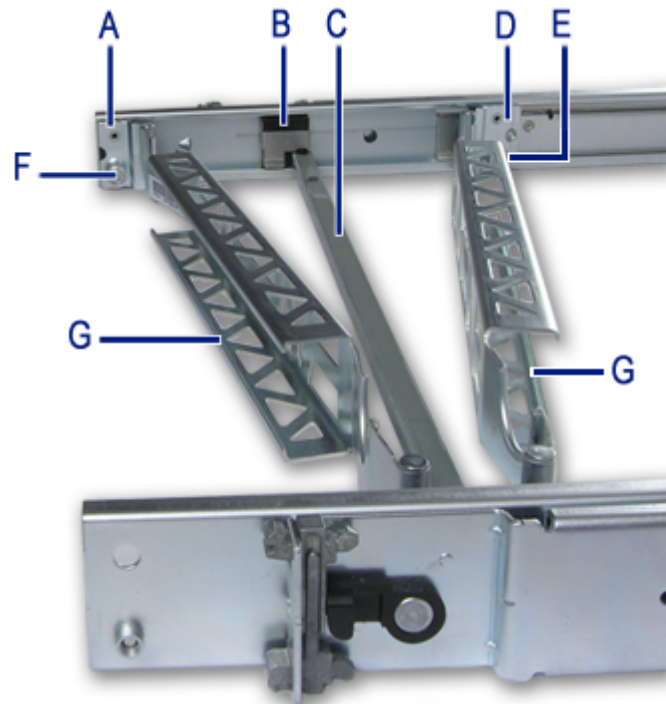
Figure 55: Cable Arm Description

A: Rear (pivoting) end
B: Anti-sag bar slider
C: Anti-sag bar
D: Front (sliding) end
E & F: Captive thumbscrew
G: Cabling channel

Installation Requirements

The cable arm can be installed either on the left sliding rail, or on the right sliding rail (the mounting tabs on either end are identical). Regardless of the selected position, the cable arm must be oriented as shown below to properly function.
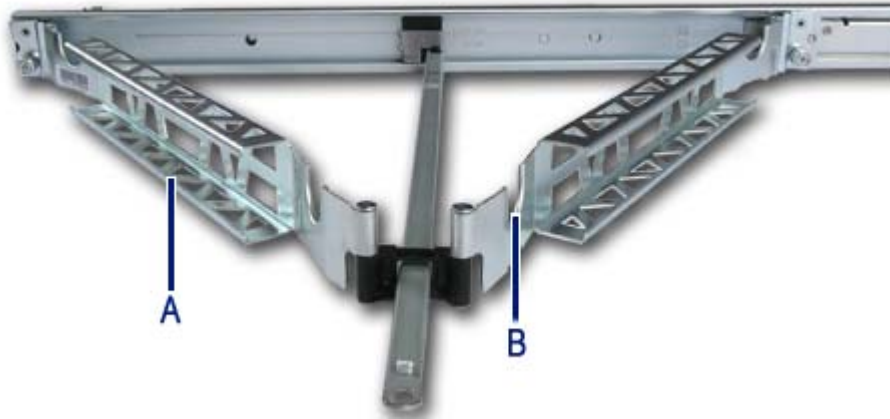
Figure 56: Installing the Cable Arm on the Sliding Rails

A: The open side of the channels are facing out.
B: The cabling cut-outs are facing up.

Installation

1. Pull the slide rails out to the fully extended (locked) position.
2. Loosely position the cable arm in the mounting position, noting the placement requirements specified above.
3. Install the spacer block (letter "B") in mounting position at the end of the cable arm chosen to be the rear (pivoting) end.

> **Note:** *The black spacer block is provided in the plastic bag with the cabling straps.*
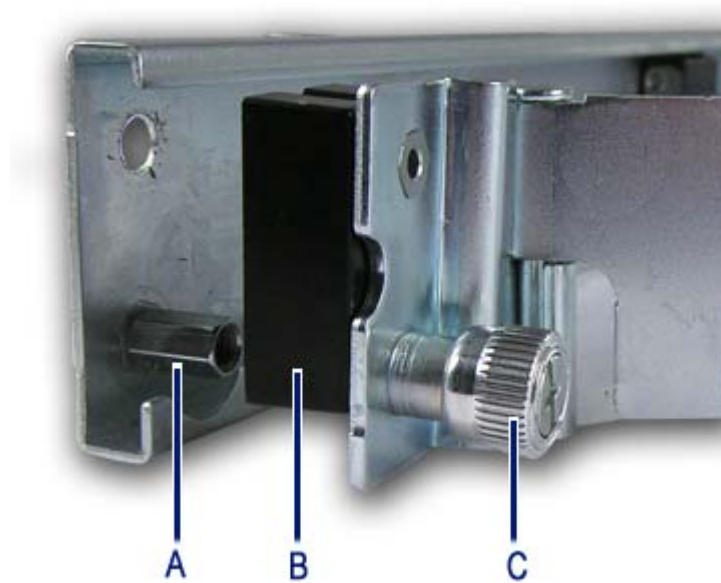
Figure 57: Installing the Spacer Block

A: Jackscrew
B: Spacer block
C: Captive thumbscrew

4. Attach the cable arm (along with the spacer block) to the rear of the sliding rail using the captive thumbscrews (letter "A" on Figure 57).

5. Open the locking clips on the anti-sag bar slider on both slide rails by lifting the silver tab.

6. Attach the anti-sag bar to the anti-sag bar sliders on the left and right slide rails.

Figure 58: Attaching the Anti-Sag Bar

7. Place the ends of the anti-sag bar over the pins.

Figure 59: Closing the Anti-Sag Bar Slider

8. Attach the front sliding end of the cable arm to the slide rail track using the captive thumbscrew.

9. Press and hold the left and right slide extension release levers and slowly move the slide rails throughout their entire range of motion.

> 📝*Note:* *Ensure the cable arm folds and expands without binding. If binding is noticed, recheck the mounting of the cable arm.*

10. Place and secure the cabling within the cable arm.

    a.   Install the sytem in the slide rails, as described in steps 13 to 16 of *"Installing a Rack Mount Kit with Sliding Rails (option)" on page 83*, and fully extend the slide rails until they lock.

    b.   Connect all the required cables to the component.

    c.   Place the cables in the cable cutouts and into the cabling channels.

    d.   Use the supplied straps to secure the cables within the cabling channels.

> *Notes:*
>
> ■ *Wrap the straps through the back of the cabling channels.*
>
> ■ *Never wrap the straps around the bottom of the cable arm. Ensure that excess strap length is either cut off, or secured to the other straps and placed in the cabling channel with the cables.*

    e.   Press and hold the left and right slide extension release levers and slowly slide the component throughout its entire range of motion to ensure that cabling is not strained or restricting movement of the sliding rails.

> *Note: Make certain cabling is not pinched when the rails and cable arm are in the fully retracted position.*

NovaScale T830 E1 Rack Installation Kit Assembly

This section provides the assembly instructions for mounting the server into a standard 19-inch rack cabinet.

Unpacking the Rack Installation Kit

Although the rack installation kit is inspected and carefully packaged at the factory, damage may occur during shipping. Follow these steps for unpacking.

1. Visually inspect the shipping containers; notify your carrier immediately of any damage.

2. Carefully remove the rack mounting hardware and verify the parts.

> **Note:** *The quantities noted below are subject to change without notice.*

2 sets of support rail assemblies (1 front and 1 rear part for each)	*Figure 60: Rail assembly front and rear parts (right side shown)*
6 (minimum) self-tapping screws (TCB M5) for support rails front and rear parts assembling	15mm *Figure 61: Self-tapping screws*

6 (minimum) washers, to be used with the 6 self-tapping screws (*"Figure 61: Self-tapping screws"*)	*Figure 62: Washers for the self-tapping screws*
8 flange head screws (M5x12) used to fix the support rail assemblies to the rack	*Figure 63: Flange head screws*
4 washer plates, to be used with the flange head screws to fix the support rail assemblies to the rack (*"Figure 63: Flange head screws"*)	*Figure 64: Washer plates*
Filler	*Figure 65: Filler*
4 flange head screws, used to fix the filler to the top cover	*Figure 66: Flange head screws*
2 Screws M5x16, to be used with the washers (*"Figure 68: Washers"*) to fix the filler to the mounting rails	*Figure 67: M5x16 screws*

2 Washers for the M5x16 screws	 *Figure 68: Washers*
2 Caged nuts, to be used with the screws (*"Figure 67: M5x16 screws"*) and washers (*"Figure 68: Washers"*) to fix the filler to the mounting rails	 *Figure 69: Caged nuts*
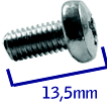
If some of the parts listed above are missing or if the hardware is damaged, notify your server representative.

Additional Parts for Future Use

8 (minimum) screws (TCB M5)	13,5mm **Figure 70: Screws**
8 (minimum) washers	12mm **Figure 71: Washers**

Before You Begin

Before you begin, please review the following cautions, warnings, and general guidelines.

⚠️ **Warning**

Be sure that power to the system is turned off and unplugged. All voltage is removed only when the power cords are unplugged.

■ Avoid excessive vibration and shock. Dropping an electronic component can cause serious damage.

■ Do not disconnect or remove parts other than those specified in the procedure.

■ Do not touch I/O connector pins.

■ All screws are Phillips-head, unless otherwise specified.

■ On completion of any assembly or reassembly, perform a power-on test. If a fault occurs, verify that the assembly or reassembly was performed correctly. If the problem persists, *see "Solving Problems" on page 264*.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Assembly

The following subsection describes how to assemble your rack-mount server into a standard 19-inch rack cabinet.

Before you begin select an appropriate location in your rack cabinet for the rack-mount server. To improve rack stability, mount heavier items towards the bottom of the rack cabinet. If the rack is a stand-alone unit and the rack is more than 75% filled with components, consider installing an optional stabilizer kit.

Note: *When planning your system configuration for the rack cabinet you should consider the length of the cables that inter-connect system components.*

⚠️ **Warning**

■ ANCHOR THE EQUIPMENT RACK: The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of it on slide assemblies. The anchors must be able to withstand a force of up to 113 kg (250 lbs). You must also consider the weight of any other device installed in the rack.

■ MAIN AC POWER DISCONNECT: You are responsible for install-ing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labelled as controlling power to the entire unit, not just to the server(s).

■ GROUNDING THE RACK INSTALLATION: To avoid the potential for an electrical shock hazard, you must include a third wire safety grounding conductor with the rack installation. If a server power cord is plugged into an AC outlet that is part of the rack, then you must provide proper grounding for the rack itself. If server power cords are plugged into wall AC outlets, the safety grounding conductor in each power cord

provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

⚠ **Caution**

Temperature: The operating temperature of the server, when installed in an equipment rack, must not go below 5 °C or rise above 35 °C. Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 4,100 Btu's per hour for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

▤ Note: For vertical reference, every three screw holes on the rack vertical mounting rail are equal to 1U (1.75 inches).

Mounting holes in the vertical rails of equipment racks are commonly spaced in a 5/8 x 5/8 x 1/2-inch sequence. Perform the following steps carefully; brackets must be mounted with precision to allow room for the next server you install in a rack.

Assembling the Front and Rear Parts of Support Rails

The support rails are made of a front and a rear part. Those two parts may be adjusted to fit the distance between the front and rear vertical rails of the rack.

1. Assemble the front (A) and rear (B) parts of the right support rail with 3 self tapping screws (C) and 3 flat washers (D).

▤ Note: When using self-tapping screws, we recommend you tighten the screw for 3 quarters of a turn, and loosen for 1 quarter. Repeat this cycle until the screw is completely tightened.

2. Adjust the total length to fit the distance between the front and rear vertical rails of the rack before securing the screws.

Figure 72: Right support rail front and rear parts

3. Assemble the left support rail the same way.

Installing the Support Rails

1. Install the right support rail (A) as shown in illustration.

2. Secure the rail to the front (B) and rear (C) vertical mounting rails with two flange head screws (D) and the washer plate (E).
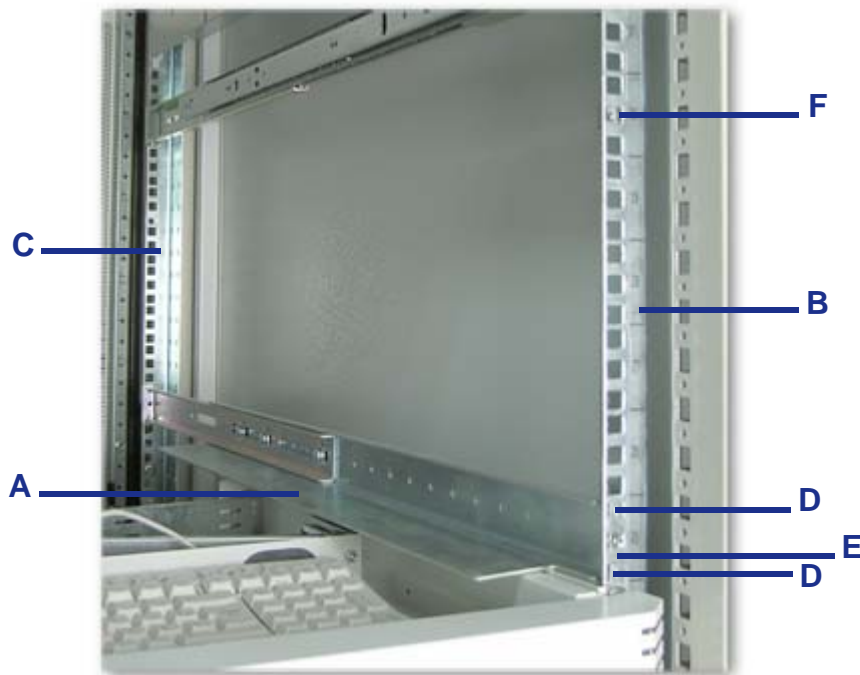
Figure 73: Installing the right support rail

3. Insert one caged nut (F) as shown in the figure above, in the middle hole of the sixth U. Insert the caged nut in the front mounting rail as follows (*see "Figure 74: Inserting a caged nut"*):

   ■ Position the caged nut on the inside of the front vertical mounting rail.

   ■ Hook the side lip of a caged nut into the square hole in the rail.

■ Push the other side lip of the caged nut into the square hole in the rail until it is secured.
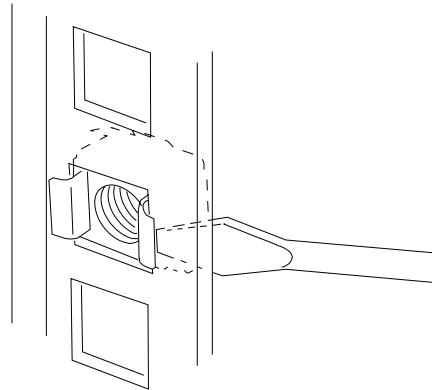
Figure 74: Inserting a caged nut

4. Repeat steps 1 to 3 for the left support rail.

Installing the Filler on the Server

Install the filler on the server as follows:

1. Remove the right side door as described in *"Removing or Installing the Left side cover" on page 207*.

2. Remove the four plastic plugs from the top side cover.
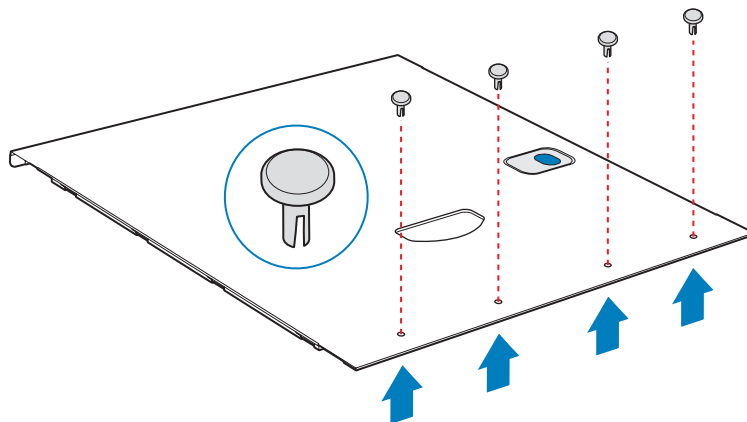
TP02004

Figure 75: Removing the Plastic Plugs from the Top Side Cover

3. Install the filler on the top of the cover using four flangehead screws. The handles must face the front of the server.

4. Replace the top side cover.

Installing the Server in the Rack Cabinet

⚠️ **Warning**

The system can weigh up to 23.5 kg. If it contains numerous optional boards and peripheral devices, it will weigh more. To avoid personal injury, make sure you have at least one person help you lift or move the system.

1. Lift the server onto the support rails and slide it toward the rear of the cabinet.
2. Assemble the M5x16 screws (*"Figure 67: M5x16 screws"*) and their assorted washers (*"Figure 68: Washers"*) as shown in the figure below.

3. Secure the server to the vertical mounting rails by inserting the screws prepared in step 2 in the caged nuts located in the middle of the sixth U (A).

Figure 76: Securing the server to the rack cabinet

Setting Up Your System (Tower)

This chapter describes how to select a site, unpack the system, make cable connections, and power on the system units.

Setup Flow.

Select a suitable site for the system.

Unpack the system and accessories from the shipping carton box.

Connect peripheral devices to the system.

Connect the power cord to the system.

Power on the system to start software setups. Setups depend on the optional internal devices installed and the peripheral devices connected.

If no operating system was factory-installed, install one to the server.

Install the utilities in the provided ExpressBuilder disc.

After all the system setup procedures are completed, make backup copies of system information. System information is required for recovering the system from the trouble or after replacing the system board.

Selecting System Site

⚠ Warning

Observe the following instructions to use the system safely. Failure to follow these instructions may result in death or serious personal injury. See "General Safety Information" on page 132 for details.

■ Do not use the system in any unapproved place.

■ Do not connect the ground line to a gas pipe.

⚠ Caution

Failure to follow the instructions listed below may cause a fire, personal injury, or property damage. See "General Safety Information" on page 132 for details.

■ Do not install the system where the load may be concentrated on a specific point.

■ Do not exceed the rating power of the wiring.

Do not install the system in the places listed below, doing so may cause malfunctions to occur.

■ Place of uneven or slanting floor

■ Place enduring drastic temperature changes (near a heater, air conditioner, or refrigerator)

■ Place where intense vibrations may be generated

■ Place where corrosive gazes are generated, chemicals are nearby, or chemicals may be accidentally sprayed over.

■ Place where a carpet that is not anti-static is laid.

■ Place near a device generating intense magnetic fields (such as a TV, radio, broadcast/communication antenna, power transmission wire, and electromagnetic crane) is placed. If it cannot be avoided, contact your sales agent to request proper shielding measures.

■ Place where the power cord of the server must be connected to an AC outlet that shares the outlet of another device with large power consumption.

■ Place near equipment that generates power noise (e.g., contact spark at power-on/power-off of commercial power supply through a relay). If you must install the server close to such equipment, request separate power cabling or noise filter installation from your sales agent.

Making Connections

Connect your keyboard, monitor, and mouse. Also connect any external peripheral devices such as a printer or scanner by following the instructions included with these devices.

⚠ Caution

Damage to the system may result if the keyboard/ mouse cable (other than USB) is inserted or removed when power is applied to the system.

Inserting a telephone line connector into a LAN RJ-45 port may result in personal injury and equipment damage.

NovaScale T810 E1 Power Supply

Connecting the Power Cord

Plug the female end of the AC power cord shipped with your system into the input receptacle on the rear of the power supply shipped with your system.

Plug the male end of the power cord into NEMA 5-15R outlet for 100-120 VAC or NEMA 6-15R outlet for 200-240 VAC.

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

■ The power 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 power cord connector that plugs into the wall outlet must be terminated in 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 power cord connector that plugs into the system must be an IEC- type CEE-22 female connector.

■ The power cord must be less than 1.8 meters (6.0 feet) long.

When connecting the power cord to a power control unit such as a UPS unit, confirm that the power control unit is powered OFF. Connecting the power cord while power is supplied to the power control unit may cause a failure.

⚠ Warning

A power cord is provided for the power supply shipped with your system. Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

NovaScale R410 E1 Power Supply

Connecting the Power Cord

Plug the female end of the AC power cord shipped with your system into the input receptacle on the rear of the power supply shipped with your system.

Plug the male end of the power cord into NEMA 5-15R outlet for 100-120 VAC or NEMA 6-15R outlet for 200-240 VAC.

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

- ■ The power 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 power cord connector that plugs into the wall outlet must be terminated in 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 power cord connector that plugs into the system must be an IEC- type CEE-22 female connector.

- ■ The power cord must be less than 1.8 meters (6.0 feet) long.

When connecting the power cord to a power control unit such as a UPS unit, confirm that the power control unit is powered OFF. Connecting the power cord while power is supplied to the power control unit may cause a failure.

⚠ Warning

A power cord is provided for the power supply shipped with your system. Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

NovaScale T830 E1 Power Supply

Depending on your configuration, your system features one of the power supplies described below:

■   A hot-swappable power supply fitted with one or two power supply modules (implying redundancy features).

■   A fixed power supply.

Connecting the Power Cord(s)

Plug the female end of the AC power cord(s) shipped with your system into the input receptacle(s) on the rear of your system power supply.

Plug the male end of the power cord(s) into NEMA 5-15R outlet(s) for 100-120 VAC or NEMA 6-15R outlet(s) for 200-240 VAC.

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

■   The power 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 power cord connector that plugs into the wall outlet must be terminated in 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 power cord connector that plugs into the system must be an IEC- type CEE-22 female connector.

■   The power cord must be less than 1.8 meters (6.0 feet) long.

When connecting the power cord(s) to a power control unit such as a UPS unit, confirm that the power control unit is powered OFF. Connecting the power cord(s) while power is supplied to the power control unit may cause a failure.

⚠ Warning

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

Hot-Swappable Power Supply Features

This hot-swappable power supply consists of two independent modules.

It can function properly with only one module.

However, if two modules are fitted, if one of the power modules should fail, the other one will supply power to the system until you can change the failed module. The failed module can be hot-swapped.

> **Note:** *Connect both power modules to power outlets to ensure continuous operation.*

Power Supply LEDs

There are two LEDs on the back of the power supply. Refer to the table below for more information.

Table 6: Power Supply LEDs

Power Supply Condition	Status LED (AC OK / Power Supply Fail)	Power LED (Power Good)	Remarks
AC Power Off	OFF	OFF	
AC Power On in Standby	Green	OFF	
AC ON and all outputs in Normal	Green	Green	
Any DC outputs in short circuit	Green	OFF	Power distribution module board only. Module OK.
DC Fan not spinning	Amber	OFF	Module protection only
Over-Temperature Protection (OTP)	Amber	Green	Send out alert signal

The PSU is protected against over-temperature conditions that may be caused by a reduction of the fan cooling or an excessive ambient temperature. In OTP mode, the power supply unit will eventually shut down.

Hot-Swapping a Power Module

⚠ **Warning**

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

1. Observe the safety and ESD precautions listed in *"General Safety Information" on page 132*.
2. Remove the power cable from the defective power supply.

⚠ **Warning**

Put on protective gloves before you follow the instructions below. The power modules are very hot and there is a risk of severe burns.

3. Press up on the green latch (A) while pulling on the handle (B) to remove the hot-swap power supply from the chassis.
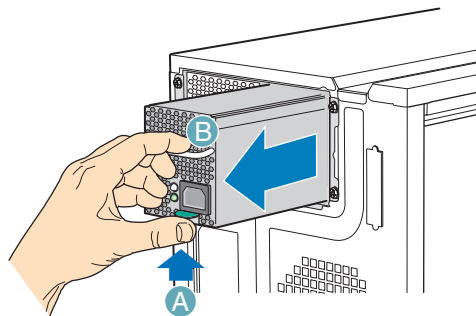
TP00856

Figure 77: Removing the Hot Swap Power Supply Module from the Chassis

4. Insert the new hot swap power supply module.
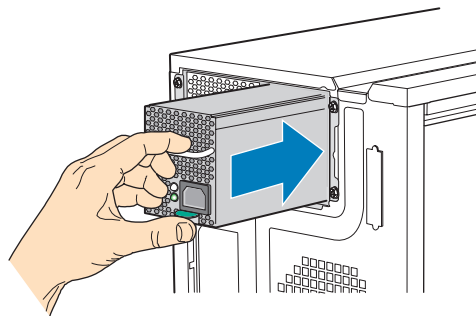
TP00854

Figure 78: Inserting Hot Swap Power Supply Module in Chassis

5. Connect the power cable to the replaced hot swap power supply.

Using the System

The following sections describe how to use this system properly and safely, including an explanation of the system power on/off sequences, what the POST program checks in the system, and how to perform a forced power shutdown.

When using the system the following precautions should be observed:

■ Make sure you power off the system before connecting or disconnecting cables between the system and peripheral devices. Connecting or disconnecting the cables while the system is powered on may cause malfunction or failures within the system. Note that this warning does not apply to hot-plug devices.

■ Check that the removable media drive access lamp is unlit before turning off the system or ejecting the media. Doing so avoids damaging the data stored on the media.

■ When you turn off the system, wait at least 10 seconds before turning it on again. Cycling the power immediately may cause malfunctions or failures in the system.

■ Power off the system and unplug the power cord before relocating the system. Moving the system while it is powered on may cause malfunctions or failures in the system.

■ Clean the system regularly. Regular cleaning prevents failures of the system and of its components.

■ Lightning may cause a momentary voltage drop. To prevent this problem, we recommend you install an uninterruptible power supply unit.

■ Only use options qualified for the system. An option we did not qualify may be installed in or connected to the system, but it may fail to operate normally or even cause failures that will not covered by the warranty.

Powering On your System

⚠ Caution

Never turn off the system before the characters following the Boot-BIOS logo are displayed on the screen.

Power on your system as follows.

1. Make sure all external devices, such as a video display, keyboard, and mouse (optional) have been connected, and that their power cords are connected.
2. Power on the video display and any other external devices.

   📝*Note: If the system power cord(s) is connected to a power control unit such as an UPS (Uninterruptible Power Supply) make sure that the power control unit is powered on.*

3. If applicable, open the door behind which the power button is located.
4. Press the POWER button to power on the system. The POWER lamp lights green. If it is does not light, make sure that the ac power cord is connected to a functional ac power source.

After a few seconds your system begins the internal Power-On Self Tests (POST). The POST automatically checks the system board, CPU(s), memory, keyboard, mouse, and most installed peripheral devices. It also displays the start message of the BIOS setup utility.

The POST check results should be especially monitored in the following cases:

■ When the system is being used for the first time.

■ When the system appears to fail.

■ When the system beeps many times between power-on and the OS start-up.

■ When an error message appears on the screen.

   📝*Note: For error messages that appear on the display unit, <u>see "Error Messages" on page 283</u>.*

⚠ **Caution**

Always allow the POST to complete before powering down your system.

If you have problems powering on your system, .

If an operating system was factory-installed on your system, you can start using it.

If not, insert the ExpressBuilder disc into the optical disc drive, reboot the system and follow the screen prompts to run ExpressBuilder.

Powering Off your System

To turn the system power off:

1. Shutdown the operating system (OS). In most cases, this will shut down the system after a few seconds (the POWER lam turns off). This is called a software power-off.

    If necessary, press the POWER switch on the front of the computer chassis again to power off the system. The POWER lamp turns off.
2. Power off the peripheral devices.

    Note: *If the system power cord is connected to a power control unit such as an UPS (Uninterruptible Power Supply), refer to the UPS user's guide for proper power-off procedures.*

Forcing a Power Shutdown

A forced power shutdown can be used when performing a soft power-off or pressing the power on/off switch does not power off the system.

To perform a forced power shutdown, press on the power on/off switch located on the front panel of the system for at least 4 seconds to force the system power off.

To power on after a forced shutdown, wait at least 10 seconds and then power on again.

Resetting the System

There are two ways to reset the system.

⚠ Caution

Resetting the system clears the DIMM memory and the data in process. To reset the system when it is not frozen, make sure that no processing is in progress.

■ Soft reset

If the system halts before starting the OS, press and hold **Ctrl** and **Alt** and press **Delete**. This restarts the system.

■ Hard reset (depending on your configuration)

Press the reset button at the front of the system. (*See "Forcing a Power Shutdown" on page 115.*)

Configuring Your System

Configuration and setup utilities are used to change your system configuration.

■ RAID Configuration Utilities

Depending on your configuration (SATA, SCSI, SAS, combination of these) and on your disk drive controller, one or several RAID Configuration Software Utilities may be available on your system. These software utilities may allow you to perform some of the following actions: configure the RAID level, setup arrays, format the drives, etc.

■ BIOS Setup Utility

You can configure your system, as well as option boards you may add to your system, using the BIOS Setup Utility. Several unique system parameters are configured using the BIOS Setup, which is stored in the system FLASH memory.

If your system has been factory configured, the BIOS Setup Utility does not need to be run unless you want to change the password or security features, add certain types of option boards or devices, or upgrade your system board.

For more information about the BIOS Setup Utility, see *"BIOS Setup Utility" on page 288*.

Configuring RAID

RAID Configuration Utility

The RAID (Redundant Array of Inexpensive Devices) option available for your system is either a RAID controller board, a RAID chipset on the motherboard, or both (depending on your configuration) which gives your system the added security of fault tolerance.

■ If you want to change the RAID level or add additional hard disk drives to the array, use the RAID configuration utility. The RAID configuration utility is included with the RAID controller.

■ If you are adding the RAID controller to an existing system, the RAID configuration utility allows you to configure your disk array before reinstalling your network operating system. The RAID controllers support various versions of RAID technology (referred to as RAID levels). To use any RAID level, you must configure the RAID controller using the RAID configuration utility prior to installing your Network Operating System.

For an explanation of this utility, check this user's guide for basic informations, and refer to the documentation that comes with the RAID controller (the manufacturer's documentation is generally included on the ExpressBuilder disc). It describes RAID technology and provides tips on making your array perform well in your specific application. It also covers array hardware preparation, configuration, and initialization. After completing the steps in the manual, you can install your Operating System.

RAID Levels

RAID Configuration	Number of required hard disk drives
RAID 0	2
RAID 1	2
RAID 10	4
RAID 5	3

RAID 0 and RAID 1

■ RAID0 (striping)

When a logical drive is striped, the read and write blocks of data are interleaved between the sectors of multiple disk drives. Performance is increased, since the workload is balanced between drives or "members" that form the logical drive.

Identical drives are recommended for performance as well as data storage efficiency. The logical drive's data capacity is equal to the number of drive members multiplied by the smallest logical drive member's capacity.

RAID 0 Stripe interleaves data across multiple drives For example, one 100GB and three 120GB drives will form a 400GB (4 x 100GB) logical drive instead of 460 GB.

⚠ **Warning**

■ RAID0 does not have data redundancy. When a hard disk drive failure occurs, data cannot be restored.

■ Logical capacity of the array becomes a multiple of the connected hard disk drive.

■ RAID1 (mirroring)

When a logical drive is mirrored, identical data is written to a pair of disk drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first.

With RAID 1, if one disk drive fails or has errors, the other mirrored disk drive continues to function. This is called Fault Tolerance. Moreover, if a spare disk drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive.

Due to the data redundancy of mirroring, the capacity of the logical drive is only the size of the smallest disk drive. For example, two 100GB disk drives which have a combined capacity of 200GB instead would have 100GB of usable storage

when set up in a mirrored logical drive. Similar to RAID 0 striping, if disk drives of different capacities are used, there will also be unused capacity on the larger drive.

⚠ **Warning**

■ RAID1 reads or writes data to/from the several hard disk drives at the same time. The disk access performance is lower than the single disk.

■ Logical capacity of the array is equal to one hard disk drive connected.

Raid 10 & RAID 5

These RAID levels may also be available on your system. Browse through the next sections of this User's Guide for more information.

■   RAID 10

Mirror/Stripe combines both of the RAID 0 and RAID 1 logical drive types. It can increase performance by reading and writing data in parallel while protecting data with duplication. At least four disk drives are needed for RAID 10 to be installed.

With a four-disk-drive logical drive, one drive pair is mirrored together then striped over a second drive pair.

The data capacity is similar to a RAID 1 logical drive, with half of the total storage capacity dedicated for redundancy. An added plus for using RAID 10 is that, in many situations, such a logical drive offers double fault tolerance. Double fault tolerance may allow your logical drive to continue to operate depending on which two disk drives fail.

■   RAID 5

RAID level 5 organizes data across the disk drives of the logical drive, and distributes parity information across the disk drives along with the data blocks.

This organization allows increased performance by accessing multiple disk drives simultaneously for each operation, as well as fault tolerance by providing parity data. In the event of a disk drive failure, data can be re-calculated by the RAID system based on the remaining data and the parity information.

The adjustable block size of the RAID 5 logical drive allows for performance tuning based on the typical I/O request sizes for your system. The block size must be set at the time the logical drive is created and cannot be adjusted dynamically.

RAID 5 makes efficient use of hard drives and is the most versatile RAID Level. It works well for file, database, application and web servers.

The capacity of a RAID 5 logical drive is the smallest disk drive size multiplied by the number of disk drives, less one. Hence, a RAID 5 logical drive with four 100 GB disk drives will have a capacity of 300 GB. A logical drive with two 120 GB disk drives and one 100 GB disk drive will have a capacity of 200 GB.

RAID Configuration using Intel Matrix Storage Manager

Description

The Intel Matrix Storage Manager software provides the following features:

■ Serial ATA RAID driver providing high performance RAID 0, fault-tolerant RAID 1, high capacity & fault-tolerant RAID 5, high performance & fault-tolerant RAID 10, and matrix RAID for the benefits of two RAID volumes on a single array.

■ Advanced Host Controller Interface support for RAID and non-RAID Serial ATA drives, providing Native Command Queuing performance benefits, as well as Native Hot Plug capability.

■ Migration Feature, allowing migration from a single-drive (also known as "RAID Ready") configuration to a RAID 0, RAID 1, RAID 5, RAID 10, or matrix RAID configuration. The ability to migrate from a RAID 0, RAID 1, or RAID 10 configuration to RAID 5 is also available. The migrations do not require a reinstallation of the operating system.

■ 3 and 4-drive RAID 0 support, allowing the user to continue to scale the performance benefits of RAID 0.

Enabling RAID in the BIOS

RAID should first be enabled in the BIOS before you can configure it. *See "Using the BIOS Setup Utility" on page 288.*

Entering the Intel Matrix Storage Manager

During the Power-On Self Test (POST), the following message will appear for a few seconds:

Press CTRL+I to enter the Configuration Utility

Press the <Ctrl> and <i> keys simultaneously to enter the RAID Configuration Utility.

📰 **Note**: *If you cannot see this message during POST, press F2 during boot to open the BIOS Setup Utility, and disable the Quiet Boot Setting on the Main Menu. Save the settings, exit the BIOS Setup Utility and reboot your system.*

Creating a RAID Volume

1. Select option 1 *Create RAID Volume* and press the **Enter** key.

2. Type in a volume name and press **Enter**, or simply press **Enter** to accept the default name.

3. Select the RAID level by scrolling through the available values (RAID 0, RAID 1, RAID 5, RAID 10) by using the arrows keys.

4. Press **Enter** after you have selected the desired RAID level.

5. Unless you have selected RAID 1, select the strip value for the RAID array by scrolling through the available values by using the arrows keys and pressing Enter. The available values range from 4 KB to 128 KB in power of 2 increments. The strip value should be chosen based on the planned drive usage. The default selection is 128 KB for RAID 0 and RAID 10 volumes, and 64KB for RAID 5 volumes.

6. Press **Enter** to select the physical disks. This will bring up another dialog.

7. Select the appropriate number of hard drives by scrolling through the list of available hard drives by using the arrows keys and pressing **Space** to select the drive. When you have finished selecting hard drives, press **Enter**.

8. Select the volume size.

9. At the Create Volume prompt, press **Enter** to create the volume. Confirm this selection by pressing **Enter** after the prompt.

10. Scroll to option 4 *Exit* and press **Enter** to exit the RAID Configuration utility. Confirm the exit by pressing **Y**.

📝 **Note**: *To change any of the information before the volume creation has been confirmed, you must exit the Create Volume process and restart it. Press* **Esc** *to exit the Create Volume process.*

Deleting a RAID Volume

⚠️ Warning

All data on the RAID drives will be lost unless the volume that is selected is a RAID 1 volume.

---

1. Select option 2 *Delete RAID Volume* and press **Enter** to delete the RAID volume.

2. Use the up and down arrow keys to select the volume you would like to delete.

3. Press **Delete** to delete the RAID volume. Confirm the volume deletion by pressing **Y**.

Resetting Disks to Non-RAID

> 📑 **Note:** *Possible reasons to 'Reset Disks to Non-RAID' could include issues such as incompatible RAID configurations, a failed volume or a failed member of a RAID 0 volume.*

> ## ⚠️ **Warning**
>
> All data on the RAID drives and any internal RAID structures will be lost unless the drives are members of a RAID 1 volume. Resetting drives that are members of a RAID 1 volume to non-RAID will not result in the loss of data on those member drives.

1. Select option 3 '*Reset Disks to Non-RAID*' and press **Enter** to delete the RAID set and remove any RAID structures from the drives.

2. In the selection screen, use **Space** to select the drives you would like to reset. Press **Enter** after selecting the drives.

3. Confirm the selection by pressing **Y.**

RAID Configuration using the Intel® Embedded Server RAID BIOS Configuration Utility

Description

The Intel® Embedded Server RAID BIOS Configuration utility allows a user to:

■   Create, add, modify, and clear logical drive configurations.

■   Initialize or rebuild the configured drives.

■   Set the boot drive.

■   Create a global hotspare drive.

■   View physical and logical drive parameters.

■   View and set adapter properties, including consistency check and auto-resume.

SATA and SAS systems use different versions of the Intel Embedded Server RAID BIOS Configuration utility, but both versions use the same keystrokes and contain identical menus. The utility menus show limited help at the bottom of the screen and selections are chosen with the arrow keys and the space bar. A warning is displayed if there is no logical drive available to be configured.

Enabling RAID in the BIOS

RAID should first be enabled in the BIOS before you can configure it. For more information, refer to *"BIOS Setup Utility" on page 288.*

Entering the Intel Embedded Server RAID BIOS Configuration Utility

When the SATA RAID or SAS RAID options are enabled in the server BIOS, an option to enter the Intel Embedded Server RAID BIOS Configuration utility displays during the server boot process. To enter the utility, press the <Ctrl> + <E> when prompted.

> 📄 **Note**: *The onboard SAS and SATA RAID features are optional. Depending on your configuration, they may or may not be available on your system.*

Setting Up the RAID Feature

Please refer to the *Intel® Embedded Server RAID BIOS Configuration Utility Software Guide* included on the ExpressBuilder disc for more information.

RAID Configuration using the MegaRAID Configuration Utility

Use this utility to set up the RAID configuration of your hard disk drives.

📰 **Notes**:

For more information, refer to the specific documentation included on the ExpressBuilder DVD-ROM.

RAID Configuration using the Universal RAID Utility

Use this utility to set up the RAID configuration of your hard disk drives.

> **Notes**:
>
> *For more information, refer to the specific documentation included on the ExpressBuilder DVD-ROM.*

Configuring the BMC

Overview

The servers' Integrated Baseboard Management Controller (iBMC) provides the ability for IPMI-based management systems to monitor and retrieve information from the server 'Out-Of-Band', independent of whether any operating system is running.

To permit management systems to do this it is necessary to configure the BMC with an IP address and user credentials. This is done using the *SYSCFG* (System Configuration) command line utility.

An additional Windows application, *SELVIEW* (System Event Log Viewer) is provided to view the contents of the BMC's System Event Log.

Installation

Windows

Windows-based *SYSCFG* and *SELVIEW* utilities are provided on the ExpressBuilder DVD. These can be found in the `\BMC\Windows` directory.

To install these utilities, copy the contents of the `\BMC\Windows` directory of the DVD and its'subdirectories to a suitable directory on the server, for example, `C:\BMC`.

IMB Driver Installation

To use the Windows BMC utilities it is necessary to first install the *Intelligent Management Bus* (IMB) device driver. This driver provides the Operating System with access to the BMC.

To install the IMB device driver, run `\BMC\IMBDRIVER\SETUPIMB.EXE`

Once installed, the device can be seen in the *Device Manager* under the *System Devices* section.

Linux

Refer to the release notes in the `\BMC\Linux\<version>\SysCfg` directory for instructions on installing the Linux version of the *SYSCFG* utility.

SYSCFG

The *SYSCFG* command line utility is used to configure the IP address and user credentials of the BMC. Although Windows and Linux versions of this utility are provided, their command syntax is the same.

The following commands can be used to change the required parameters.

> 📄 **Note**: *These commands must be run from the directory containing the SYSCFG.EXE program.*

IP address Configuration

> 📰 **Note**: *The IP address of the BMC operates independently of any operating system IP address and must be unique to avoid conflicts.*

IP address

Syntax: `syscfg /lhi <IP-address>`

Example: ***syscfg /lhi 192.168.1.10***

Subnet Mask

Syntax:`syscfg /lsm <subnet-mask>`

Example: ***syscfg /lsm 255.255.255.0***

Default Gateway

Syntax:`syscfg /lgi <gateway-IP-address>`

Example: ***syscfg /lgi 192.168.1.254***

To confirm the LAN configuration details, use the following command:

Syntax:`syscfg /d lan 1`

Example:

```
C:\BMC\SysCfg>syscfg /d lan 1
LAN Configuration Settings:
---------------------------
LAN Channel Selected: 1
LAN Alert Destination Index Selected: None. LAN
Alert Configuration will not be displayed.

IP Address Source: Static
BMC Host IP Address: 192.168.1.10
Subnet Mask: 255.255.255.0
Gateway IP Address: 192.168.1.254
Gateway MAC Address: 00-00-00-00-00-00
Backup Gateway IP Address: 0.0.0.0
Backup Gateway MAC Address: 00-00-00-00-00-00
Community String: AMI
Gratuitous ARP Enable: Disabled
Gratuitous ARP Interval (milliseconds): 0
BMC ARP Response Enable: Enabled
```

User Details

Five users can be defined within the BMC. By default, these users are configured as follows:

User #	User Name
1	`Anonymous User`
2	`root`
3	`test1`
4	`test2`
5	`test3`

To view the configuration of a particular user, use the following command:

Syntax:`syscfg /d user <user#> 1`

Examples:

```
C:\BMC\SysCfg>syscfg /d user 2 1
User Configuration Settings:
----------------------------
User ID Selected: 2
Channel Selected: 1


User Name: root
User Status: Enabled
Privilege Level Limit: Admin
SOL Enable: Enabled


C:\BMC\SysCfg>syscfg /d user 5 1
User Configuration Settings:
----------------------------
User ID Selected: 5
Channel Selected: 1


User Name: test3
User Status: Disabled
Privilege Level Limit: Admin
SOL Enable: Enabled
```

User Name

It is not possible to delete a user – only change its' name. To change the name of a user, use the following command:

Syntax:`syscfg /un<user#> <new-name>`

Example: **`syscfg /un5 necuser`**

User Password

To change the password of a user, run the following command:

Syntax:`syscfg /up<user#> <new-password>`

Example: **`syscfg /up5 necpass`**

With the IP address and User IDs configured, an IPMI-based management system can now communicate directly with the BMC.

SELVIEW

SELVIEW (System Event Log Viewer) is provided to view the contents of the BMC's System Event Log and save the log to a file. This file can then be sent to a support team for analysis.

This utility is only available for the Windows Operating System.

Refer to the release notes for further information on using *SELVIEW*.

Upgrading Your System

General Safety Information

⚠ Warning

The DC push-button on/off switch on the front panel does not turn off completely the system AC power. +5vdc is present on the system board whenever the AC power cord connects the system to an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cord from the back of the chassis.

Failure to disconnect the power cord before opening your system can result in personal injury and equipment damage.

⚠ Caution

Operating your system with the covers removed can damage your system components.

For proper cooling and airflow, always replace the covers before powering on your system.

⚠ Warning

Avoid burns: If the system has been running, any installed pro-cessor and heat sink on the processor board(s) will be hot.

To avoid the possibility of a burn, be careful when removing or installing components that are located near processors.

Contact your sales representative or dealer for a list of the approved optional peripheral devices.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can ensure some ESD protection by wearing an anti-static wrist strap attached to chassis ground when handling system components. Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Equipment Log

Use the equipment log form located at the end of this manual to record the model and serial number of your system, all the installed options, and any other pertinent information specific to your system. You will need this information when configuring your system.

Tools Recommended for Upgrading Your System

Depending on the upgrade, you will need one or more of the following tools:

- Phillips screwdriver (#1 bit and #2 bit)

- Flat-head screwdriver

- Small needle nose pliers

- Pen or pencil

- ESD workstation or anti-static wrist strap (recommended)

Preparing Your System for Upgrade

To prepare your system for installation or removal of system components perform the following procedure:

1. Observe the safety and ESD precautions listed under *"General Safety Information"* and *"Static Precautions"* at the beginning of this chapter.
2. Shutdown the operating system (OS).
3. If necessary, press the power on/off switch on the front panel of the system (*See "Powering On your System" on page 112.*). The power-on LED goes out.
4. Power off the peripheral devices.
5. Unplug the system power cord(s) from the AC wall outlet(s).

📝 ***Note****: If the system power cord is connected to a power control unit such as an UPS (Uninterruptible Power Supply), refer to the UPS user's guide for proper power-off procedures.*

---

6. Unplug all the I/O cables connected to the rear panel of your system.

Cabling SATA Devices

The S-ATA Cable

Your system comes equipped with several S-ATA cables.

Both connectors go either to a drive or to the motherboard.

Figure 79: S-ATA Cable

> 📖 **Note**: *The color of the S-ATA cable and connectors may differ from the color of the cable shown in the picture.*

System Power Cables

Power cables come from the power supply and are attached to standard storage devices. System power cables vary in length and provide connector sizes to accommodate a variety of supported storage configurations. Power cable connectors are keyed to fit only in the correct position.

Depending on your configuration, the cables from the power supply are either of the:

- Molex type, and requires one of the adaptator below (included with your system),

Figure 80: S-ATA Storage Device Power Cable Adaptor

Figure 81: Slim S-ATA Storage Device Power Cable Adaptor

- or SATA type, and can be directly plugged in your SATA device.

Cabling a S-ATA Drive

All storage devices require power and DATA cable connections. Devices shipped with the system are already connected.

The following procedure explains how to attach the cables to a drive.

1. Connect the S-ATA cable connector to the matching pins on the storage device.

    ■ Take care to prevent bending drive connector pins.

    ■ Align the cable connector to the matching pins on the drive.

2. Locate an available power connector coming from the power supply.
3. Connect the appropriate power cable to the cable power adaptor.
4. Connect the power cable adaptor to the connector on the storage device.

Cabling a S-ATA Drive

Cabling SAS Devices

The SAS Cable

Your system comes equipped with one of the following SAS cables, depending on the hard disk drives controller you have selected.

> 📄 **Note**: *The color of the SAS cable may differ from the color of the cable shown in the picture.*

Refer to the instructions included in the *Installing Hard Disk Drives* or *Hard Disk Drives Cage* chapters (depending on your configuration) for more information on the motherboard to backplane connection.

Figure 82: SAS Cable (1 to 1)

Connect one end of the cable to the motherboard SAS connector, and the other end to the hard disk drives cage backplane.

Figure 83: SAS Cable (1 to 4)

A: Backplane connector
B: Motherboard connectors (numbered P1 through P4)

.
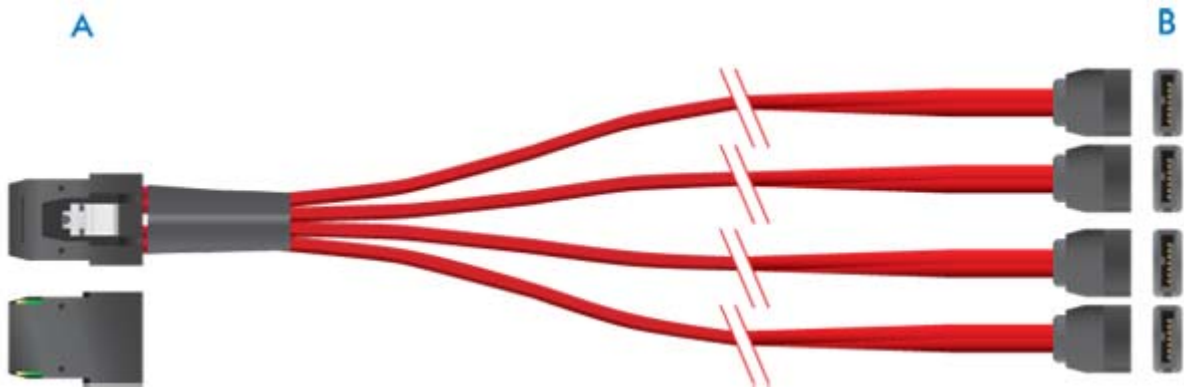
Figure 84: SAS Cable (1 to 4)

A: Backplane connector
B: Motherboard connectors
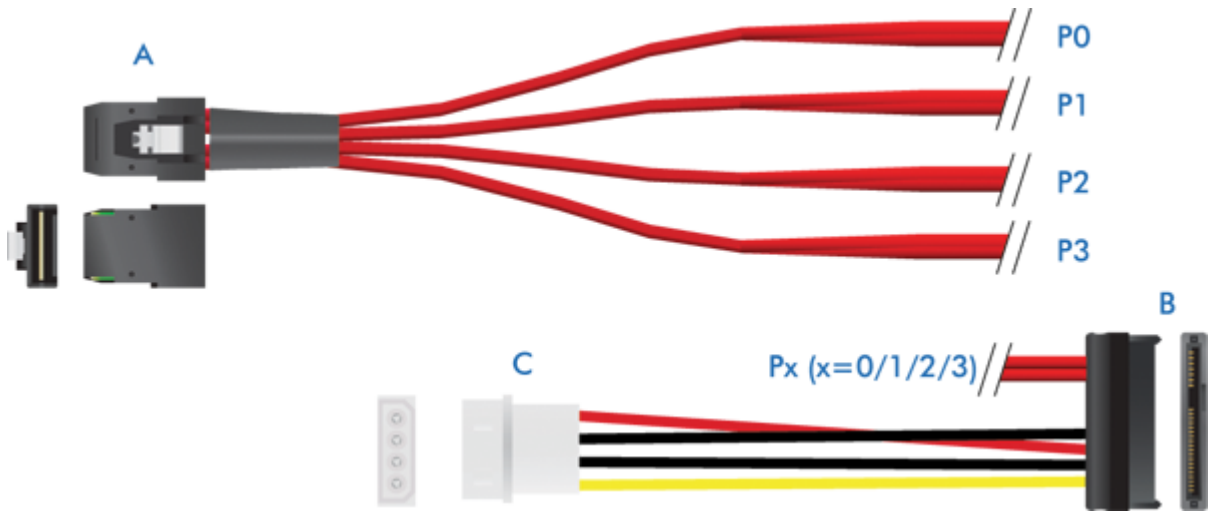
Figure 85: SAS Data and Power Cable (1 to 4)

A: Additional SAS controller (such as the LSI 8708EM2) connector
B: Hard disk drive connector
C: Power supply connector

Interrupt Requests

The factory-set interrupt requests (IRQs) are listed below. Find an appropriate one to install an optional device.

Table 7: Interrupt Requests

ISA Interrupt	Standard Function
INTR	Processor interrupt
NMI	NMI to processor
IRQ0	System timer
IRQ1	Keyboard interrupt
IRQ2	Slave PIC
IRQ3	Serial Port 1 interrupt from Super I/O device, user-configurable
IRQ4	Serial Port 1 interrupt from Super I/O device, user-configurable
IRQ5	
IRQ6	Floppy disk
IRQ7	Generic
IRQ8_L	Active low RTC interrupt
IRQ9	SCSI
IRQ10	Generic
IRQ11	Generic
IRQ12	Mouse interrupt
IRQ13	Floaty processor
IRQ14	Compatibility IDE interrupt from primary channel IDE devices 0 and 1
IRQ15	Secondary IDE cable
SMI	System Management Interrupt. General purpose indicator sourced by the Intel(R) ICH7R to the processor

⚠ Caution

When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments.

Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

NovaScale T810 E1 Upgrade

Removing or Installing the Right Side Door

The right side door provides access to the disk drive bays, to the motherboard and to the 5.25 and 3.5-inch bays.

Removing the Right Side Door

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Unlock the key lock.

Figure 86: Key lock

4. Lift the release latch on the back of your system as shown in the picture below.

Figure 87: Right Side Door Release Latch

5. Carefully slide the right side door about two centimetres towards the back of the unit. Please note that you may find this procedure easier to follow if you lay the unit on the left side.

6. Lift the right side door away from the computer

Replacing the Right Side Door

Avoid damaging your system - before replacing the right side door, make sure no cables or other devices protrude from the chassis.

📝 **Note**: *If you have previously removed the front panel, be sure to fasten it securely to the chassis before restoring the cover. The front panel must be securely connected to the chassis before you replace the cover.*

---

1. Take a few moments to examine the interior side of the cover, and notice the 2 rails on two separate edges and the 3 slots located on a third edge.
2. Leaving about 1 centimetre to slide the cover forward, lay the cover on the chassis, and check that the rail is ready to slide on its corresponding edge and that the slots are ready to fit with their corresponding metal hooks. You may find this procedure easier to follow if you lay the unit on the left side.
3. Slide the cover forward as far as it will go, and make sure the cover is properly inserted; the cover, the chassis and the front panel should fit squarely together.
4. Push the release latch down.
5. Lock the key.

Removing and Replacing the Front Panel

Removing the Front Panel

1. Remove the right side door. See *"Removing the Right Side Door" on page 139*

2. Locate the front panel release latches (A) and gently pull them to release the left side of the front panel.

Figure 88: Pop-in Tabs

3. Once the left side is free, pivot the front panel toward you until it is totally released.

Replacing the Front Panel

1. Insert the three tabs located on the left inside of the front panel into their respective slots. You may have to slightly pivot the front panel to aid the process.

2. Gently press on the left (outside) of the front panel until the four remaining tabs are securely inserted into their slots.

3. Replace the right side door. See *"Replacing the Right Side Door" on page 140*.

Installing or Removing a 5.25-inch Device

This section of the chapter describes how to add and remove 5.25-inch devices. You can install a CD-ROM, DVD-ROM, COMBO DVD-ROM CD-RW or DVD+R9 Drive, tape backup unit, or other 5-25 inch devices in the additional 5.25-inch bay. See the installation instructions included with those items for specific installation information.

Adding a 5.25-inch Device

1. Remove the right side door. *See "Removing the Right Side Door" on page 139.*
2. Remove the front panel. *See "Removing the Front Panel" on page 141.*
3. From the inside of the chassis, push on the desired slot cache with your left hand and hold it with your right hand outside the chassis.
4. Pivot the cache until it gets released from the frame.

> **Note**: The two tabs that hold the cache actually break: this is normal.

5. Take two slide rails marked as "CD-ROM". Slide rails come with the system in a plastic bag.
6. Attach the slide rails to the upper holes on both side of the 5.25-inch device.

Figure 89: Attaching the Slide Rails

7. Slide in the 5.25-inch device until it clicks into place.
8. Connect the cable(s) to the drive. *See "Cabling SATA Devices" on page 134.*
9. Replace the front panel. *See "Replacing the Front Panel" on page 141.*
10. Replace the right side door. *See "Replacing the Right Side Door" on page 140.*

> **Note**: Modify the BIOS Setup program to recognise the additional device. For additional information, refer to *"BIOS Setup Utility" on page 288*.

Removing a 5.25-inch device

1. Remove the right side door. *See "Removing the Right Side Door" on page 139.*
2. Remove the front panel. *See "Removing the Front Panel" on page 141.*
3. Unconnect the cable(s) from the 5.25-inch device.
4. Press both slide rails ends (A) to release the 5.25-inch device
5. Pull the 5.25-inch device out of the frame.
6. Replace the front panel. *See "Replacing the Front Panel" on page 141.*
7. Replace the right side door. *See "Replacing the Right Side Door" on page 140.*

Installing or Removing a 3.5-inch Floppy Disk Drive

Removing a 3.5-inch Floppy Disk Drive

1. Remove the right side door. *See "Removing the Right Side Door" on page 139.*
2. Remove the front panel. *See "Removing the Front Panel" on page 141.*
3. Disconnect the cables from the floppy disk drive.
4. Press both slide rails ends to release the floppy disk drive
5. Pull the floppy disk drive out of the frame.
6. Replace the front panel. *See "Replacing the Front Panel" on page 141.*
7. Replace the right side door. *See "Replacing the Right Side Door" on page 140.*
8. Set the floppy disk drive aside.

Installing a 3.5-inch Floppy Disk Drive

1. Remove the right side door. *See "Removing the Right Side Door" on page 139.*
2. Remove the front panel. *See "Removing the Front Panel" on page 141.*
3. Take two slide rails marked as "FDD". Slide rails come with the system in a plastic bag.
4. Attach the slide rails to the holes on both sides of the floppy disk drive.

Figure 90: Attaching the Slide Rails

5. Slide in the floppy disk drive.
6. Connect the data cable to the floppy disk drive with the marked edge toward pin 1 of the drive.
7. Connect the power cable to the drive.
8. Replace the front panel. *See "Replacing the Front Panel" on page 141.*
9. Replace the right side door. *See "Removing the Right Side Door" on page 139.*

> ✎ **Note**: *Modify the BIOS Setup program to recognise the additional device. For additional information, refer to "BIOS Setup Utility" on page 288.*

Installing or Removing Hard Disk Drives

Removing a Hard Disk Drive

1. Remove the right side door. *See "Removing the Right Side Door" on page 139.*

2. Loosen the screw (A) securing the HDD bracket and the 3.5/5.25-inch bracket together.

3. Locate the HDD bracket latch (B).

Figure 91: HDD Bracket Screw and Latch

4. Disconnect the data cable and the power cable from each installed hard disk drive.

⚠ Caution

Be careful when working around the cables connected to the already installed drives.

If necessary disconnect these cables, but be sure to note which device each cable or power lead was attached to.

---

5. Both holding the HDD bracket and pressing down the latch, gently slide the HDD bracket out of the chassis.

Figure 92: Sliding the HDD Bracket out

6. The hard disk drive is secured to the bracket with 3 screws located on both sides of the hard disk drive. Remove these screws, and slide the hard disk drive out of the bracket.

7. Set the hard disk drive aside.

Installing a Hard Disk Drive

⚠ Caution

Make sure to install hard disks starting from the upper slot.

---

1. Refer to the information provided with the hard disk drive for pre-installation instructions.

2. Remove the right side door. *See "Removing the Right Side Door" on page 139.*

3. If applicable, disconnect the cable(s) of the installed hard disk drives.

4. Loosen the screw (A) securing the HDD bracket and the 3.5/5.25-inch bracket together.

5. Locate the HDD bracket latch (B).

Figure 93: HDD Bracket Screw and Latch

⚠ **Caution**

Be careful when working around the cables connected to the already installed drives.

If necessary disconnect these cables, but be sure to note which device each cable or power lead was attached to.

---

6. Notice the screw holes located on each side of the HDD bracket, and the corresponding screw holes located on the hard disk drive you mean to install. Making sure the screw holes will line up, slide the hard disk drive into one of the available slots, connectors last.

7. Secure screws into the three side screw holes of the hard disk drive.

8. Slide the HDD bracket into its original place.

9. Secure the screw loosened in step 5.

10. Connect the cable(s) to their respective hard disk drives.

11. Replace the right side door. *See "Replacing the Right Side Door" on page 140.*

📑 **Note**: *Modify the BIOS Setup program to automatically recognise the hard disk drive. For additional information, refer to "BIOS Setup Utility" on page 288.*

Installing and Removing an Expansion Card

Your computer's motherboard features several expansion slots that can accommodate accessory expansion cards, such as a SCSI board or a RAID board.

Specific Recommendations

RAID Controller

Take the following into consideration when installing either a S-ATA Disk array controller or a SCSI Disk array controller.

Refer to the manual that comes with the RAID controller for more details.

■ Prepare the hard disk drives and cables corresponding to the RAID controller to be installed.

■ Configure the Logical Settings of the hard disk drive.

■ Prepare the number of hard disk drives required for the desired RAID (Redundant Array of Inexpensive [Independent] Disks) level. *See "Configuring RAID" on page 118.*

■ Installing hard disks in the disk array configuration or changing the RAID level initializes hard disks. Make sure to backup any valuable data that may be present on the hard disk drive before installing the disk mirroring controller board and configuring the array.

■ Use hard disks of the same capacity and revolution for each pack to configure them in the array.

■ The disk array configuration improves the disk reliability. On the other hand, the disk capacity is reduced (not equal to the sum of the array's hard disks total capacity).

■ Use an appropriate RAID configuration utility to configure the RAID.

■ When the disk array controller board is replaced, restore the disk array configuration information to the new disk array controller board. Use the configuration utility for the restoration. Refer to the RAID configuration utlity specific to your card for more details.

Graphics Card

When installing 75W or greater add-in cards (especially graphics cards) in both the PCI-E x8 and x4 connectors, the add-in cards must be individually powered.

Use either of the following solutions:

■ Use available power cables from the server power supply and plug the connector onto the graphics cards.

■   Plug the graphics cards onto a specific power connector on the motherboard. *See "Motherboard" on page 34.*

⚠ **Caution**

Failure to specifically power 75W or greater add-in cards may damage both the motherboard and the add-in cards.

■   Plug the graphics cards onto a specific power connector on the motherboard. *See "Motherboard" on page 34.*

Installing an Expansion Card

1. Remove the computer right side door. *See "Removing the Right Side Door" on page 139.*

2. Locate the add-on card holder near the slot you mean to fit with an expansion card.
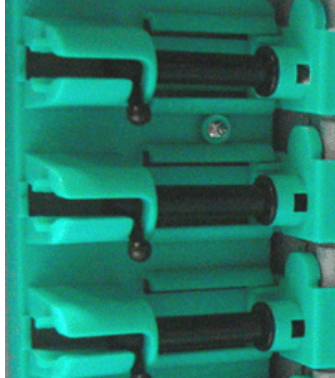
Figure 94: Add-on Card Holders

3. Pull up the relevant latch and slide it out.

4. Remove the expansion slot cover from the chassis and set it aside. Save the expansion slot cover in a safe place in case you ever need to replace it.
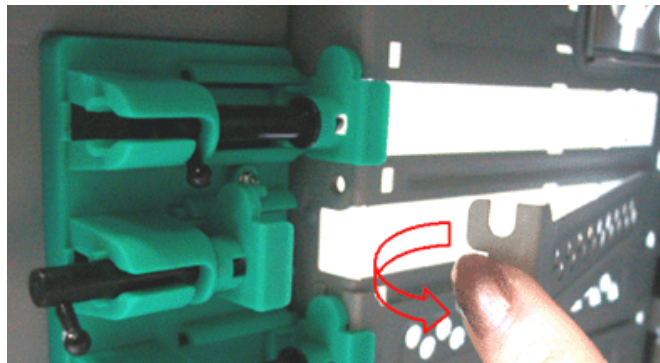
Figure 95: Removing the Expansion Slot Cover

5. Remove your expansion card from its protective packaging. Do not touch the metal "fingers" on the edge of the card.

6. Check the expansion card's documentation for any switches or jumpers that may need to be set, and set them now.

7. Carefully, but firmly, press the expansion card into the connector.

8. Replace the computer right side door. *See "Replacing the Right Side Door" on page 140.*

Removing an Expansion Card from Your System

1. Remove the computer right side door. *See "Removing the Right Side Door" on page 139.*

2. Locate the add-on card holder near the slot from which you mean to remove an expansion card.

Figure 96: Add-on Card Holders

3. Pull up the relevant latch and slide it out.

4. Do not touch any components on the card - handle it only by its edges, to avoid risk of damage from electrostatic discharge. Without flexing the motherboard, carefully unplug the card from its connector on the motherboard, and remove it from the expansion slot on the chassis' rear panel.

5. Store the expansion card in an anti-static bag (available from electronic supply stores) or a cardboard box.

6. Place an expansion slot cover in the space left by the expansion card you removed.

For more details on the location and availability of the expansion card slots on your system's motherboard, see *"Motherboard" on page 34*.

Upgrading Microprocessor

Your system is fitted with a processor installed in a socket LGA 775.

Removing a Processor

1. Open the server chassis.
2. If your chassis is a tower chassis, lay the unit on its left side, the instructions will be easier to follow.
3. Disconnect the fan cable(s) from the processor fan connector(s) on the motherboard.
4. Remove the processor heatsink:
   - Remove the four screws fastening the heatsink to the motherboard.
   - Remove the heatsink manually using a gentle rocking motion.

📄 *Note: To reassemble the heatsink:*

■ *Reset the fastener's caps to their original position.*

■ *Re-attach the cable to the cable management clips.*

---

5. Open the processor socket:
   - Use your right thumb to push down and outwards the lever in order to disengage it from the retention tab.

⚠ **Caution**

If you do not follow scrupulously these instructions, the lever can bounce back and cause bend contacts.

   - Rotate the load lever to its fully open position at approximately 135°.
   - Rotate the load lever to its fully open position at approximately 100°.
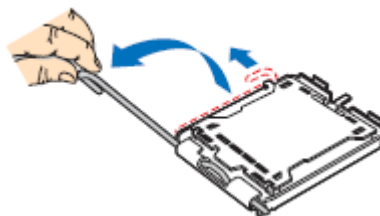
Figure 97: Opening the processor socket

6. Grasp the processor (use your index to hold the load plate side, and your thumb to hold the lever side).

7. Lift the processor straight and away.

8. Set the processor immediately in its protective cover.

   - Hold the CPU by three of its corners.

   - The chamber of the protective cover should match the connection 1 on the CPU.

   - The rentention tabs on the cover and the processor contacts should point each other.

Installing a CPU

1. Remove the processor from its shipping materials, and, if applicable, remove its protective cover.

Figure 98: Removing from the shipping materials

⚠ **Caution**

■ Do not touch the processor sensitive contacts.

■ Hold the processor by the substrate edges.

2. Locate the connection 1 indicator and the two orientation key notches on the CPU and on the socket.

3. Grasp the processor with your thumb and index finger by the orientation key notches.

4. Carefully lower down the processor into the socket body.
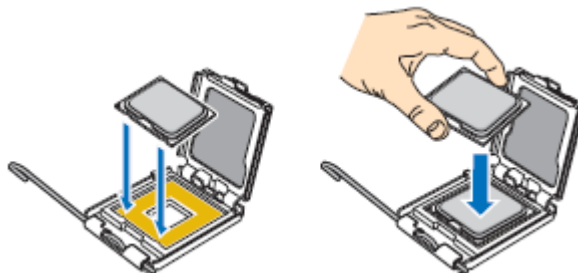
Figure 99: Installing the processor

⚠ **Caution**

Do not tilt the processor or shift it into place, doing so may damage the sensitive contacts.

5. Check that the orientation notches and the connection 1 indicator are properly fitted to the socket body.
6. Close the soket:
   - Close the load plate.
   - Press gently on the load plate and engage the load lever.
   - Secure the load lever under its retention tab.
7. Remove the heatsink from its packaging materials.
8. Place the heatsink on the processor socket.
   - Ensure that the fan cable(s) are on the closest side to the fan(s) header(s) on the motherboard.
   - Align the screws with the screwholes on the motherboard.
   - Make sure that the heatsink is completely level with the motherboard.

⚠ **Caution**

Check the following:

■ No cables are trapped or interfere with the screws.

■ The screws are perpendicular to the heatsink.

9. Secure the heatsink:
   - Hold the heatsink to prevent it from tilting, and tighten the screws.
10. Connect the fan cable(s) to the header(s) on the motherboard.
11. Secure the excess cable with a tie-wrap to ensure that the cable does not interfere with fan operation or make contact with other components.
12. Close the server chassis.

Upgrading Random Access Memory (RAM)

Recommended Memory Configuration

Refer to *"Memory Configuration" on page 40* for more information.

Checking System Memory

If you do not know how much memory is installed in your system, check the amount by using the relevant following procedure.

1. On the Windows desktop, click on **Start**, and select **Control Panel**.

2. Click on **Switch to classic view**.

3. Double click on the **System** icon, and click on the **General** tab. This tab shows the random access memory (RAM). This is the amount of system memory in your computer.

Removing and Replacing a DDR2 module

Figure 100: DDR2 Memory Module Sample

If your memory configuration requires the removal of a module, perform the following steps:

1. Remove the right side door. *See "Removing the Right Side Door" on page 139.*

2. Remove the front panel. *See "Removing the Front Panel" on page 141.*

3. Locate the memory upgrade sockets on the motherboard.

DIMM 1A
Socket

DIMM 2B
Socket

DIMM 2A
Socket

DIMM 1B
Socket

AF002309
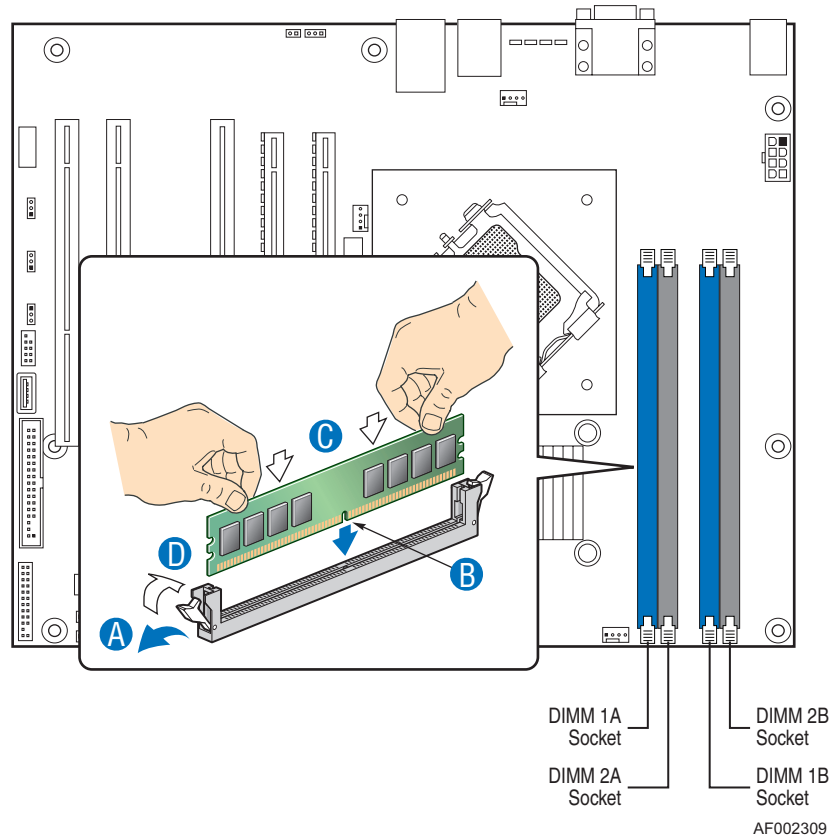
Figure 101: Upgrading the Memory

4. Press the plastic clips at the outer edge of the socket away from the memory module. This ejects the memory module from the socket (see "A" on Figure 101). Do not touch the module's metal "fingers." Store the module in an anti-static bag (available at electronic supply stores) or a cardboard box.

5. Align the new module with an empty memory socket. Make sure the notch on the module aligns with the key in the socket. The module is designed to install into the socket in only one way (see "B" on Figure 101).

6. Press the module firmly into the socket (see "C" on Figure 101). If you have difficulty installing a module, do not force it! Carefully remove the module, then check the alignment of the module's notch with the one in the socket. Then re-install the module.

7. Make sure the locking clips at either end of the module click closed (see "D" on Figure 101). If the brackets do not secure themselves to the module, carefully remove the module, then reinstall it.

8. Replace the front panel. *See "Replacing the Front Panel" on page 141.*

9. Replace the right side door. *See "Replacing the Right Side Door" on page 140.*

> 📑 **Note**: *The amount of installed memory will be automatically detected by the system.*

Replacing the Battery

All motherboards use a battery to maintain system configuration information. If it fails to maintain system configuration, replace it with an identically rated battery from the same manufacturer.

Replace the battery as described below:

⚠ Caution

Removing the battery from the motherboard causes the computer to lose system configuration information. Before removing it, run Setup and record the system configuration settings.

Use this information to restore the system after replacing the battery.

---

1. Turn off and unplug the system unit and any external options connected to the system.
2. Open the server chassis.
3. Locate the battery on the motherboard. *See "Motherboard" on page 34.*
4. Use your finger to carefully remove the battery from the battery socket on the motherboard.

⚠ Warning

The battery may explode if it is incorrectly replaced or improperly discarded.

Use only an identically rated battery from the same manufacturer.

---

5. With the positive (+) side facing up, press the new battery into the socket.
6. Close the server chassis.
7. Connect the external peripherals and the power cables.
8. Run Setup to reconfigure system parameters.

NovaScale R410 E1 Upgrade

Removing and Replacing the Front Bezel

Please note that the front bezel is optional.

Removing the Front Bezel

1. Follow the precautions listed in *"Preparing Your System for Upgrade" on page 133*.
2. Unlock the bezel.
3. Pull the bezel from the chassis.
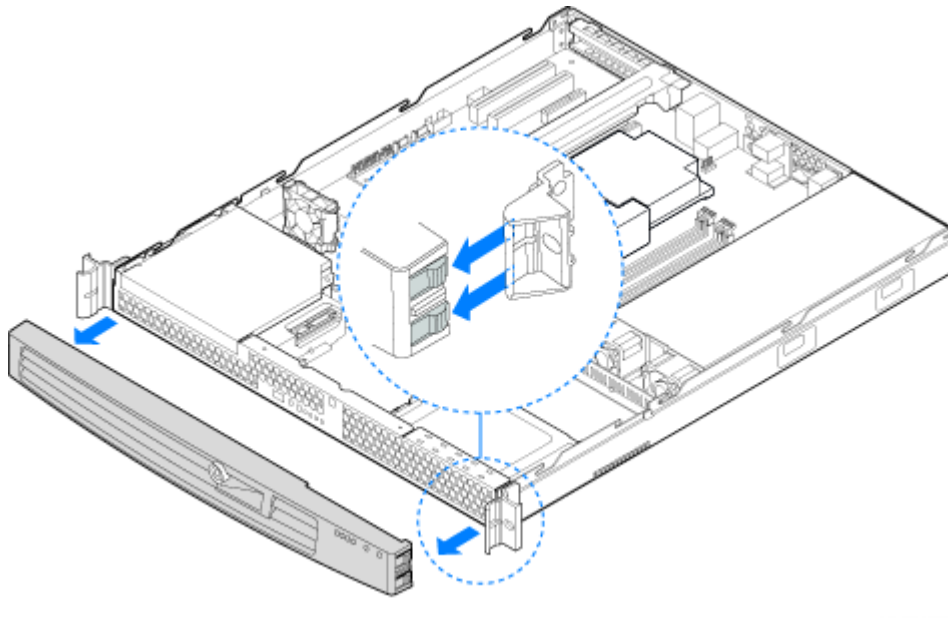
Figure 102: Removing the Front Bezel

Installing the Front Bezel

1. At each end of the bezel, line up the center notch on the bezel with the center guide on the rack handles.

2. Push the bezel onto the front of the server until it clicks into place.

3. Lock the bezel.
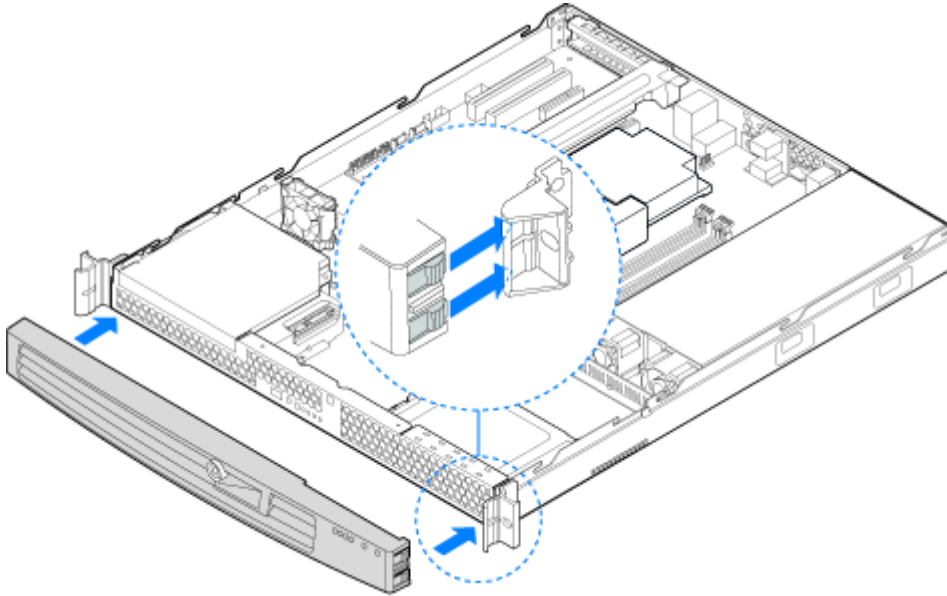
Figure 103: Installing the Front Bezel

Removing or Installing the Server Cover

The server must be operated with the server cover in place to ensure proper cooling. Remove the cover to add or replace components inside of the server.

None of the internal components are hot-swappable.

> 📄 **Note**: *Use a nonskid surface or a stop behind the server to prevent it from sliding on your work surface.*

Removing the Server Cover

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the two screws at the front of the chassis. See letter "A" in Figure 104.

4. Loosen the screw at the rear of the chassis. See letter "B" in Figure 104.

5. Push rearward on the blue grip point at the front of the server. Slide the cover back until it stops and then lift the cover upward to remove it. See letter "C" in the figure below.
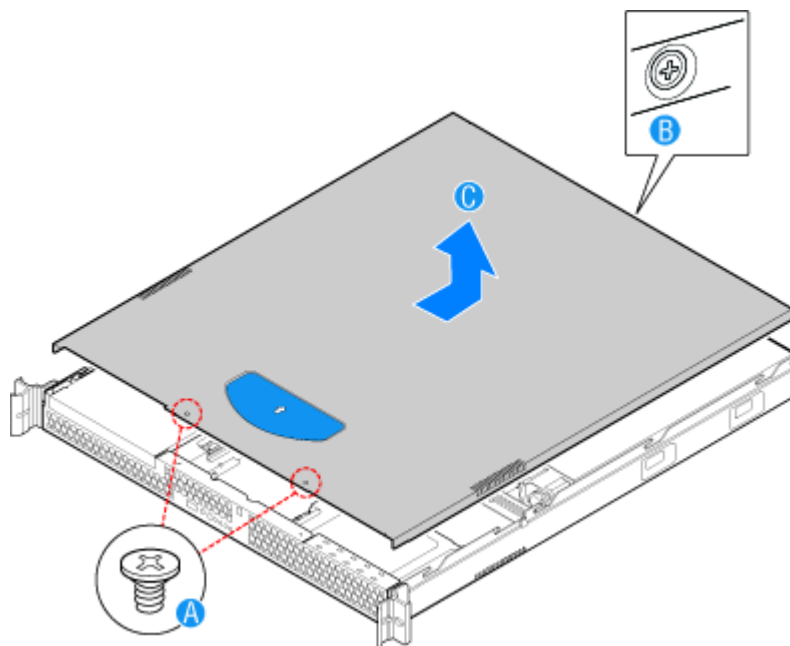
Figure 104: Removing the Server Cover

Installing the Server Cover

1. Place the cover over the server so that the side edges of the cover sit just inside the server sidewalls. Slide the cover forward. See letter "A" in Figure 105.

2. Tighten the screw at the rear of the server. See letter "B" in Figure 105.

3. Install the two screws at the front of the server. See letter "C".
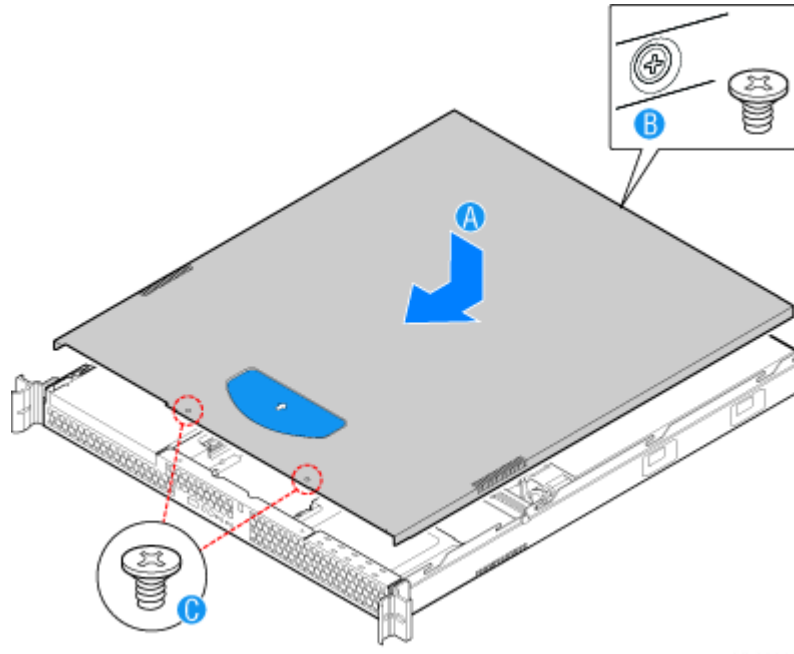
Figure 105: Installing the Server Cover

4. Reconnect all peripheral devices and the AC power cord.

Removing or Installing the Processor Duct

Always operate your server with the processor air duct in place. The air duct is required for proper airflow within the server.

Removing the Processor Air Duct

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Lift the processor air duct from its location behind the two system blower fans.
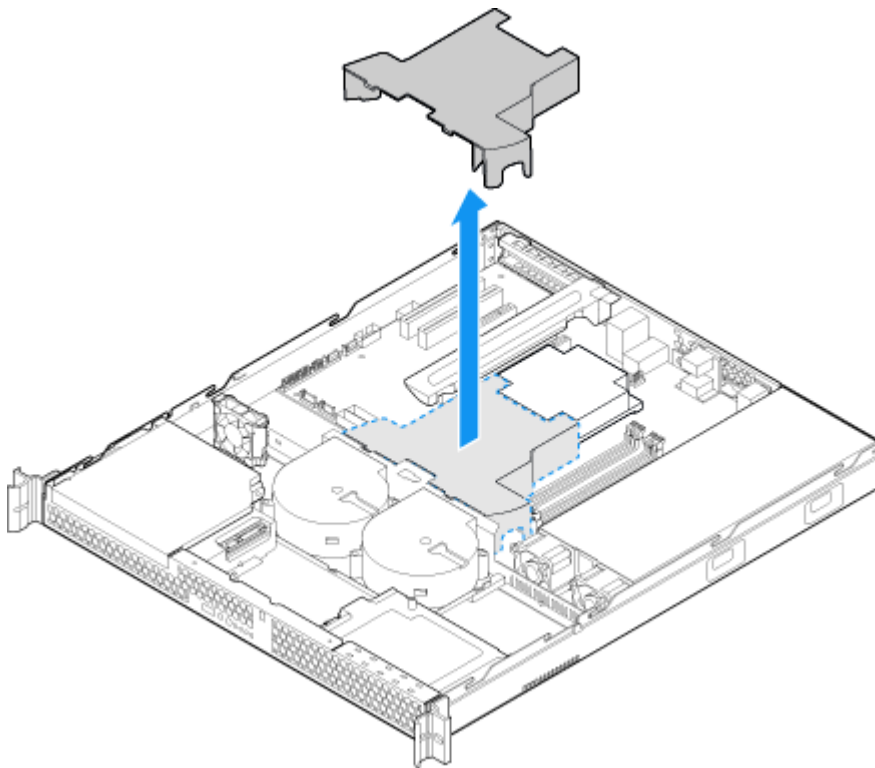
Figure 106: Removing the Processor Air Duct

Installing the Processor Air Duct

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Lower the air duct into place: insert the two hooks at the front of the processor air duct into the corresponding slots on the bracket behind the two system blower fans.

> 📑 **Note**: *Use caution not to pinch or disengage cables that may be near or under the air duct.*
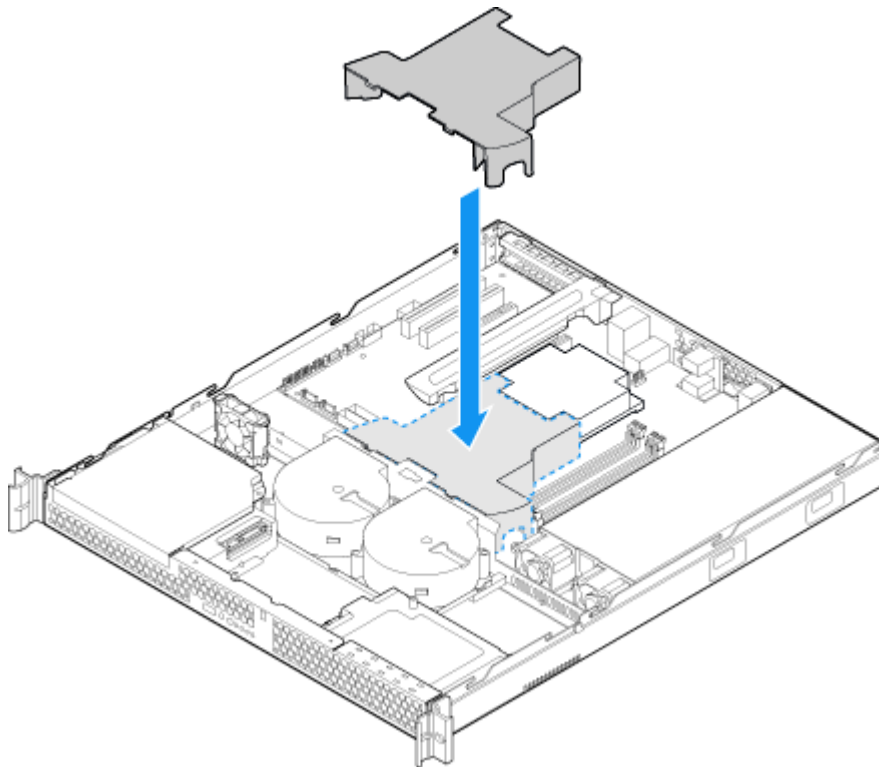
Figure 107: Installing the Processor Air Duct

5. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

Installing or Removing a 5.25-inch Device

This section of the chapter describes how to add and remove 5.25-inch devices. You can install an optical disc drive, tape backup unit, or other 5.25-inch devices in the additional 5.25-inch bay.

📄 **Note**: *Additional power and/or data cables may be included with your system. In this case, store them in a safe place, you will need them if you decide to add additional drives.*

Installing a Slimline Optical Device

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Remove the bezel if it is installed. Refer to *"Removing the Front Bezel" on page 158*.

5. Note the orientation of the PCI cooling fan that is located behind the optical drive bay, then lift the fan (letter "B") from the mounting pegs. It is not necessary to disconnect the fan cable (letter "A").
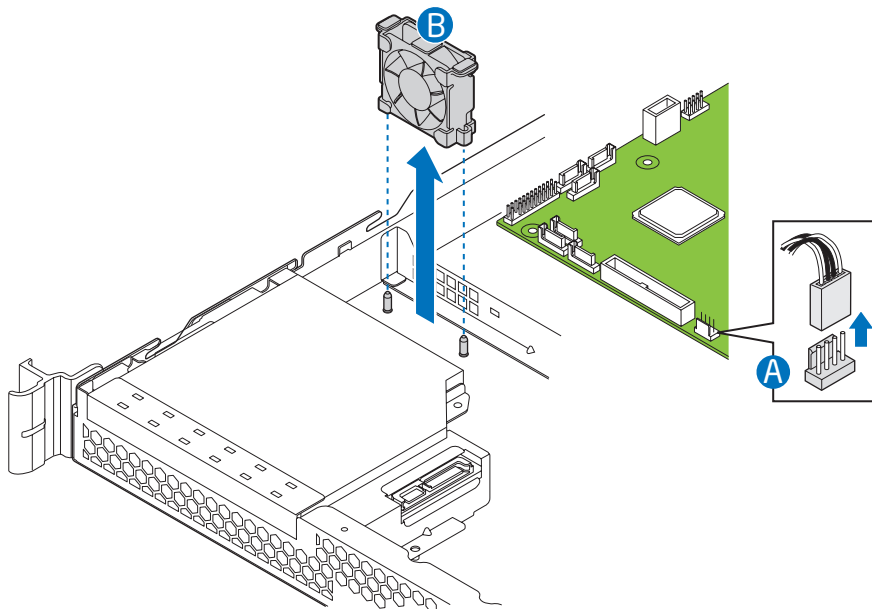
Figure 108: Lifting the PCI Cooling Fan from the Mounting Pegs

6. First time installation only: Remove the knock-out by rocking it back and forth. See letter "A" in the figure below. The knock-out cannot be reinstalled.
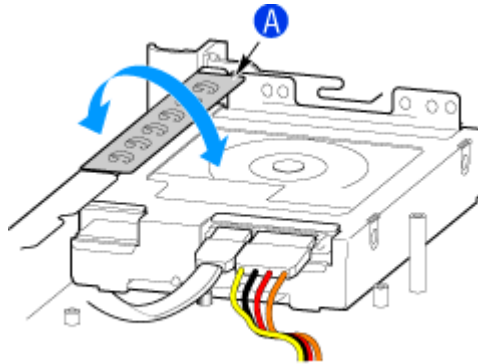
Figure 109: Removing the Knock-out from the Sheet Metal Panel

7. Attach the optical drive to the brackets using four screws.
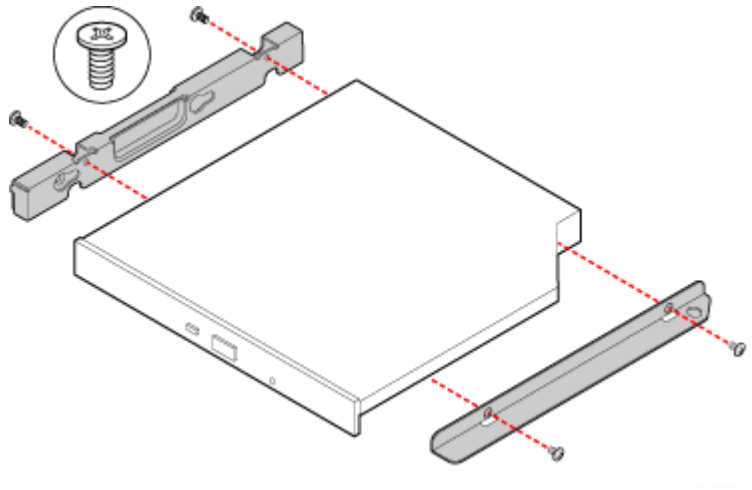
Figure 110: Attaching the Optical Drive to the Brackets

8. Slide the optical drive assembly in through the front of the chassis.

9. Reinstall the screw that you removed in step 6.

10. Connect the power and data cables on the optical drive.

11. Insert the PCI cooling fan onto the mounting pegs that are located behind the optical drive bay. The fan label should face the rear of the system. See letter "A".
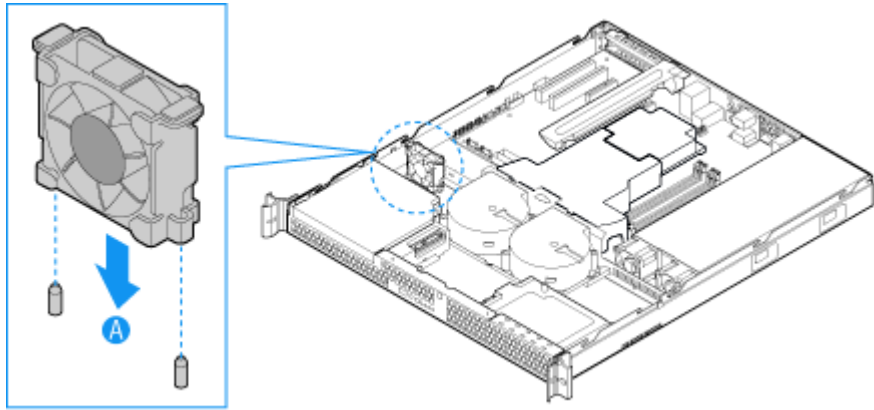
Figure 111: Installing the PCI Cooling Fan

12. Optional: replace the front bezel. Refer to *"Installing the Front Bezel" on page 159*.

13. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

14. Plug all peripheral devices and the AC power cable into the server.

> 📄 **Note**: *If necessary, modify the BIOS Setup program to recognise the additional device. For additional information, refer to "BIOS Setup Utility" on page 288.*

Removing a Slimline Optical Drive

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Remove the bezel if it is installed. Refer to *"Removing the Front Bezel" on page 158*.

5. Note the orientation of the PCI cooling fan that is located behind the optical drive bay, then lift the fan from the mounting pegs. It is not necessary to disconnect the fan cable. See letter "A" in the figure below.
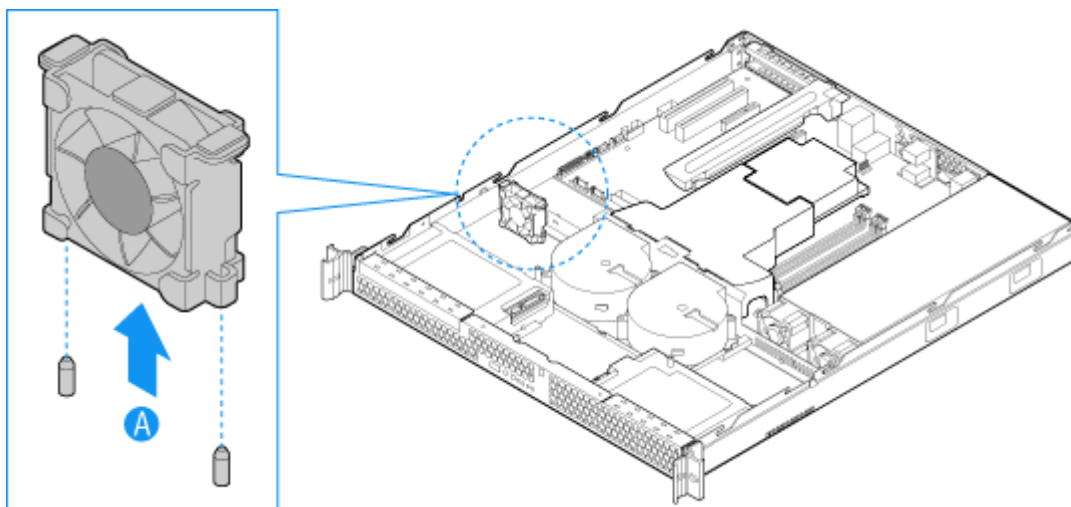
Figure 112: Lifting the PCI Cooling Fan from the Mounting Pegs

6. Disconnect the optical drive power and data cables. See letters "A" and "B" in *Figure 113*.

7. Remove the screw that holds the optical drive bracket to the server chassis. See letter "C" in *Figure 113*.

📄 **Note**: Save this screw. You will reinstall it later.

8. Slide the optical drive out through the front of the system. See letter "D" in the figure below.
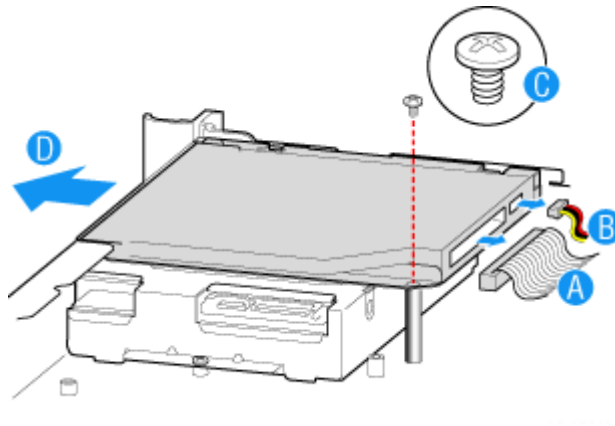
Figure 113: Removing the Optical Drive

9. Remove the four screws that hold the optical drive to the brackets as shown in the figure below. Save these screws for future use.
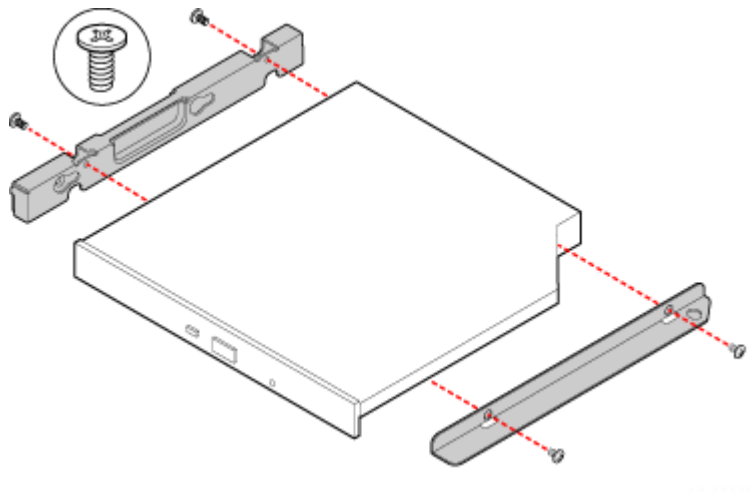
Figure 114: Attaching the Optical Drive Bracket to the Brackets

> 📝 **Note**: *If you are installing a replacement optical drive, skip the rest of these steps and instead continue with "Installing a Slimline Optical Device" on page 164, step 7.*

10. Insert the PCI cooling fan onto the mounting pegs that are located behind the optical drive bay. The fan label should face the rear of the system.
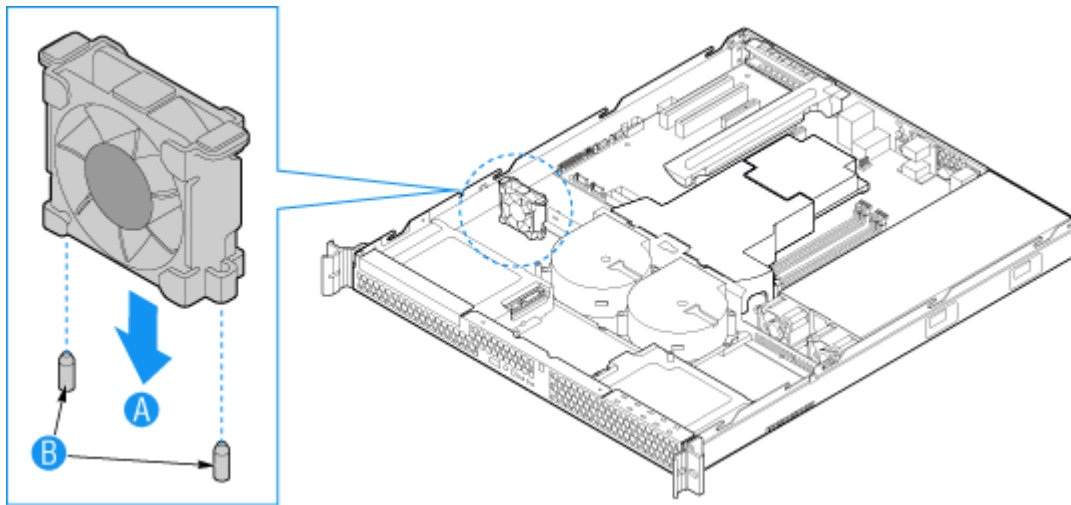
Figure 115: Installing the PCI Cooling Fan

11. Optional: replace the front bezel. Refer to .

12. Replace the server cover. Refer to .

13. Plug all peripheral devices and the AC power cable into the server.

Installing or Removing Hard Disk Drives

⚠ Caution

The hard drives are NOT hot swappable. Before removing or replacing a hard drive, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the AC power cord from the system or wall outlet.

Up to two SATA drives can be installed. The drives do not need to be installed in order; HDD1 can be installed before HDD0.

- The HDD0 drive bay is at the left side of the chassis, underneath the optional optical disc drive.

- The HDD1 drive bay is at the right side of the chassis.

Installing a Hard Disk Drive

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Locate the drive position you want to use.
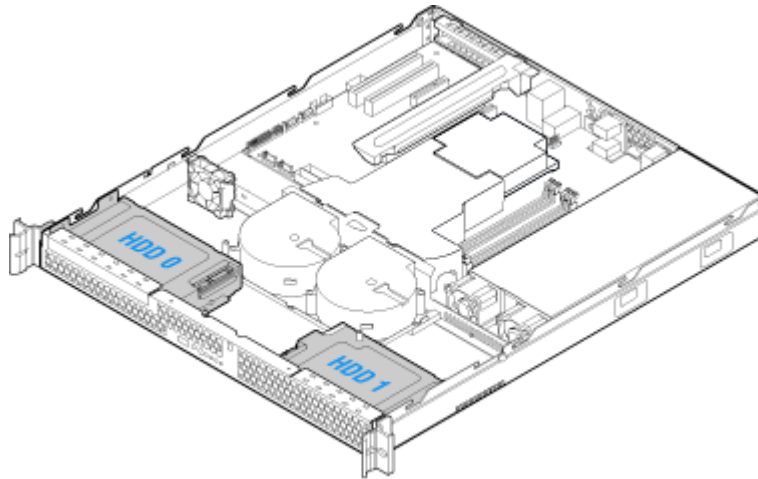
Figure 116: Locating Drive Positions

- HDD1 location only: Slide the power cables from the cable clip that is located on the top of the hard drive carrier.

5. Remove the screw that holds the hard drive bracket to the chassis. See letter "A" in the figure below.

> ✎ **Note**: *Save this screw. You will use it to reinstall the drive assembly later.*

6. Lift the drive carrier from the chassis. See letter "B" in the figure.
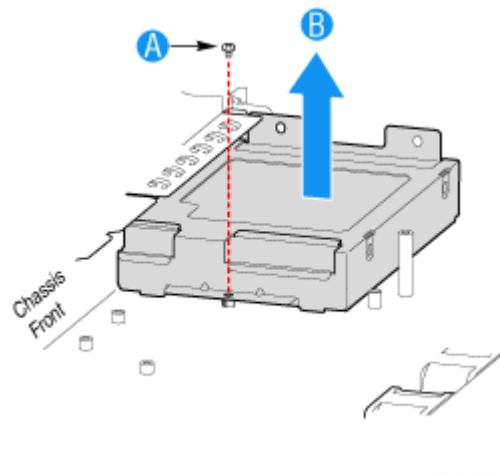
Figure 117: Removing the Drive Carrier

7. Position the drive with the drive connectors facing up, as shown by the figure below.

8. Set the drive carrier over the drive, as shown by the letter "A" in the figure. The data and power connectors must be positioned so they are accessible through the cut-out, shown by letter "B".

9. Use the four screws provided to attach the drive to the carrier. See letter "C" in the figure.
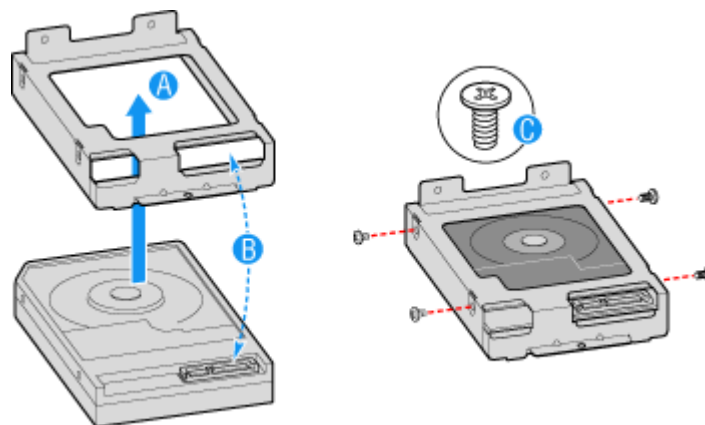
Figure 118: Installing the Drive into the Drive Carrier

⚠ Caution

Use the screws provided with the hard disk drive. Using screws longer than the required length may cause the hard disk drive to be damaged.

10. Set the drive assembly into place in the chassis. See letter "A" in the figure below.

11. Attach the drive assembly to the chassis with the screw that you removed in Step 6. See letter "B" in the figure below.

> 📧 **Note***: The assembly that contains the optical drive bracket must be installed at the left side of the system..*
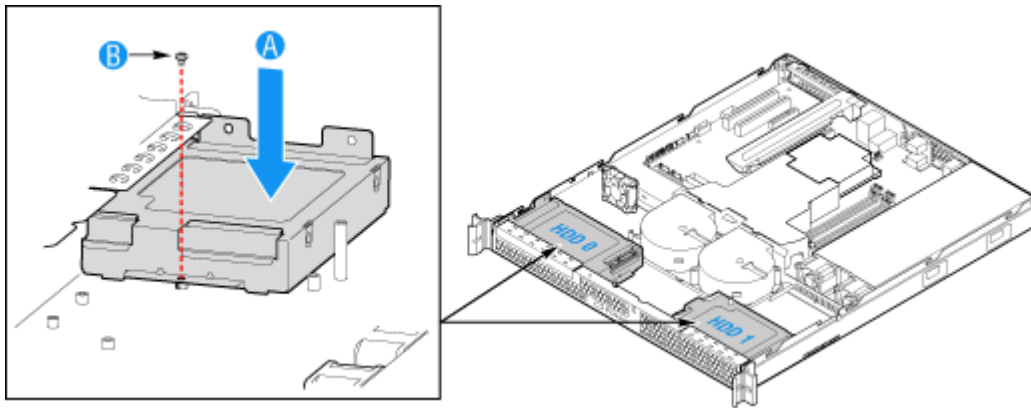
Figure 119: Installing the Drive Assembly

- HDD1 only: Route the power cable into the cable clip on the top of the hard drive bracket. See letter "A" in *Figure 120*.

12. Connect the data cables to the drive(s).

■ If a drive is installed in the HDD0 carrier, connect the HDD0 data cable to the SATA 1 connector on the server board. See letter "B" in *Figure 120*.

■ If a drive is installed in the HDD1 carrier, connect the HDD1 data cable to the SATA 2 connector on the server board. See letter "C" in *Figure 120*.

> 📧 **Note***: The data cables are factory routed underneath the fan module. Use caution to make sure you connect the connect cables between the server board and the hard drives. The cables are labeled at each end.*

13. Connect the power cables to the drive(s):

■ If a drive is installed in the HDD1 carrier, attach the connector on the daisy chain power cable that is closest to the power supply to the HDD1 connector. See letter "E" in *Figure 120*.

■ If a drive is installed in the HDD0 carrier, attach the middle connector on the daisy chain power cable to the HDD0 power connector. See letter "D" in *Figure 120*.
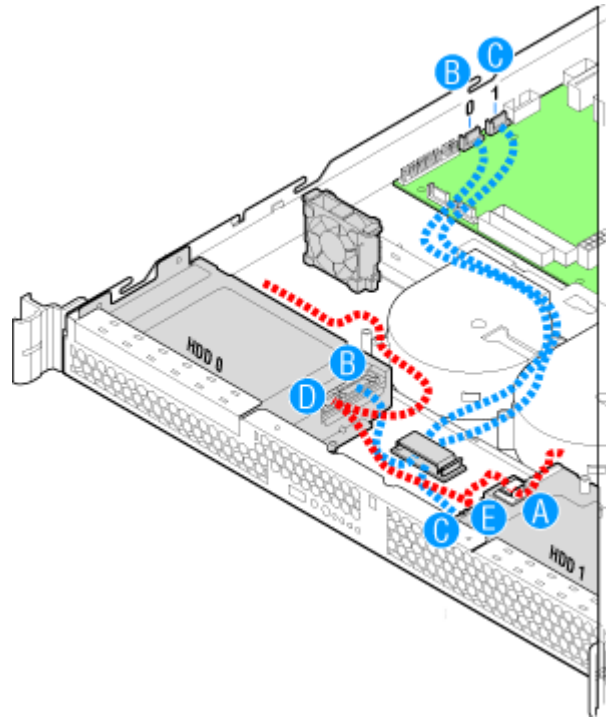
Figure 120: Connecting the Hard Drive Power and Data Cables

14. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

Removing a Hard Disk Drive

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Disconnect the power and data cables from the drive.
   - HDD1 location only: Slide the power cable from the cable clip that is located on the top of the hard drive carrier.

5. Remove the screw that holds the hard drive bracket to the chassis. See letter "A" in the figure below.

📰 **Note**: *Save this screw. You will use it to reinstall the drive assembly later.*

---

6. Lift the drive carrier from the chassis. See letter "B" in the figure.
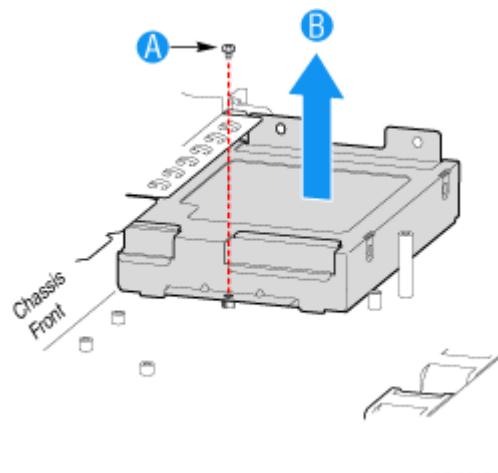
Figure 121: Removing the Drive Carrier

7. Remove the four screws that attach the hard drive to the drive carrier.

8. Lift the drive from the carrier. Store the drive in an anti-static bag.

⚠ **Caution**

About data on the hard disk drive:

Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk drive to any third parties.

Data seems to be erased when you empty the Windows "Recycle Bin" or execute the "format" command of the operating system. However, the actual data remains written on the hard disk drive, and can be restored by special software and used for unexpected purposes.

We strongly recommended you use special software or service for data erasure in order to avoid any troubles. For details on data erasure, ask your sales representative.

> 📋 **Note**: *If you are installing a new drive, skip the rest of these steps and instead see "Installing a Hard Disk Drive" on page 171, beginning with step 8.*

9. Insert the screws that held the drive in the carrier into the screw locations on the carrier for future use.

10. Set the drive assembly into place in the chassis. See letter "A" in the figure below.

11. Attach the drive assembly to the chassis with the screw that you removed in Step 6. See letter "B" in the figure below.

> 📋 **Note**: *The assembly that contains the optical drive bracket must be installed at the left side of the system.*
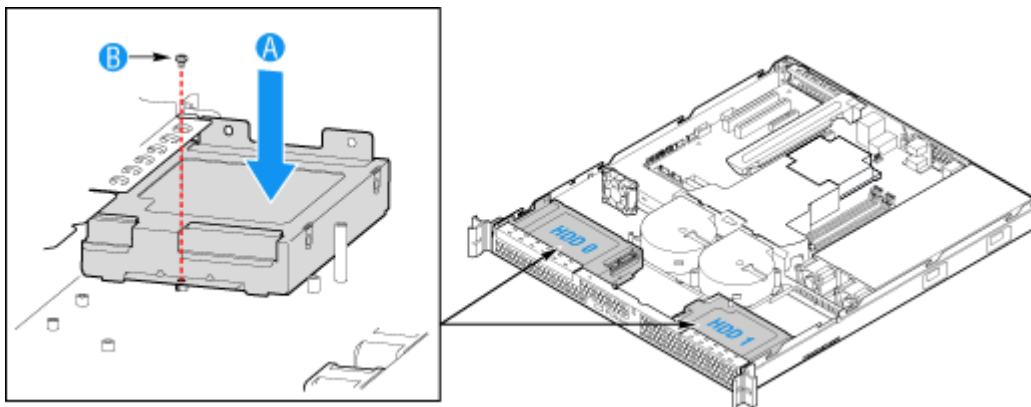
Figure 122: Installing the Drive Carrier

12. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

Installing or Removing the Motherboard

⚠️ Warning

This procedure must only be performed by a service represen-
tative certified by Bull.

Removing the Motherboard

1. Make sure the power switches for the computer, video monitor and any
   peripheral devices are turned OFF and unplug the power cord (see *"General
   Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Remove the processor air duct. Refer to *"Removing the Processor Air Duct"
   on page 162.*

5. Remove the PCI riser assembly. Refer to *"Removing the PCI Riser Assembly"
   on page 200*.

6. Disconnect all cables attached to the motherboard.

7. Remove the heatsink and processor. Refer to *"Removing a Processor" on
   page 194*.

8. Remove the memory modules. Refer to *"Removing and Replacing a DDR2
   module" on page 198*.

9. Remove the nine screws from the server board (see letter "A") and lift the server board from the server (see letter "B").
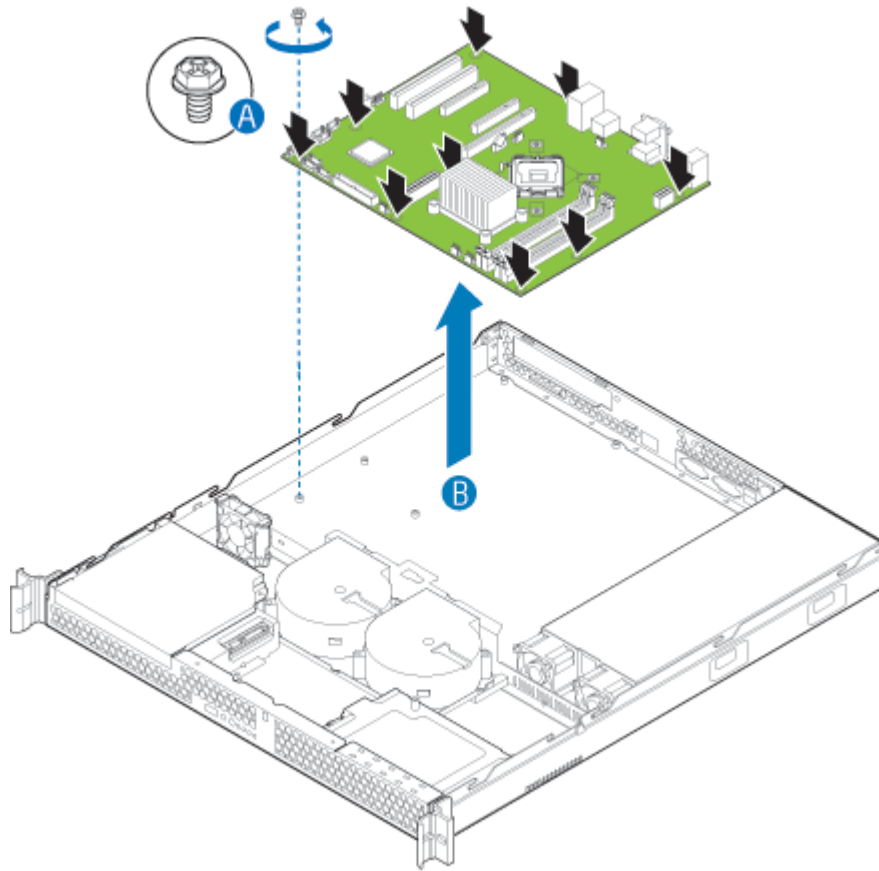
Figure 123: Removing the Server Board

10. Place the server board into the server as shown by letter "A" in Figure 124.

11. Attach the server board with nine screws. See letter "B" in the figure below.
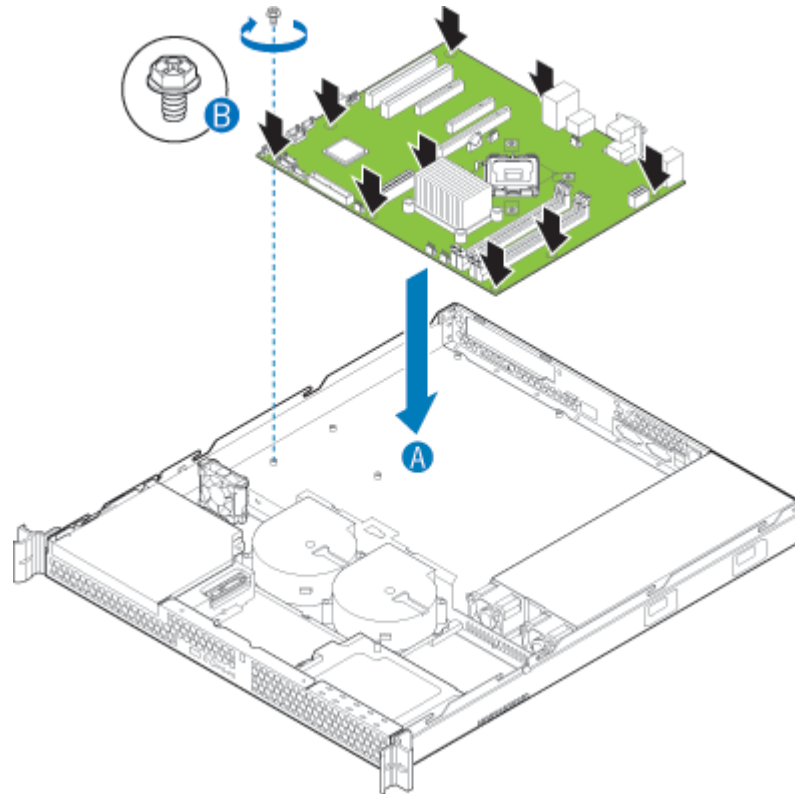
Figure 124: Installing the Server Board

12. Install the processor. Refer to *"Installing a Processor" on page 195*.

13. Install the DIMMs. Refer to *"Removing and Replacing a DDR2 module" on page 198*.

14. Install the PCI riser assembly. Refer to *"Installing the PCI Riser Assembly" on page 201*.

15. Reconnect all cables to the server board. For a full cabling diagram, refer to *"Cable Routing" on page 192*.

16. Install the processor air duct. Refer to *"Installing the Processor Air Duct" on page 163*.

17. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

18. Plug all peripheral devices and the AC power cable into the server.

Replacing the Power Supply

⚠ Warning

This procedure must only be performed by a service represen-
tative certified by Bull.

⚠ Caution

The power supply is NOT hot swappable.

The power supply can be replaced if it fails or if one of the fans that is integrated into it
fails. To replace the power supply, use the following instructions.

1. Make sure the power switches for the computer, video monitor and any
   peripheral devices are turned OFF and unplug the power cord (see *"General
   Safety Information" on page 132*).
2. Disconnect the monitor and peripheral devices from the system.
3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.
4. Disconnect all power cables connected to the server board and peripherals.

   A: 2x4 power connector

   B: 2x12 main power connector

   C: Daisy-chain cable to:

   - Optical drive power connector, if an optical drive is installed.
   - HDD0 power connector, if a hard drive is installed here.

- HDD1 power connector, if a hard drive is installed here.
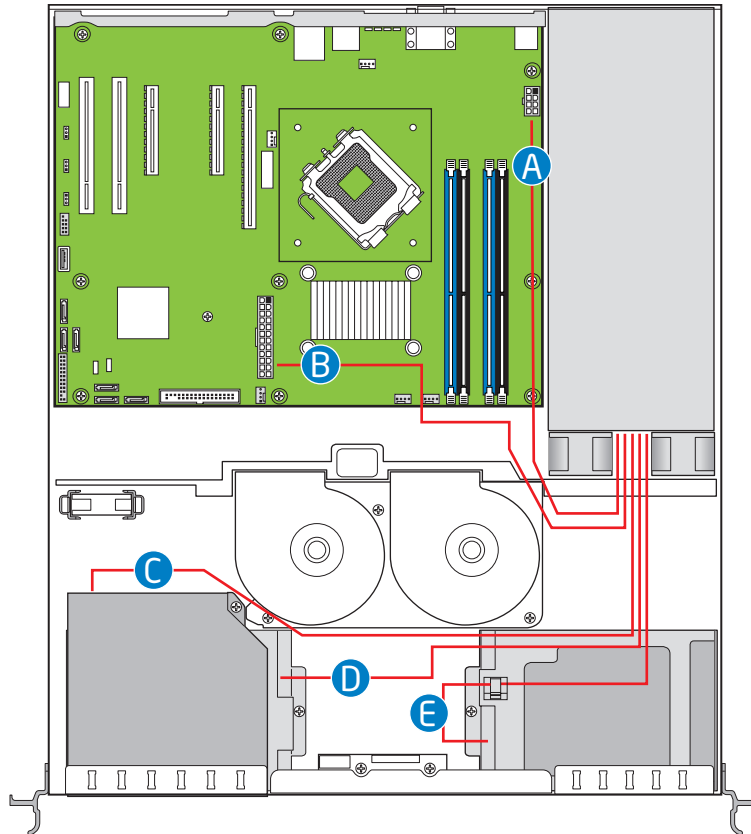
AF002473

Figure 125: Disconnecting Power Cables

5. Remove the screw at the back of the server, next to the AC power input. Save this screw. You will re-insert it later. See letter "A" in Figure 126.

6. Lift up slightly on the front of the power supply until it clears the foot at the bottom of the chassis. See letter "B" in Figure 126.

7. Slide the power supply forward (see letter "C") and then lift it from the chassis.
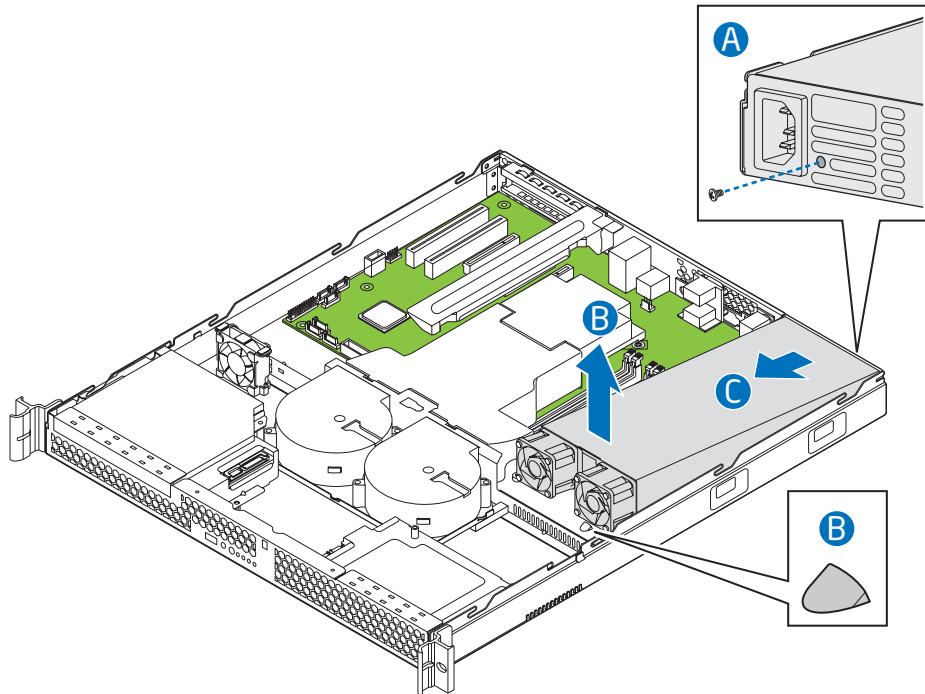
AF002474

Figure 126: Removing the Power Supply from the System

8. Insert the replacement power supply at an angle into the server, sliding the power connector side in first to fit it through the cut-out area at the rear of the system. See letter "A" in Figure 127.

9. Set the front of the power supply down pushing the power supply back so it fits behind the foot at the bottom of the chassis. See letter "B" in Figure 127.

10. Insert the screw you removed in step 5 to attach the power supply to the server. See letter "C".
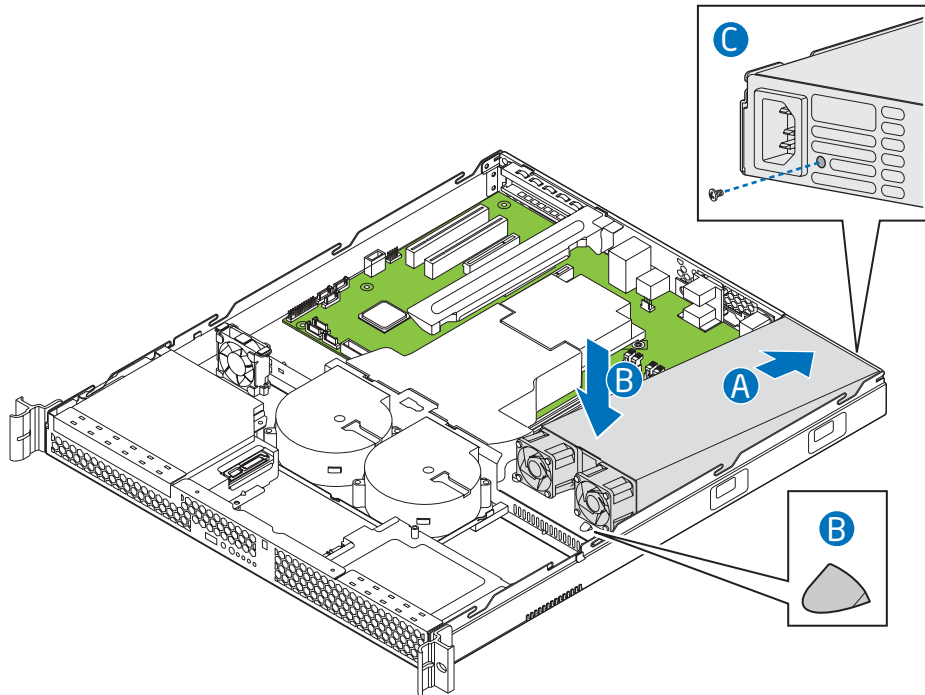
AF002475

Figure 127: Installing Power Supply Module into the System

11. Connect the power supply cables to the server board and peripherals.

A: 2x4 power connector

B: 2x12 main power connector

C: Daisy chain cable to:

- HDD1 power connector, if a hard drive is installed here. Use the connector on cable that is closest to power supply.

- HDD0 power connector, if a hard drive is installed here. Use the center connector on the cable.

- Optical drive power, if an optical drive is installed. Use the end connector on the power supply.
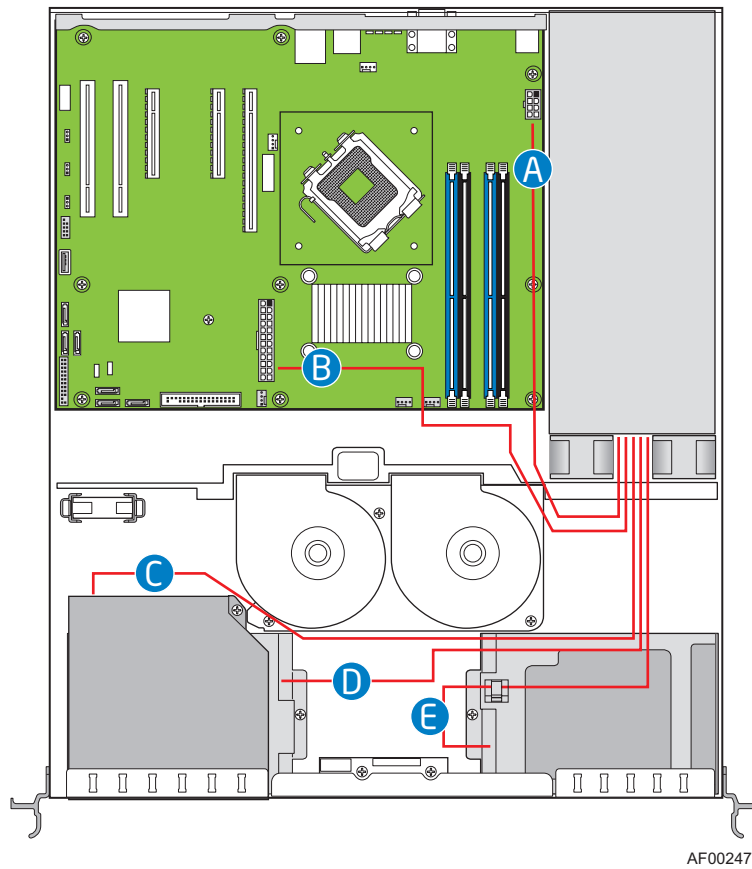
Figure 128: Connecting Power Cables

12. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

13. Plug all peripheral devices and the AC power cable into the server.

Replacing the Front Panel Board

⚠️ Warning

This procedure must only be performed by a service represen-
tative certified by Bull.

⚠️ Caution

The control panel is NOT hot swappable.

Your server must be operated with a control panel installed.

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Disconnect the power and data cables connected to HDD1, at the right side of the system. It is not necessary to remove the HDD1 drive.

5. Disconnect the front panel cable and the USB cable from the front panel board.

6. Remove the two screws that attach the front panel board to the server. See letter "A" in Figure 129.

📋 *Note: Save these screws. You will re-install them later.*

7. Lift the front panel board from the system. See letter "B" in the figure below.
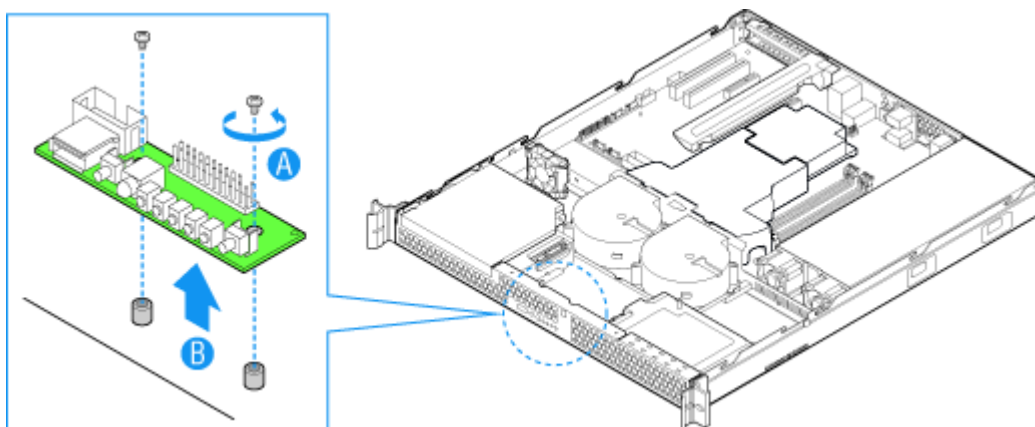
Figure 129: Removing the Front Panel Board

8. Insert the replacement front panel board into the server over the two standoffs. Press down gently until the board clicks into place.

9. Use the two screws you removed in step 7 to attach the front panel board to the system.

10. Connect the USB cable and the front panel cable.

11. Connect the HDD1 power and data cables.
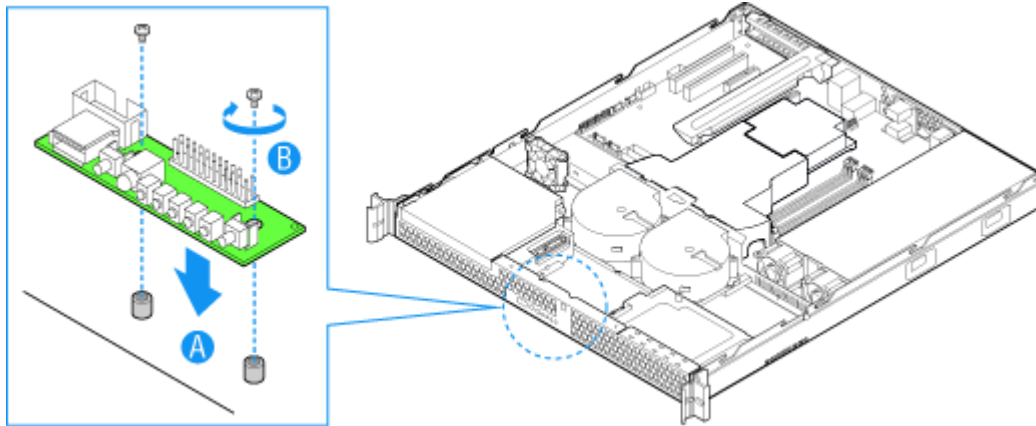
Figure 130: Installing the Front Panel Board

12. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

13. Plug all peripheral devices and the AC power cable into the server.

Replacing a Cooling Fan

⚠ Warning

This procedure must only be performed by a service represen-
tative certified by Bull.

⚠ Caution

The fans are NOT hot swappable.

The blower fans can be individually replaced if one of them fails. If a fan in the power
supply fails, the power supply must be replaced. Use the steps below to replace a
system blower fan or the PCI cooling fan.

> 📝 *Note: The fans that are integrated into the power supply
> cannot be replaced separately. If one of the fans in the power
> supply fails, the power supply must be replaced.*

Replacing the System Blower Fans

1. Make sure the power switches for the computer, video monitor and any
    peripheral devices are turned OFF and unplug the power cord (see *"General
    Safety Information" on page 132*).
2. Disconnect the monitor and peripheral devices from the system.
3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.
4. Remove the processor air duct (see letter "A" in the figure below). Refer to
    "Removing the Processor Air Duct" on page 162.

5. Disconnect the two fan cables from the server board (see letter "B" in the figure below) and untie the cable tie (see letter "C" in the figure below).
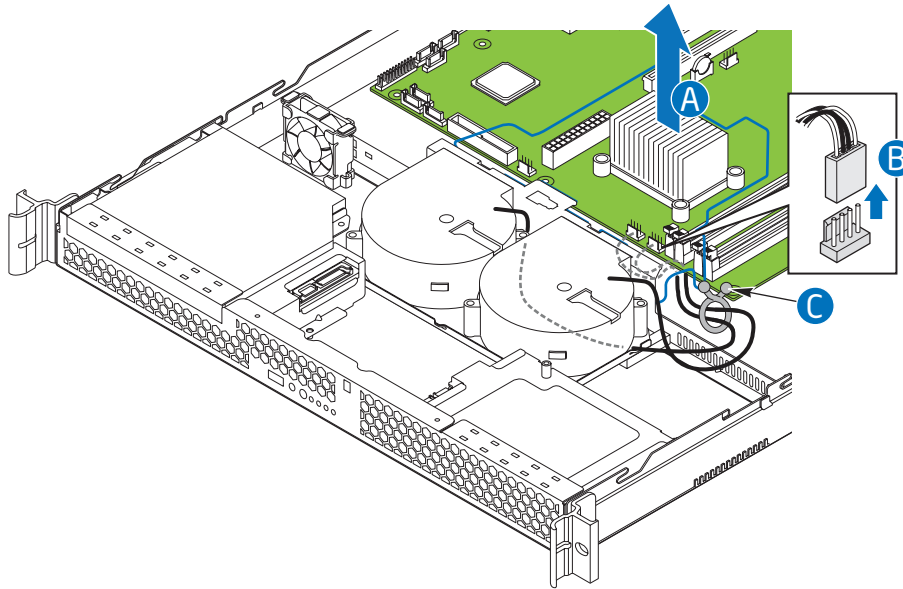
Figure 131: Disconnecting System Blower Fans

6. Remove the three screws that hold the fan bracket in place. Save these screws. You will re-install them later. See letter "A" in Figure 132.

7. Remove the fan cable from beneath the clip at the front of the fan bracket. See letter "B" in Figure 132.

8. Lift the fan bracket from the server. Lift the bracket at an angle, front of the bracket first, to clear the hard disk drive brackets. See letter "C" in Figure 132.
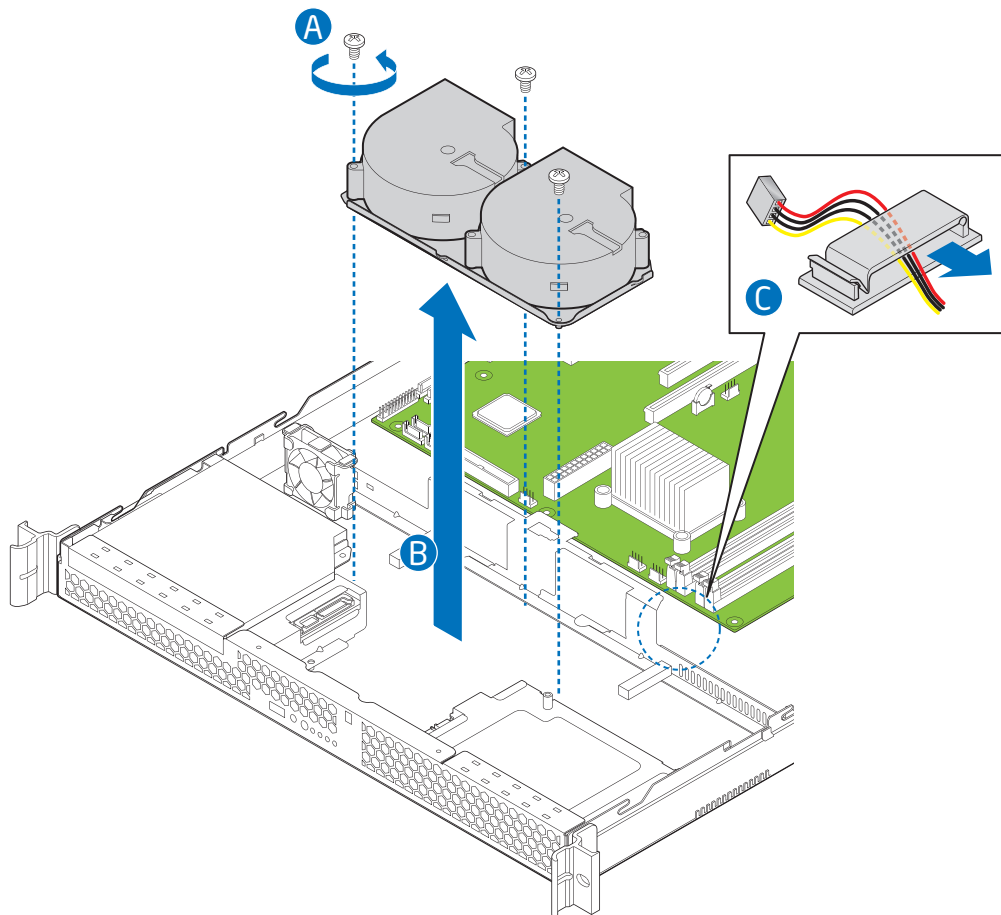
Figure 132: Removing Bracket and System Blower Fans

9. Turn the bracket over and remove the two screws that attach the failed fan to the bracket. See letter "A" in Figure 133.

> *Note: Save these screws. You will reinstall them later.*

10. Lift the fan from the bracket. See letter "B" in the figure below.
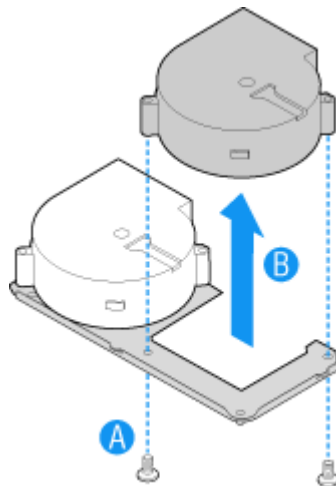
Figure 133: Removing Fan from Fan Bracket

11. Install the replacement fan onto the bracket, using the two screws you removed in step 9.

12. Set the fan assembly into the system. Insert the rear edge first and push the assembly slightly rearward to clear the hard disk drive brackets. Use caution to make sure you do not pinch any cables.

13. Route the cable from the fan at the right around the right side of the assembly and under the clip at the front of the fan bracket.

14. Connect the fans to the server board. See letters "A" and "B" in the figure below.
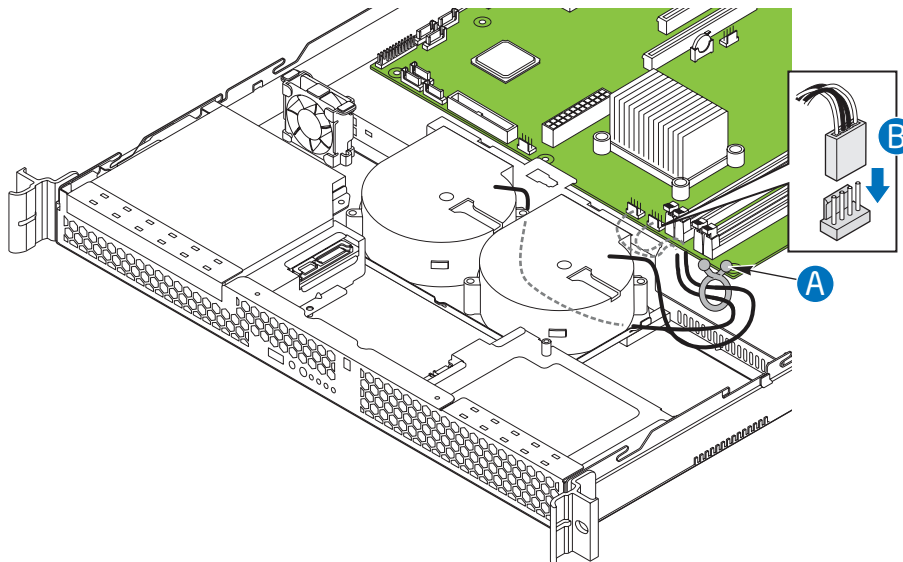
Figure 134: Connecting System Blower Fans

15. Install the processor air duct. Refer to *"Installing the Processor Air Duct" on page 163*.

16. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

17. Plug all peripheral devices and the AC power cable into the server.

Replacing the PCI Cooling Fan

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).
2. Disconnect the monitor and peripheral devices from the system.
3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.
4. Disconnect the fan cable from the server board.
5. Lift the fan from the system.
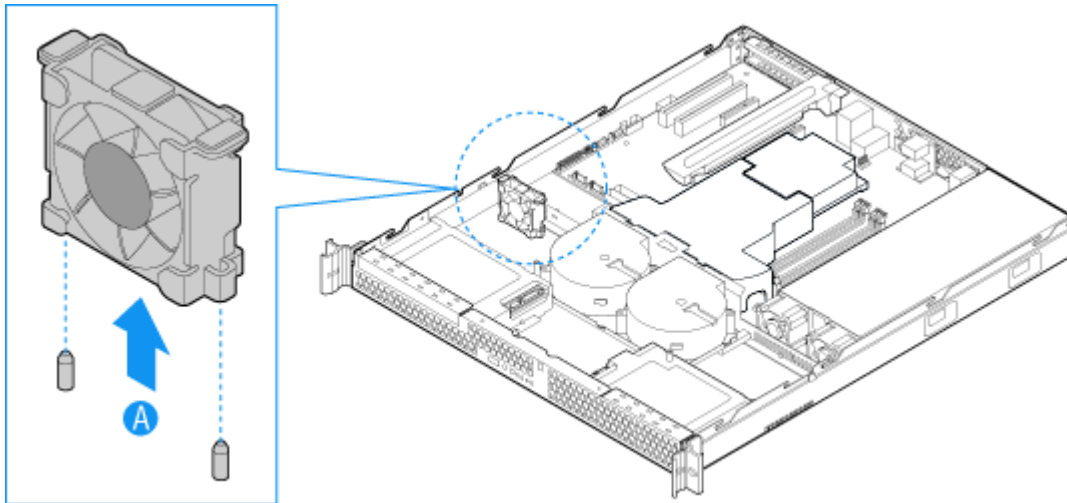
Figure 135: Removing the PCI Cooling Fan

6. Set the replacement fan into place. The label on the fan must face the rear of the system.
7. Connect the fan cable to the server board.
8. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.
9. Plug all peripheral devices and the AC power cable into the server.

Cable Routing

When you add or remove components from your server, make sure your cables are routed correctly before reinstalling the server cover. Use caution to make sure no cables or wires are pinched and that the airflow from the fans is not blocked. Use the figures below to determine the correct cable routing.

For readability, separate figures for power cable routing and data cable routing are included below. Make sure all necessary power and data cables are connected and routed as shown. Dashed lines in the drawings indicate a location where a cable is routed beneath a component and each connector end is labeled with the same letter.

Power Cable Routing
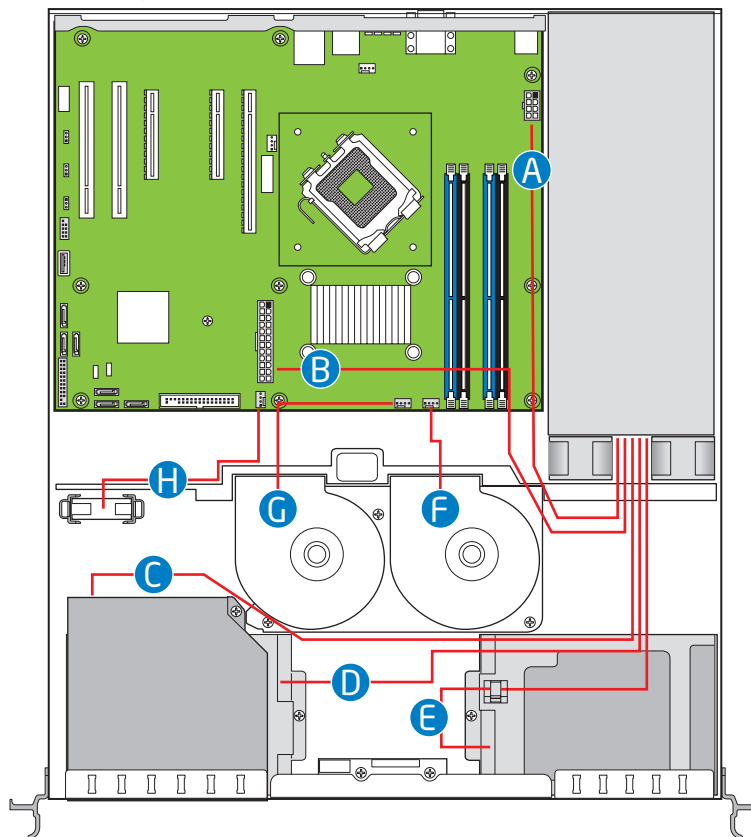
Figure 136: Power Cable Routing

A: Processor power	E: Connector closest to power supply to HDD1
B: Main power	F: Right system blower fan
C: End connector to optical drive	G: Left system blower fan
D: Center connector to HDD0	H: PCI cooling fan

Data Cable Routing
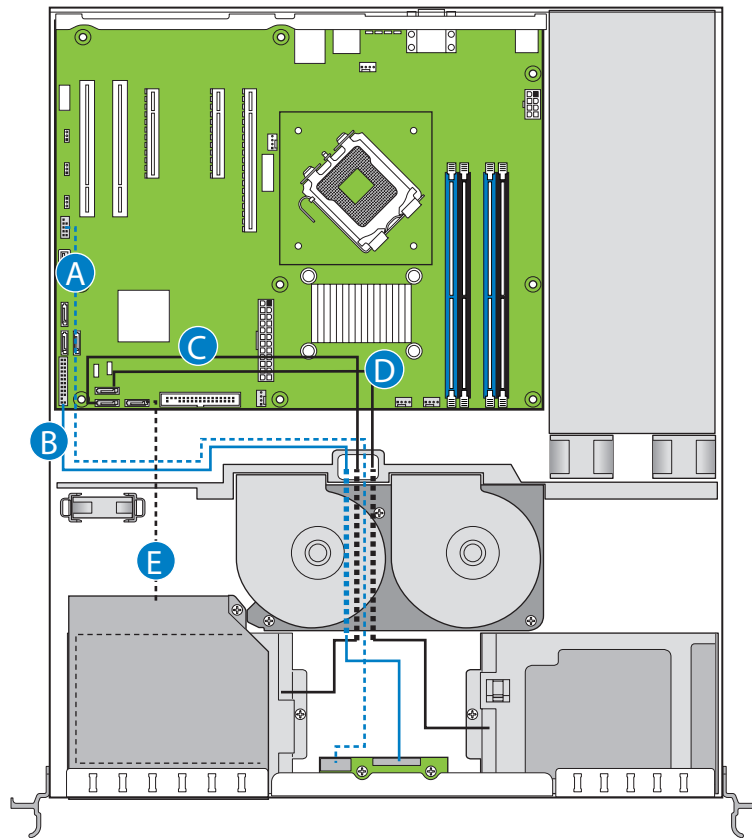
Figure 137: Data Cable Routing

A.	Front panel USB	D.	SATA 2 to HDD1
B.	Front panel	E.	SATA 0 to Optical drive
C.	SATA 1 to HDD0		

Upgrading Microprocessor

Your system is fitted with a processor installed in a socket LGA 775.

Removing a Processor

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Disconnect the fan cable(s) from the processor fan connector(s) on the motherboard.

5. Remove the processor heatsink:

   a. Remove the four screws fastening the heatsink to the motherboard.

   b. Remove the heatsink manually using a gentle rocking motion.

6. Open the processor socket:

   - Use your right thumb to push down and outwards the lever in order to disengage it from the retention tab.

⚠ Caution

If you do not follow scrupulously these instructions, the lever can bounce back and cause bend contacts.

   - Rotate the load lever to its fully open position at approximately 100°.
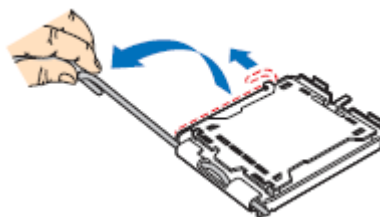
Figure 138: Opening the processor socket

7. Grasp the processor (use your index to hold the load plate side, and your thumb to hold the lever side).

8. Lift the processor straight and away.

9. Set the processor immediately in its protective cover.

   - Hold the CPU by three of its corners.

   - The chamber of the protective cover should match the connection 1 on the CPU.

- The rentention tabs on the cover and the processor contacts should point each other.

Installing a Processor

1. Remove the processor from its shipping materials, and, if applicable, remove its protective cover.

Figure 139: Removing from the shipping materials

⚠ Caution

■ Do not touch the processor sensitive contacts.

■ Hold the processor by the substrate edges.

2. Locate the connection 1 indicator and the two orientation key notches on the CPU and on the socket.

3. Grasp the processor with your thumb and index finger by the orientation key notches.

4. Carefully lower down the processor into the socket body.
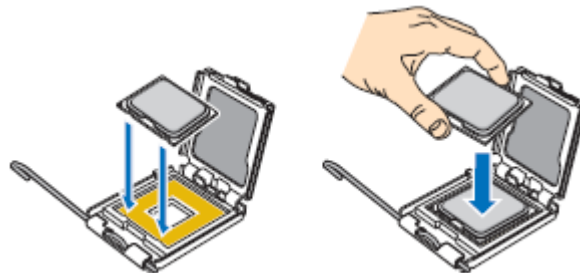
Figure 140: Installing the processor

⚠ Caution

Do not tilt the processor or shift it into place, doing so may damage the sensitive contacts.

5. Check that the orientation notches and the connection 1 indicator are properly fitted to the socket body.

6. Close the soket:

-   Close the load plate.

-   Press gently on the load plate and engage the load lever.

-   Secure the load lever under its retention tab.

7. Remove the heatsink from its packaging materials.

⚠ Caution

The heat sink has Thermal Interface Material (TIM) located on the bottom of it. Use caution when you unpack the heat sink so you do not damage the TIM.

---

8. Remove the protective cover from the TIM on the underside of the heat sink. Do not touch the TIM.

9. Place the heatsink on the processor socket.

-   Ensure that the fan cable(s) are on the closest side to the fan(s) header(s) on the motherboard.

-   Align the screws with the screwholes on the motherboard.

-   Make sure that the heatsink is completely level with the motherboard.

⚠ Caution

Check the following:

■ No cables are trapped or interfere with the screws.

■ The screws are perpendicular to the heatsink.

---

10. Secure the heatsink:

- Hold the heatsink to prevent it from tilting, and tighten the screws.
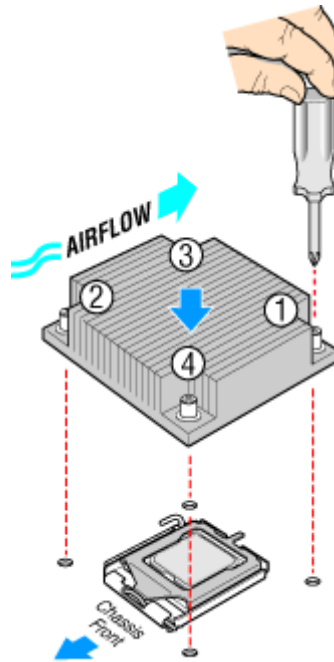
Figure 141: Securing the Heatsink

11. Connect the fan cable(s) to the header(s) on the motherboard.

12. Secure the excess cable with a tie-wrap to ensure that the cable does not interfere with fan operation or make contact with other components.

13. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

Upgrading Random Access Memory (RAM)

Recommended Memory Configuration

Refer to *"Memory Configuration" on page 40* for more information.

Removing and Replacing a DDR2 module

Figure 142: DDR2 Memory Module Sample

If your memory configuration requires the removal of a module, perform the following steps:

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).
2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.
3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Locate the memory upgrade sockets on the motherboard.

DIMM 1A
Socket

DIMM 2A
Socket

DIMM 2B
Socket

DIMM 1B
Socket

AF002309

Figure 143: Upgrading the Memory

5. Press the plastic clips at the outer edge of the socket away from the memory module. This ejects the memory module from the socket (see "A" on Figure 143). Do not touch the module's metal "fingers." Store the module in an anti-static bag (available at electronic supply stores) or a cardboard box.

6. Align the new module with an empty memory socket. Make sure the notch on the module aligns with the key in the socket. The module is designed to install into the socket in only one way (see "B" on Figure 143).

7. Press the module firmly into the socket (see "C" on Figure 143). If you have difficulty installing a module, do not force it! Carefully remove the module, then check the alignment of the module's notch with the one in the socket. Then re-install the module.

8. Make sure the locking clips at either end of the module click closed (see "D" on Figure 143). If the brackets do not secure themselves to the module, carefully remove the module, then reinstall it.

9. Replace the server cover. Refer to .

📑 **Note**: *The amount of installed memory will be automatically detected by the system.*

Installing and Removing the PCI Riser Assembly

⚠ Caution

The PCI riser assembly is NOT hot swappable.

Removing the PCI Riser Assembly

To remove the PCI riser assembly, use the following instructions.

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Disconnect any cables attached to any add-in cards.

5. Lift riser assembly up to remove it. Use caution to gently easy the riser card from the add-in card slot so you do not damage the slot or the riser card.
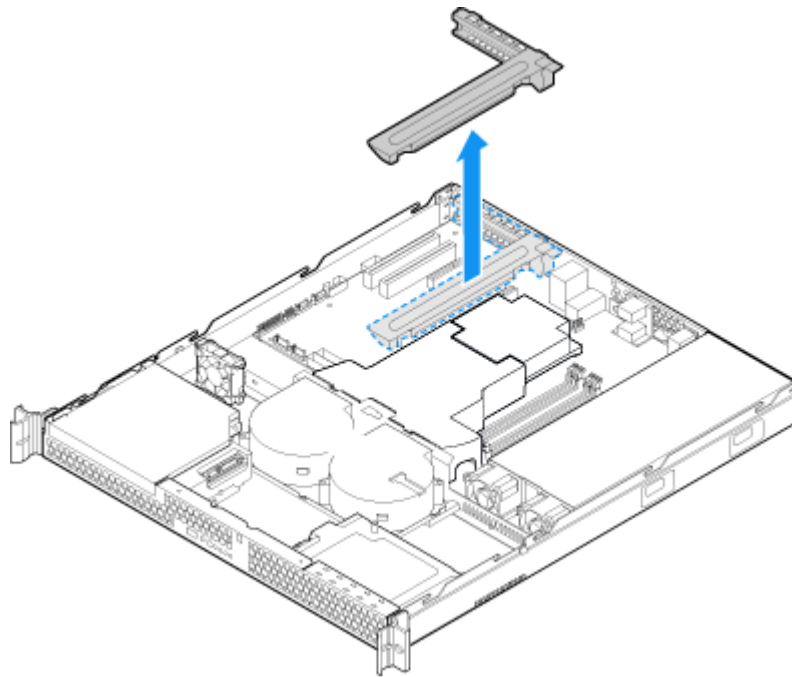
Figure 144: Removing the PCI Riser Assembly

6. If you need to add or replace a PCI riser connector, see *"Installing and Removing a PCI Riser Card" on page 202*.

7. If you need to add or replace a PCI add-in card, see *"Installing and Removing a PCI Add-in Card" on page 204*.

8. If you removed the PCI riser assembly for another procedure, continue with that procedure.

Installing the PCI Riser Assembly

> 📝 **Note**: *For clarity, the figure in this series of instructions does not show an attached add-in card. If you are installing an add-in card, do so before installing the PCI riser assembly into your server.*

1. Lower the riser assembly into place over the add-in card slot. See letter "A" in Figure 145.

2. Align the three hooks in the riser assembly with the matching slots at the back of the server. See letter "B" in the figure below.
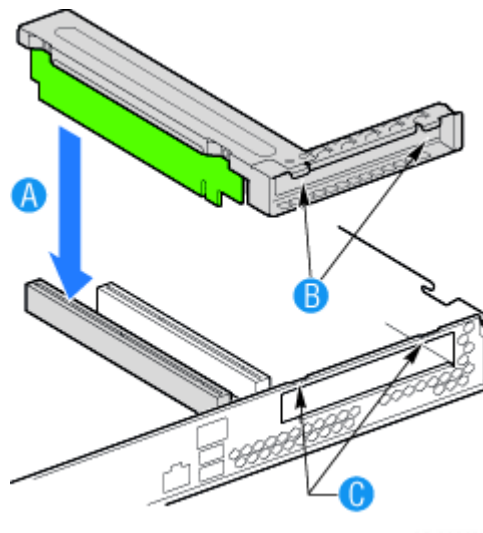
Figure 145: Installing PCI Riser Assembly

3. Press down uniformly until the two hooks on the rear of the PCI riser assembly engage the server back panel slots. The riser cards will seat into the matching sockets on the server board.

4. Connect any cables to add-in cards that require them. See your add-in card documentation for information and add-in card requirements.

5. Replace the server cover. Refer to *"Installing the Server Cover" on page 161*.

Installing and Removing a PCI Riser Card

⚠ Caution

The PCI riser card is NOT hot swappable.

You can install a full-height PCI Express riser with one PCI Express x8 slot.

📑 **Note**: *To avoid installing the replacement connector on the wrong side of the PCI riser assembly, replace one connector at a time.*

Removing a PCI Riser Card

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Disconnect any cables attached to any add-in cards.

5. Remove the PCI riser assembly. For instructions, see *"Removing the PCI Riser Assembly" on page 200*.

6. Remove any add-in cards from the PCI riser connector. For instructions, see *"Removing a PCI Add-in Card" on page 205*.

7. Remove the two screws that attach the riser card to the riser assembly. Save these screws to be used later.
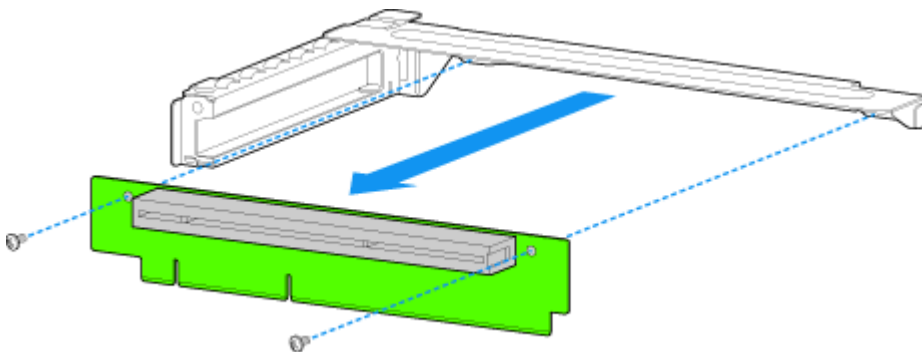
Figure 146: Removing the Riser Card from the Riser Assembly

---

8. Install the replacement riser connector, if desired. For instructions, see *"Installing a PCI Riser Card" on page 203*.

9. Install the PCI riser assembly into the server. For instructions, see *"Installing the PCI Riser Assembly" on page 201*.

10. Install the server cover. For instructions, see *"Installing the Server Cover" on page 161*.

11. Plug all peripheral devices and the AC power cable into the server.

Installing a PCI Riser Card

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Remove the processor air duct. Refer to *"Removing the Processor Air Duct" on page 162.*

5. Disconnect any cables attached to any add-in cards.

6. Remove the PCI riser assembly. Refer to *"Removing the PCI Riser Assembly" on page 200*.

7. Remove any add-in cards from the PCI riser connector. Refer to *"Removing a PCI Add-in Card" on page 205*.

8. Use two screws to attach the riser card to the riser assembly.
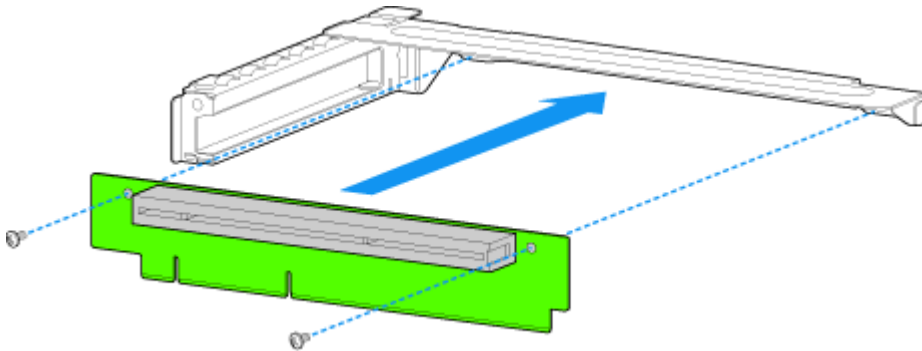
Figure 147: Installing the Riser Card onto the Riser Assembly

9. Install a PCI add-in card if desired. Refer to *"Installing a PCI Add-in Card" on page 204*.

10. Install the PCI riser assembly into the server. Refer to *"Installing the PCI Riser Assembly" on page 201*.

11. Connect any cables to add-in cards that require them. See your add-in card documentation for information and add-in card requirements.

12. Re-install the processor air duct. Refer to *"Installing the Processor Air Duct" on page 163*.

13. Install the server cover. Refer to *"Installing the Server Cover" on page 161*.

14. Plug all peripheral devices and the AC power cable into the server.

Installing and Removing a PCI Add-in Card

⚠ Caution

The add-in cards are NOT hot swappable

Installing a PCI Add-in Card

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Remove the PCI riser assembly. Refer to *"Removing the PCI Riser Assembly" on page 200*.

5. Remove the screw at the rear of the riser assembly. See letter "A" in Figure 148.

≣ **Note**: *Save this screw. You will reinstall it later.*

---

6. If a filler panel is installed over the opening at the rear of the riser assembly lift it from the riser assembly. See letter "B" in Figure 148.

≣ **Note**: *Save the filler panel in case you later need to remove the add-in card.*

---

7. Insert the add-in card into the socket in the riser assembly. Push the add-in card into place firmly until it seats in the riser card connector, but use caution so you do not twist or bend the card. See letter "C" in Figure 148.

8. Re-install the screw you removed in step 5. See letter "A" in Figure 148.
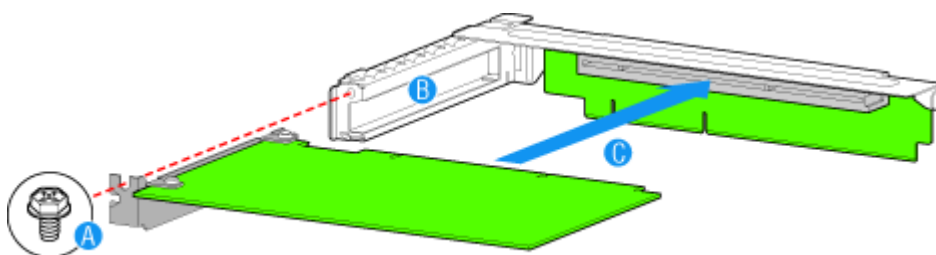
Figure 148: Installing an Add-In Card

9. Install the PCI riser assembly into the server. Refer to *"Installing the PCI Riser Assembly" on page 201*.

10. Install the server cover. Refer to *"Installing the Server Cover" on page 161*.

11. Plug all peripheral devices and the AC power cable into the server.

Removing a PCI Add-in Card

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the server cover. Refer to *"Removing the Server Cover" on page 160*.

4. Remove the PCI riser assembly. Refer to *"Removing the PCI Riser Assembly" on page 200*.

5. Remove the screw at the rear of the riser assembly. See letter "A" in Figure 149.

Note: Save this screw. You will use it later.

---

6. Pull the add-in card from the socket in the riser assembly. See letter "B" in Figure 149.

Note: You may need to wriggle the card from front to back to remove it, but use caution so you do not twist or bend the card.

---

7. Install a filler panel over the opening at the rear of the riser assembly. See letter "C" in Figure 149.

8. Re-install the screw you removed in step 5. See letter "A" in Figure 149.
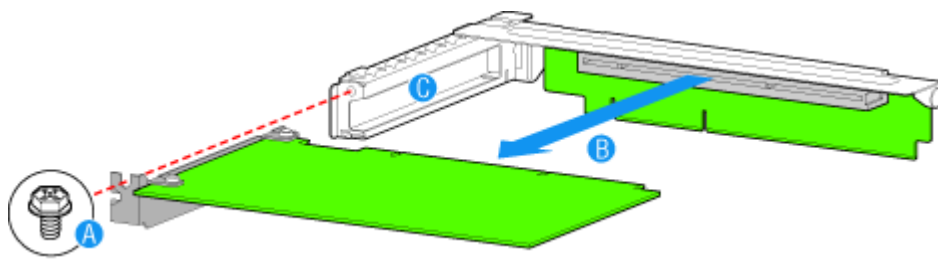
Figure 149: Removing a Full Height Add-In Card

Note: Make sure that all empty add-in card slots have filler panels installed.

---

9. Install the PCI riser assembly into the server. Refer to *"Installing the PCI Riser Assembly" on page 201*.

10. Re-install the processor air duct. Refer to *"Installing the Processor Air Duct" on page 163*.

11. Install the server cover. Refer to *"Installing the Server Cover" on page 161*.

12. Plug all peripheral devices and the AC power cable into the server.

NovaScale T830 E1 Chassis Upgrade

Removing or Installing the Left side cover

The left side cover provides access to the disk drive bays, to the motherboard and to the 5.25 and 3.5-inch bays.

Removing the Left Side Cover

1. Make sure the power switches for the computer, video monitor and any peripheral devices are turned OFF and unplug the power cord (see *"General Safety Information" on page 132*).

2. Disconnect the monitor and peripheral devices (printers, for instance) from the system.

3. Remove the two screws (A).

4. Push on the latch (B) with your right hand, and with your left hand, grasp the rear cover clasp and slide the left side cover rearward (C).

TP00559
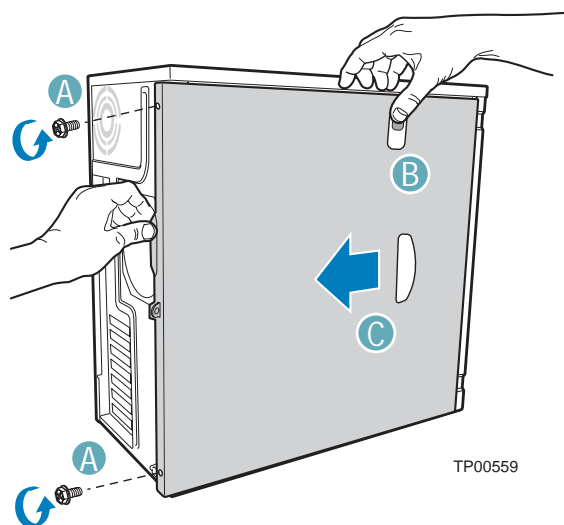
Figure 150: Removing the cover

A: screws
B: latch
C: sliding the cover out of the chassis

5. Slide the cover completely out of the chassis.

Replacing the Left Side Cover

Avoid damaging your system - before replacing the left side cover, make sure no cables or other devices protrude from the chassis.

1. Take a few moments to examine the interior side of the cover, and notice the rails and hooks inside the cover.

2. Leaving about 1 centimetre to slide the cover forward, lay the cover on the chassis, and check that the rail is ready to slide on its corresponding edge and that the slots are ready to fit with their corresponding metal hooks. You may find this procedure easier to follow if you lay the unit on the left side.

3. Slide the cover forward as far as it will go (A), and make sure the cover is properly inserted; the cover, the chassis and the front bezel should fit squarely together.

TP00831
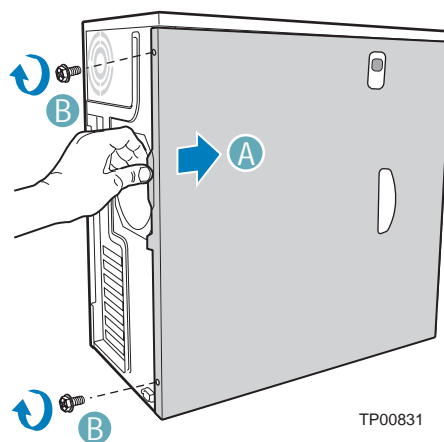
Figure 151: Replacing the left side cover

A: sliding the left side cover forward
B: screws

4. Replace and tighten the screws (B).

Removing and Replacing the Front Panel

Removing the Front Panel

1. Remove the left side cover. See *"Removing the Left Side Cover" on page 207*
2. Disengage the two panel tabs from the left side of the chassis (A).
3. Rotate the left side of the front panel assembly outward slightly (B).
4. Disengage the three clips that attach the right side of the front panel assembly to the chassis and remove the front cover (C).
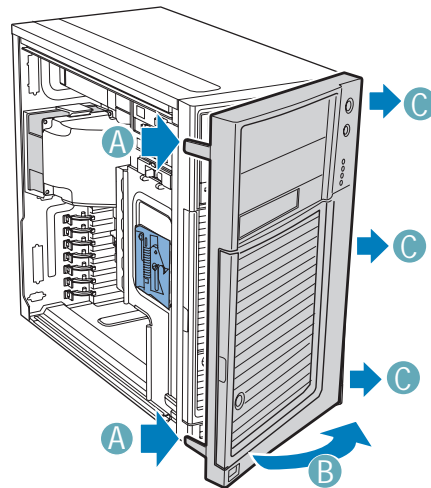
TP02034

Figure 152: Removing the Front Panel

A: panel tabs
B: rotating the front panel assembly outward
C: front panel clips

Replacing the Front Panel

1. Line up the three clips on the right-side of the front bezel assembly with the corresponding slots on the right-side of the chassis (A). Engage the clips with the slots (B).

2. Rotate the left side of the the front bezel assembly towards the chassis (C).

3. Snap the two bezel tabs into the corresponding recesses at the left edge of the chassis front panel (D).
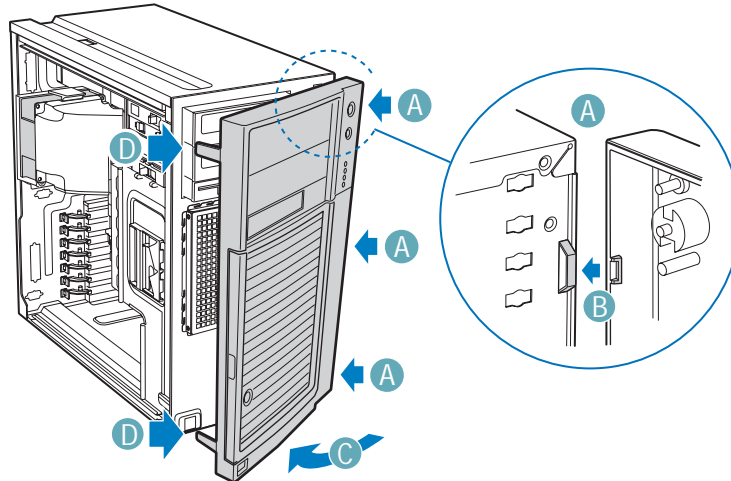
TP02035

Figure 153: Replacing the Front Panel

A: front panel clips
B: engaging the clips in the slots
C: rotating the front bezel assembly
D: bezel tabs

4. Replace the left side cover. See *"Replacing the Left Side Cover" on page 208*.

Installing or Removing a 5.25-inch Device

This section of the chapter describes how to add and remove 5.25-inch devices. You can install an optical disc drive, tape backup unit, or other 5.25-inch devices in the additional 5.25-inch bay.

📝 **Note**: *Additional power and/or data cables may be included with your system. In this case, store them in a safe place, you will need them if you decide to add additional drives.*

Adding a 5.25-inch Device

1. Remove the left side cover. *See "Removing the Left Side Cover" on page 207.*
2. Remove the front panel. *See "Removing the Front Panel" on page 209.*
3. Remove the EMI shield from the 5.25-inch device drive bay (A).
4. Move the latch to the "unlock" position (B).
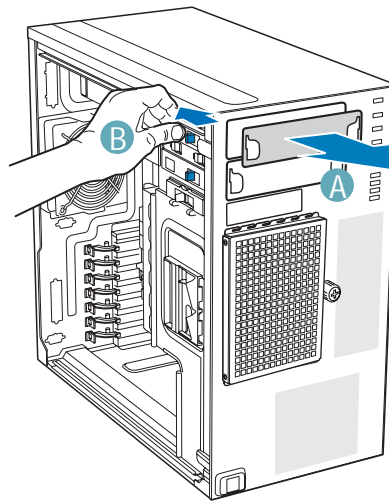
TP00651

Figure 154: Removing 5.25-inch Drive EMI Shield

5. Insert the drive into the 5.25-inch device drive bay (C).

6. Line up the holes in the optical disc drive with the holes in the chassis (D).

7. Move the latch to the "lock" position (E).

8. Connect the cable(s) to the rear of the optical disc drive.
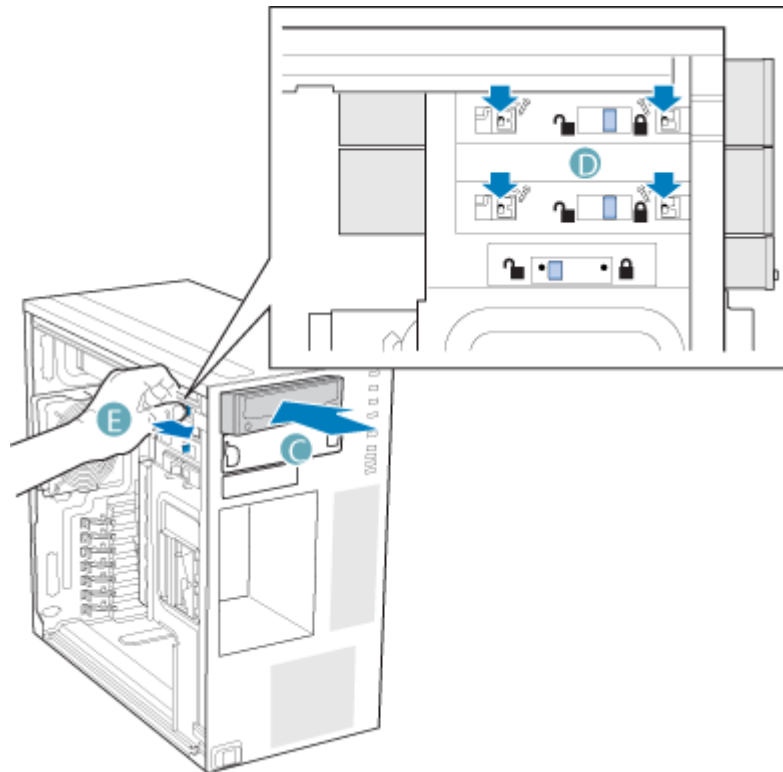
Figure 155: Installing an Optical Disc Drive

9. If necessary, remove the filler plate from the front bezel assembly.
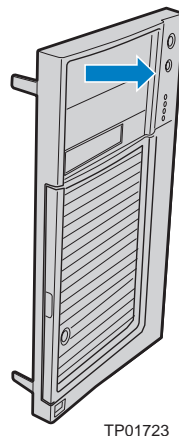
TP01723

10. Replace the front panel. *See "Replacing the Front Panel" on page 210.*

11. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*

> 📝 **Note**: *If necessary, modify the BIOS Setup program to recognise the additional device. For additional information, refer to "Using the BIOS Setup Utility" on page 288.*

Removing a 5.25-inch Drive

1. Remove the left side cover. *See "Removing the Left Side Cover" on page 207.*
2. Remove the front panel. *See "Removing the Front Panel" on page 209.*
3. Disconnect the cable(s) from the rear of the optical disc drive.
4. Move the latch to the "unlock" position (A).
5. Slide the optical disc drive out of the device drive bay (B).
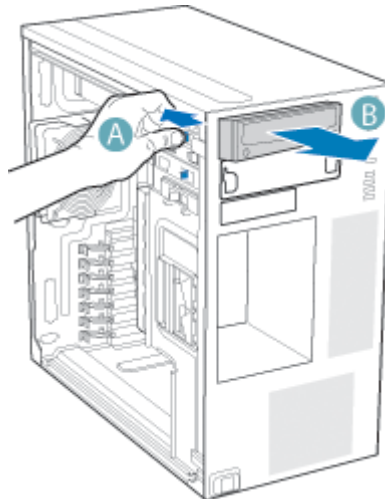
Figure 156: Removing an Optical Disc Drive

6. When reinstalling a new optical disc drive, see *"Adding a 5.25-inch Device" on page 211* for instructions.

   If you are not replacing the drive, reinstall the EMI shield and front panel filler plate, if available.
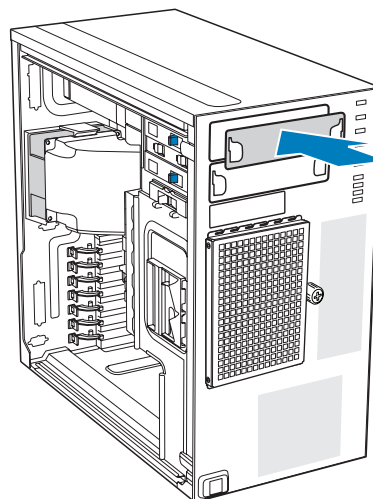
TP02048

Figure 157: Installing 5.25-in Drive EMI Shield

7. Replace the front panel. *See "Replacing the Front Panel" on page 210.*
8. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*

Hot-Swap Hard Disk Drives

> 📰 **Note**: *Additional power and/or data cables may be included with your system. In this case, store them in a safe place, you will need them if you decide to add additional drives.*

Removing and Replacing a Hot-Swap Hard Disk Drive

1. Open the drive bay access door.

AF000311
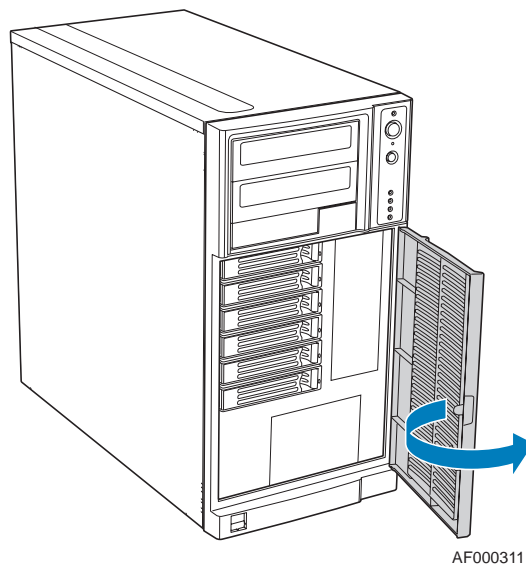
Figure 158: Opening the Drive Bay Access Door

2. Press on the green latch at the front of the drive carrier (A).
3. Pull out on the black lever (B) to slide the drive carrier from the hot swap drive cage.

AF000312
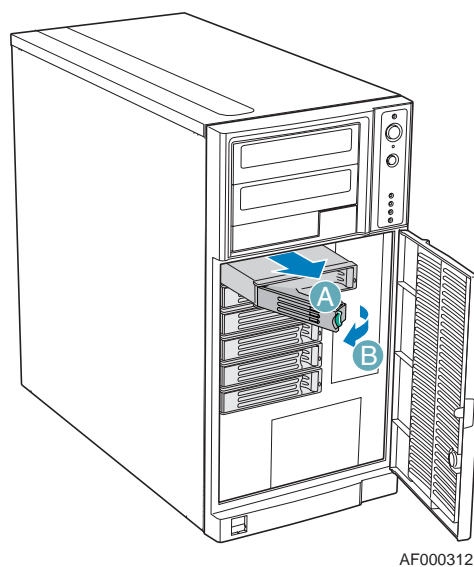
Figure 159: Removing the Drive Carrier from the Hot Swap Drive Cage

4. Remove the four screws that attach the hard drive to the drive carrier. Lift the drive from the carrier. Store the old drive in an anti-static bag.
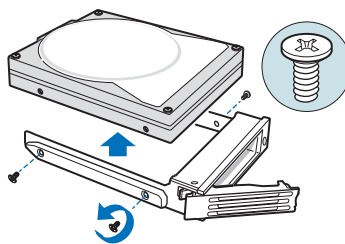
TP01714

Figure 160: Removing the Hard Drive from the Drive Carrier

5. Remove the new drive from its anti-static bag and place in the drive carrier.

With the drive circuit-side down, position the connector end of the drive so that it is facing the rear of the drive carrier.

Align the holes in the drive to the holes in the drive carrier and attach the drive to the carrier with the screws removed in the previous step.
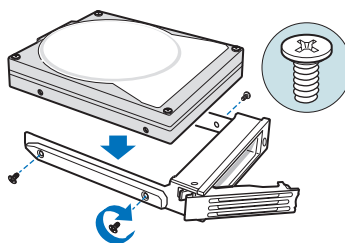
TP00929

Figure 161: Installing the Hard Drive in the Drive Carrier
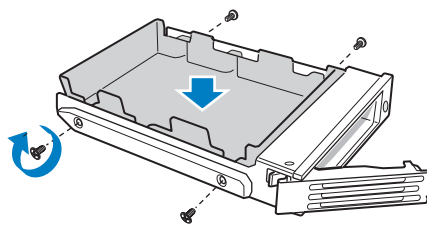
TP01713

Figure 162: Installing the Plastic Retention Device in the Drive Carrier

6. With the black lever in the fully open position, slide the drive carrier into the chassis. The green latch must be to the left. Do not push on the black lever until the lever begins to close by itself.

When the black lever begins to close by itself, push on it to lock the drive carrier into place.

Notes: *For proper airflow, the drive carrier must be replaced in the chassis, even if no hard drive is installed in it.*
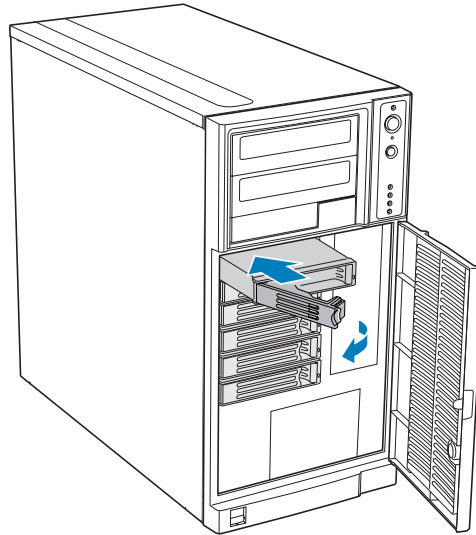
AF000313

Figure 163: Re-installing the Drive Carrier in the Hot Swap Drive Cage

7. Close the drive bay access door.
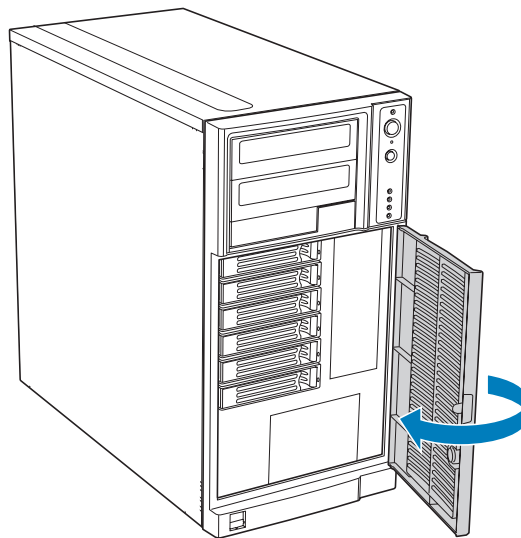
AF000314

Figure 164: Closing the Drive Bay Access Door

Cabling the Hot-Swap Hard Disk Drive Cages

Refer to the instructions below should you have to disconnect and reconnect the backplane and server board/RAID controller card cables.

For a six-drive SAS/SATA hot swap drive cage:

⚠ Caution

It is critical that you connect the SAS/SATA data cables correctly from the SAS/SATA backplane to your server board or RAID controller card. Failure to do so may result in data loss.

---

1. Connect the two power cables (A) to the power cable connectors on the SAS/SATA backplane.

2. Connect a SAS/SATA data cable (B) to each appropriate SAS/SATA connector on the SAS/SATA backplane. The hard drives in the drive cage are numbered as follows when viewed from the front.
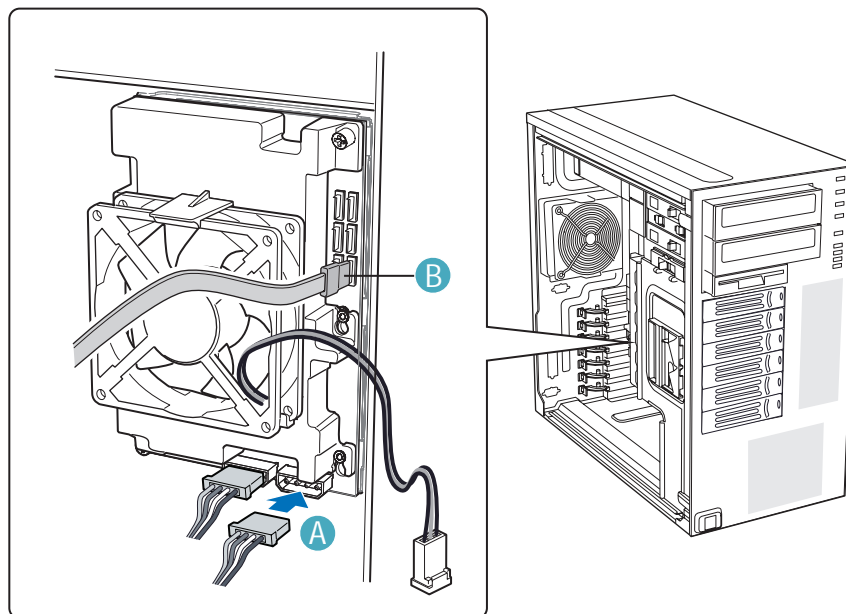
TP00987

Figure 165: Cabling the SAS/SATA Hot Swap Drive Cage

3. Make server board/RAID controller card connections.

Drive Number	Position in a Pedestal-configured system (SATA/SAS)	Position in a Rack-configured system (SATA/SAS)
Drive 0	Bottom	Left
Drive 1	Second from bottom	Second from left
Drive 2	Third from bottom	Third from left
Drive 3	Third from top	Third from right
Drive 4	Second from top	Second from right
Drive 5	Top	Right

SAS/SATA Backplane connectors

📋 **Notes**: *The SAS/SATA cables are labeled to correspond with each drive. Make sure to connect the cables correctly to avoid confusion later.*

The SAS/SATA connectors are laid out as follows on the SAS/SATA backplane.
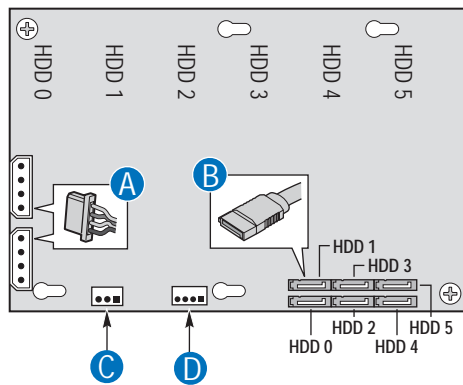
AF00450

Figure 166: SAS/SATA Backplane Cable connectors
(Backplane without expander shown)

A: Power cable
B: Data cable
C: IPMB
D: SES

Connecting a SAS/SATA hot swap backplane without expander

⚠ **Caution**

SATA controllers cannot be used with an expander backplane.

---

1. Connect the two power cables (A) to the power cable connectors on the SAS/ SATA backplane.
2. Connect a SAS/SATA data cable (B) to each appropriate SAS/SATA connector on the SAS/SATA backplane.
3. Connect the IPMB cable (C).
4. Connect the SES cable to the SAS controller.
5. Connect the fan power to the FAN1 connector on the motherboard.
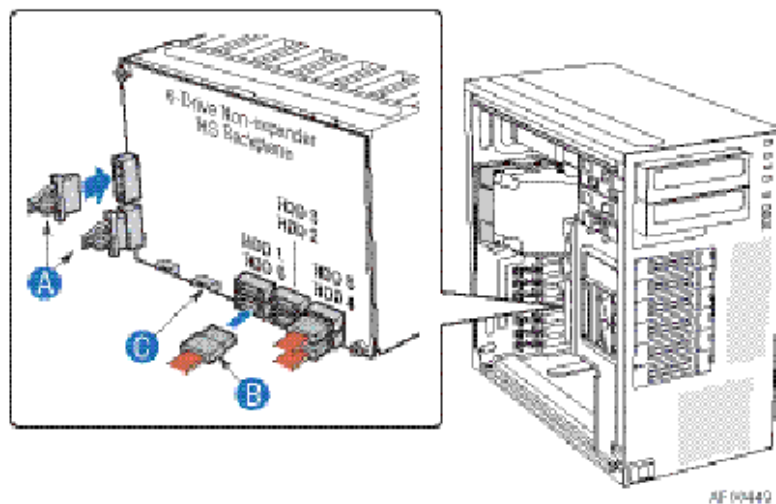
Figure 167: Connecting the Six-drive SAS/SATA Hot-Swap Drive Cage Backplane without Expander

(fan bracket not shown in the illustration for clarity)

Upgrading Microprocessor

Your system is fitted with a processor installed in a socket LGA 775.

Removing a Processor

1. Remove the left side cover. *See "Removing the Left Side Cover" on page 207.*
2. Remove the front panel. *See "Removing the Front Panel" on page 209.*
3. If your chassis is a tower chassis, lay the unit on its left side, the instructions will be easier to follow.
4. Disconnect the fan cable(s) from the processor fan connector(s) on the motherboard.
5. Remove the processor heatsink:
    -   Remove the four screws fastening the heatsink to the motherboard.
    -   Remove the heatsink manually using a gentle rocking motion.

📑 **Note**: To reassemble the heatsink:

■ *Reset the fastener's caps to their original position.*

■ *Re-attach the cable to the cable management clips.*

---

6. Open the processor socket:
    -   Use your right thumb to push down and outwards the lever in order to dis-engage it from the retention tab.

⚠ Caution

If you do not follow scrupulously these instructions, the lever can bounce back and cause bend contacts.

-   Rotate the load lever to its fully open position at approximately 135°.
-   Rotate the load lever to its fully open position at approximately 100°.
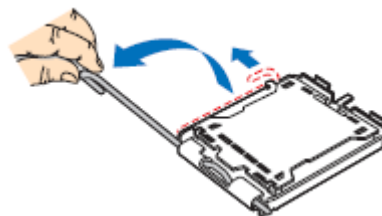
Figure 168: Opening the processor socket

7. Grasp the processor (use your index to hold the load plate side, and your thumb to hold the lever side).

8. Lift the processor straight and away.

9. Set the processor immediately in its protective cover.

   - Hold the CPU by three of its corners.

   - The chamber of the protective cover should match the connection 1 on the CPU.

   - The rentention tabs on the cover and the processor contacts should point each other.

Installing a CPU

1. Remove the processor from its shipping materials, and, if applicable, remove its protective cover.

Figure 169: Removing from the shipping materials

⚠ **Caution**

■ Do not touch the processor sensitive contacts.

■ Hold the processor by the substrate edges.

---

2. Locate the connection 1 indicator and the two orientation key notches on the CPU and on the socket.

3. Grasp the processor with your thumb and index finger by the orientation key notches.

4. Carefully lower down the processor into the socket body.
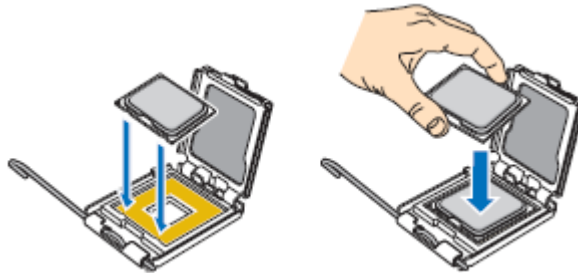
Figure 170: Installing the processor

⚠ **Caution**

Do not tilt the processor or shift it into place, doing so may damage the sensitive contacts.

5. Check that the orientation notches and the connection 1 indicator are properly fitted to the socket body.

6. Close the soket:

    -   Close the load plate.

    -   Press gently on the load plate and engage the load lever.

    -   Secure the load lever under its retention tab.

7. Remove the heatsink from its packaging materials.

8. Place the heatsink on the processor socket.

    -   Ensure that the fan cable(s) are on the closest side to the fan(s) header(s) on the motherboard.

    -   Align the screws with the screwholes on the motherboard.

    -   Make sure that the heatsink is completely level with the motherboard.

⚠ **Caution**

Check the following:

■ No cables are trapped or interfere with the screws.

■ The screws are perpendicular to the heatsink.

9. Secure the heatsink:

    -   Hold the heatsink to prevent it from tilting, and tighten the screws.

10. Connect the fan cable(s) to the header(s) on the motherboard.

11. Secure the excess cable with a tie-wrap to ensure that the cable does not interfere with fan operation or make contact with other components.

12. Replace the front panel. *See "Replacing the Front Panel" on page 210.*

13. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*

Upgrading Random Access Memory (RAM)

Recommended Memory Configuration

Refer to *"Memory Configuration" on page 40* for more information.

Checking System Memory

If you do not know how much memory is installed in your system, check the amount by using the relevant following procedure.

1. On the Windows desktop, click on **Start**, and select **Control Panel**.
2. Click on **Switch to classic view**.
3. Double click on the **System** icon, and click on the **General** tab. This tab shows the random access memory (RAM). This is the amount of system memory in your computer.

Removing and Replacing a DDR2 module

Figure 171: DDR2 Memory Module Sample

If your memory configuration requires the removal of a module, perform the following steps:

1. Remove the left side cover. *See "Removing the Left Side Cover" on page 207.*

2. Remove the front panel. *See "Removing the Front Panel" on page 209.*

3. Locate the memory upgrade sockets on the motherboard.

DIMM 1A
Socket

DIMM 2A
Socket

DIMM 2B
Socket

DIMM 1B
Socket

AF002309
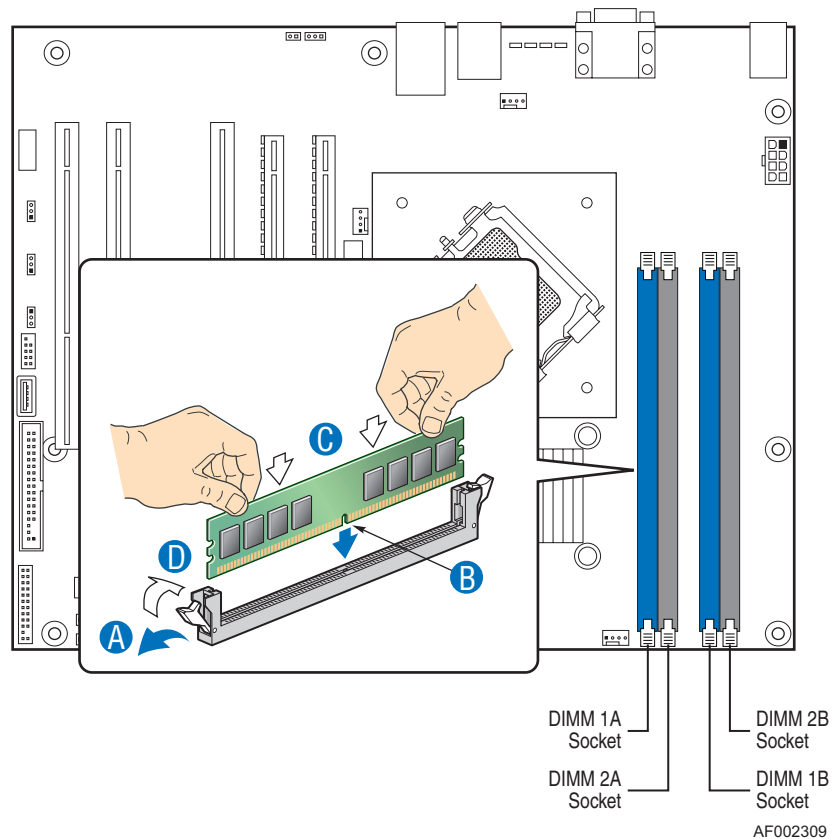
Figure 172: Upgrading the Memory

4. Press the plastic clips at the outer edge of the socket away from the memory module. This ejects the memory module from the socket (see "A" on Figure 172). Do not touch the module's metal "fingers." Store the module in an anti-static bag (available at electronic supply stores) or a cardboard box.

5. Align the new module with an empty memory socket. Make sure the notch on the module aligns with the key in the socket. The module is designed to install into the socket in only one way (see "B" on Figure 172).

6. Press the module firmly into the socket (see "C" on Figure 172). If you have difficulty installing a module, do not force it! Carefully remove the module, then check the alignment of the module's notch with the one in the socket. Then re-install the module.

7. Make sure the locking clips at either end of the module click closed (see "D" on Figure 172). If the brackets do not secure themselves to the module, carefully remove the module, then reinstall it.

8. Replace the front panel. *See "Replacing the Front Panel" on page 210.*

9. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*

> *Note: The amount of installed memory will be automatically detected by the system.*

Replacing the Battery

All motherboards use a battery to maintain system configuration information. If it fails to maintain system configuration, replace it with an identically rated battery from the same manufacturer.

Replace the battery as described below:

⚠ Caution

Removing the battery from the motherboard causes the computer to lose system configuration information. Before removing it, run Setup and record the system configuration settings.

Use this information to restore the system after replacing the battery.

---

1. Turn off and unplug the system unit and any external options connected to the system.
1. Remove the left side cover. *See "Removing the Left Side Cover" on page 207.*
2. Remove the front panel. *See "Removing the Front Panel" on page 209.*
3. Locate the battery on the motherboard. *See "Motherboard" on page 34.*
4. Use your finger to carefully remove the battery from the battery socket on the motherboard.

⚠ Warning

The battery may explode if it is incorrectly replaced or improperly discarded.

Use only an identically rated battery from the same manufacturer.

---

5. With the positive (+) side facing up, press the new battery into the socket.
6. Replace the front panel. *See "Replacing the Front Panel" on page 210.*
7. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*
8. Connect the external peripherals and the power cables.
9. Run Setup to reconfigure system parameters.

Installing and Removing an Expansion Card

Your computer's motherboard features several expansion slots that can accommodate accessory expansion cards, such as a RAID board.

Specific Recommendations

RAID Controller

Take the following into consideration when installing either a S-ATA Disk array controller or a SCSI Disk array controller.

Refer to the manual that comes with the RAID controller for more details.

■ Prepare the hard disk drives and cables corresponding to the RAID controller to be installed.

■ Configure the Logical Settings of the hard disk drive.

■ Prepare the number of hard disk drives required for the desired RAID (Redundant Array of Inexpensive [Independent] Disks) level. *See "Configuring RAID" on page 118.*

■ Installing hard disks in the disk array configuration or changing the RAID level initializes hard disks. Make sure to backup any valuable data that may be present on the hard disk drive before installing the disk mirroring controller board and configuring the array.

■ Use hard disks of the same capacity and revolution for each pack to configure them in the array.

■ The disk array configuration improves the disk reliability. On the other hand, the disk capacity is reduced (not equal to the sum of the array's hard disks total capacity).

■ Use an appropriate RAID configuration utility to configure the RAID.

■ When the disk array controller board is replaced, restore the disk array configuration information to the new disk array controller board. Use the configuration utility for the restoration. Refer to the RAID configuration utility specific to your card for more details.

Graphics Card

When installing 75W or greater add-in cards (especially graphics cards) in PCI-E connectors, the add-in cards must be individually powered.

Use available power cables from the system power supply and plug the connector onto the graphics cards.

⚠ **Caution**

Failure to specifically power 75W or greater add-in cards may damage both the motherboard and the add-in cards.

Installing an Expansion Card

📄 **Note**:*You may want to install an operating system before installing any PCI add-in boards.*

---

1. Remove the left side cover.

2. Remove the front panel.

3. Press on the back panel PCI Add-in Card Retention Device lock corresponding to the slot into which you wish to install the PCI card. The retention device opens.
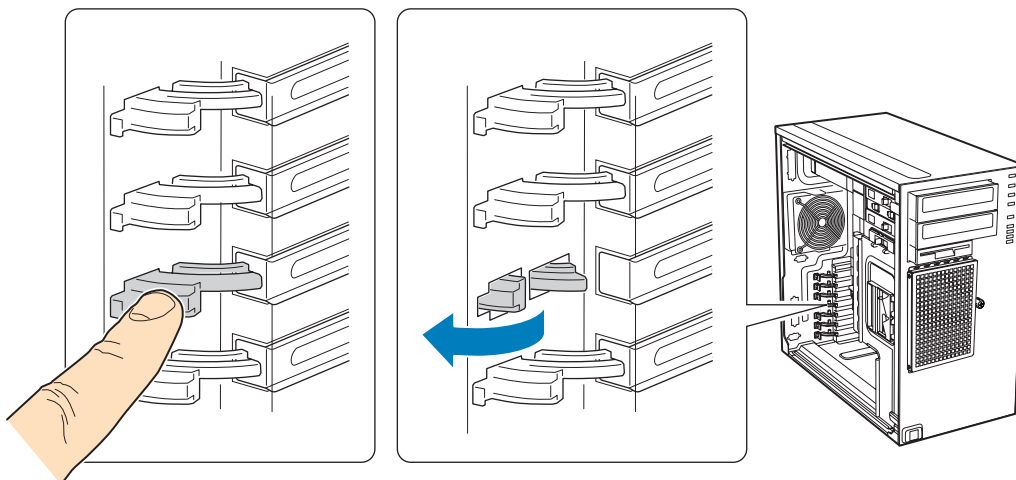
TP01748

Figure 173: Opening the PCI Add-in Card Retention Device

4. Remove the PCI slot shield, if it has not already been removed, by pushing the shield out from the inside of the chassis.
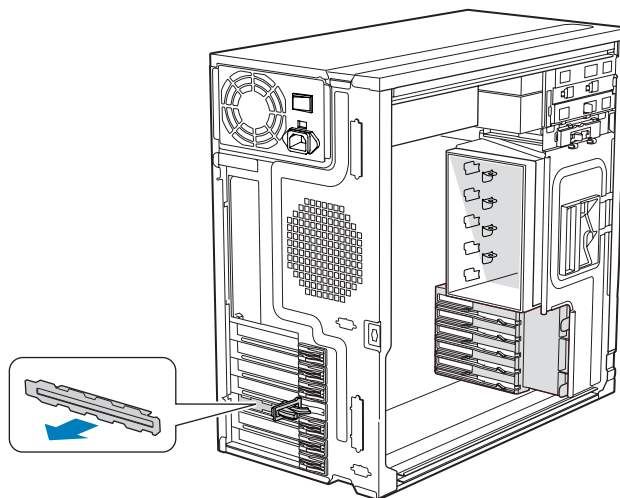
Figure 174: Removing the PCI Slot Shield

5. Remove a PCI add-in board from its protective wrapper.

⚠ **Caution**

Be careful not to touch the components or gold-edge connectors. Place the board on an anti-static surface.

---

6. Record the type and serial number of the add-in board in your equipment log

7. Set jumpers or switches on the board according to the manufacturer's instructions.

8. Hold the PCI add-in board by its top edge or upper corners. Firmly press the add-in board into an expansion slot on the server board (A).

9. Close the back panel PCI Add-in Card Retention Device (B).
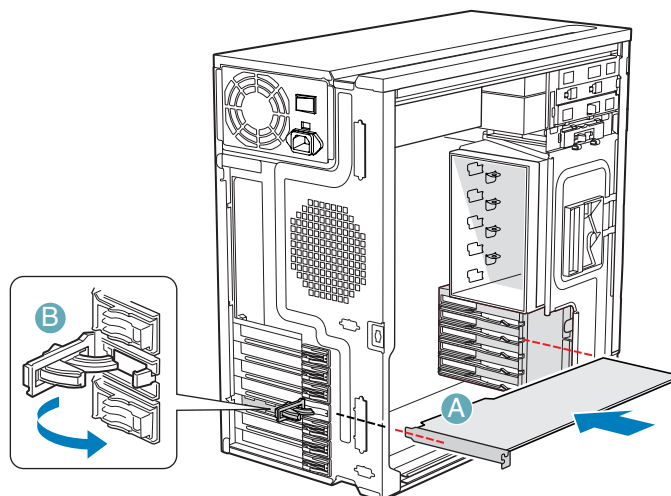
TP01745

Figure 175: Installing the PCI Add-in Board

10. Repeat the previous steps until all PCI add-in boards are installed.

11. Attach cables, if necessary.

12. Replace the front panel. *See "Replacing the Front Panel" on page 210.*

13. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*

Removing an Expansion Card

⚠ Caution

PCI add-in boards are extremely sensitive to electric static discharge (ESD) and always require careful handling. After removing the add-in board from its protective wrapper or from the server board, place it with the component side up on a grounded, static-free surface or conductive foam pad. Do not slide the add-in board over any surface.

1. Remove the left side cover. *See "Removing the Left Side Cover" on page 207.*

2. Remove the front panel. *See "Removing the Front Panel" on page 209.*

3. Open the back panel PCI Add-in Card Retention Device by pressing open from the inside of the chassis.
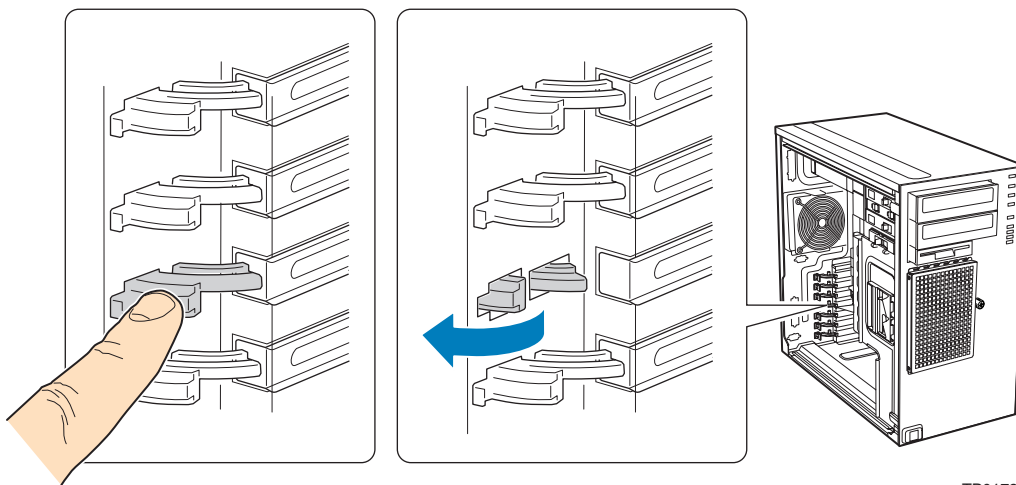
TP01725

Figure 176: Opening the PCI Add-in Card Retention Device

4. Disconnect any cables that may be attached to the PCI add-in board that needs to be removed.

5. Firmly grab the PCI add-in board by its top edge or upper corners and remove it from the expansion slot on the server board (A).

   Place the removed add-in board in an anti-static protective wrapper.

6. Close the back panel PCI Add-in Card Retention Device (B).
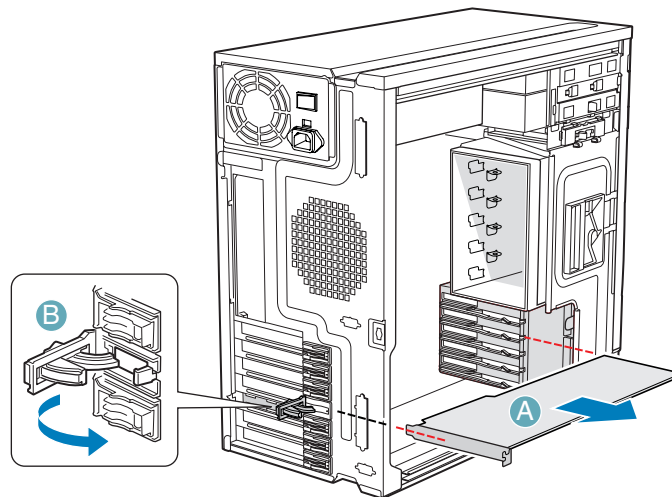
TP01724

Figure 177: Removing the PCI Add-in Board

7. If available, replace the PCI slot shield by pressing the slot shield into the opening on the chassis.
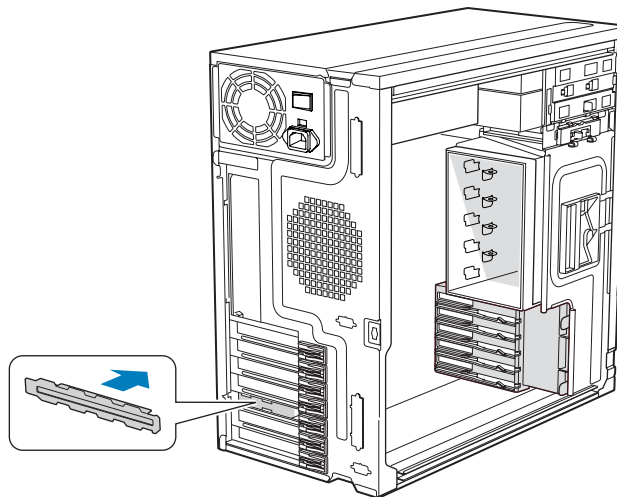
TP01726

Figure 178: Replacing the PCI Slot Shield

8. Replace the front panel. *See "Replacing the Front Panel" on page 210.*

9. Replace the left side cover. *See "Replacing the Left Side Cover" on page 208.*

Installing and Using Utilities

Please setup the server using the ExpressBuilder disc both when setting it up for the first time, and when you make changes to its configuration.

With the ExpressBuilder DVD you can:

■   Install the Operating System, using the Express Setup.

■   Create a support disk; this disk will be used to manually install a Microsoft operating system.

■   Install utilities, such as management software for Windows (NEC ESMPRO etc.). Windows-based applications are installed via the Master Control menu.

> 📝 **Note**: *Some of the utilities mentionned above may not be available on your server.*

■   Read the on-line documentation (Windows systems only).

> 📝 **Note**: *Some of the features can be performed remotely using a cross cable (COM) or LAN.*

Software End-User License Agreement

Carefully read the terms and conditions of the Software End User License Agreement printed on the ExpressBuilder disc sleeve.

Utilities

All the utilities described in the pages hereafter are not available on your server system. Most depend on your configuration.

For instance, amid the several RAID configuration and management utilities listed, only the ones relevant to your RAID hardware (card or chipset) will be available.

ExpressBuilder

ExpressBuilder is an automated software integration tool that helps simplify the process of installing and configuring your system. It provides a flexible, guided installation process for system administrators to install Microsoft® Windows Server™ 2003.

To install other operating systems, please contact your service representative for more information on the operating systems certified on the system.

> 📰 **Note**: *Before using ExpressBuilder for initial setup, complete the hardware configuration.*

ExpressBuilder includes two distinct programs:

■   Express Setup. *See "Installing Microsoft Windows Server 2003 " on page 237.*
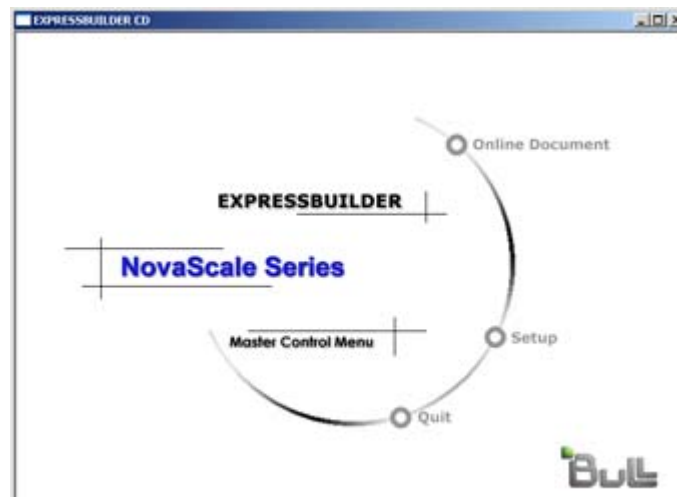
■   Windows-based

This program is called "Master Control Menu" and runs under the Microsoft Windows system (Windows 95 or later and Windows NT 4.0 or later). You can install the several applications and read the documentation from this menu.
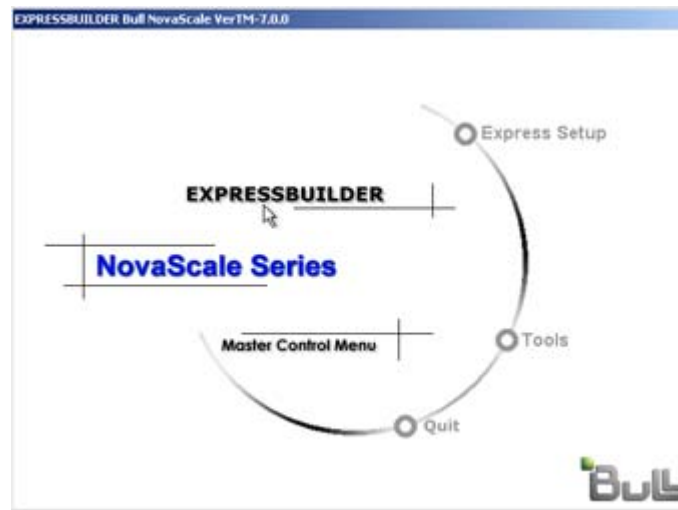
ExpressBuilder for Windows-Based (Master Control Menu)

The Master Control Menu is used to,

■   Read the User's Guide or the other documents,

■   Update the system, and

■   Install the management software.

📑 *Notes*:

■ *Master Control Menu requires Microsoft Windows 95 (or later) or Windows NT 4.0 (or later).*

■ *Some documents are provided in the PDF format. Use the Adobe Acrobat Reader to read these documents.*

Insert the ExpressBuilder disc into the optical disc drive, the Master Control Menu appears on the screen automatically. If the Autorun function is invalid in your system, run the \MC\1ST.EXE file in the disc directly. Some items are grayed-out when the logon user does not have administrator authority, or if the item is not proper for the system.
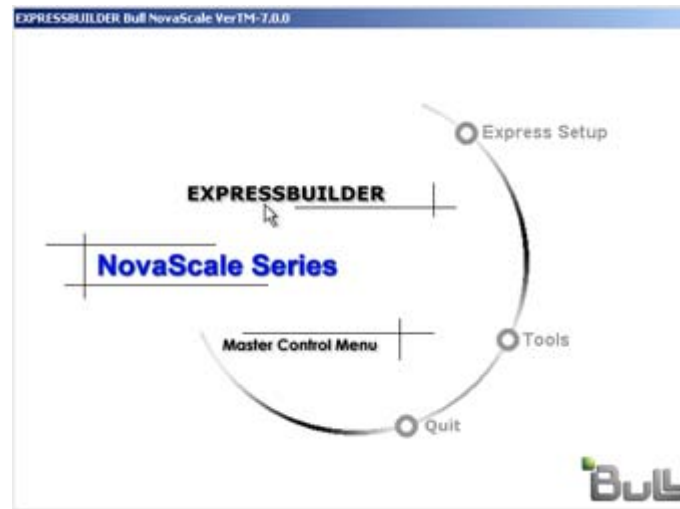
To use Master Control Menu,

■   Click on [Online Document], [Setup] or [Quit], or

■   Click the right mouse button on Master Control Menu window.

Intel Matrix Storage Manager (Windows Interface)

The Intel Matrix Storage Console allows the management of the RAID drives and volumes in a user-friendly interface.

For more information on using the Intel Matrix Storage Console, refer to the Intel Matrix Storage Console Online Help.

Installing the Operating System with Express Setup

This section describes information on using Express Setup to install and configure the following operating systems to the system.

■   Microsoft® Windows® Server 2003

To use the system with the other operating systems described in this section, contact your service representative.

⚠ **Caution**

Before installing the operating system, adjust the system date and time by using the BIOS setup utility "SETUP."

About Express Setup

"Express Setup" contained in your ExpressBuilder CD-ROM is intended for initial setup of the system. Its automatic installation mode guides the user easily through the process by detailing specific hardware features and providing screen prompts for software selection and configuration. The program loads the utilities and drivers, applies RAID settings, partitions the disk, and installs the desired operating system.

⚠ **Caution**

Express Setup is intended for the initial setup of the system. Therefore, it clears the contents of the hard disk.

Express Setup automatically configures your system and installs the operating system. After a few tasks are completed, all that remains to be done is to remove the ExpressBuilder CD-ROM and set the Windows CD-ROM, input a product ID number, and acknowledge the license agreement.

Installing Microsoft Windows Server 2003

This subsection provides information on installing the Microsoft® Windows® Server 2003 Standard Edition x32 or x64 in the system. Read the instructions in this section before proceeding the installation.

Installation Notice

This section explains precautions and matters you should be aware of before beginning the installation in order to install Windows Server 2003 correctly.

Supported Operating System on this Model

The system supports Microsoft Windows Server 2003 Standard Edition (hereinafter, referred to as "Windows Server 2003") x32 and x64.

When installing other operating systems, contact your sales dealer or the maintenance service representative.

BIOS Specification

Before installing the Operating System, verify if the BIOS specification of the hardware is correct. *See "BIOS Setup Utility" on page 288.*

Restrictions

⚠ Caution

■ Before starting the installation, complete all the process of adding the optional device and the setup of system mainframe (BIOS and optional board specification)

■ The document for installing Windows Server 2003 is also attached to the other software package which is sold separately from Bull, but refer to this document when you install Windows Server 2003 on this model.

■ After completing Express Setup, see "Setup for Solving Problems" described later to specify the settings for trouble recovery such as "Specifying Memory Dump".

Installing on a RAID Pack

If you want to install Windows Server 2003 on a volume, the RAID pack needs to be configured first.

Creating Partition Size

The minimum size for the partition where the system is to be installed can be calculated from the following formula.

Size necessary to install the system + Paging File Size + Dump File Size

Size necessary to install the system= 2900 MB

Paging File Size (Recommended)= Mounted Memory Size $\times$ 1.5

Dump file Size= Mounted Memory Size + 12 MB

⚠ Caution

■ The above paging file size is necessary for collecting debug information (memory dump). If you set the default value of paging file size smaller than the 'recommended' value, the accurate debug information (memory dump) may not be collected.

■ The maximum paging file size which can be set on one partition is 4095 MB. If the above paging file size exceeds 4095 MB, specify 4095 MB for the paging file size.

■ If you install any application program or the like, add necessary space to the partition to install these programs.

For example, if the mounted memory size is 512 MB, the minimally required partition size will be calculated by the above formula as follows:

2900 MB + (512 MB * 1.5) + (512 MB + 12 MB) = 4192 MB

Installing Windows Server 2003

This section describes how to setup the system using Express Setup.

1. Turn the power of peripheral devices on, and then turn on the system.

📝**Note:** *Connect the hard disk drive on which the operating system is not going to be installed after installing the operating system.*

---

2. Insert the ExpressBuilder disc into the optical disc drive. The "Choose Your Language" prompt displays.

3. Click on one of the flags to choose a language. The Express Setup home page displays.

■ **Express Setup**: click here to install the Operating System.

■ **Tools**: click here to access DOS tools

■ **Quit**: click here to exit Express Setup

4. Click on **Express Setup**. The Express Setup configuration screen displays.

5. Fill in the boxes.

6. Click on **Start Installation**.

7. The *Configurations Settings OK* dialog box displays. Click on **OK** if the settings are correct, or click on **Cancel** to make any changes.

8. The *Start Installation Confirmation* dialog box displays. Click on **OK**, or click on **Cancel** to return to the Main screen..

9. The installation starts.

📝 **Note:** *The system fan(s) may operate at full speed during the operating system installation. We recommend you shutdown and restart the system after the installation to ensure an adequate fan regulation.*

Installing Drivers or Software

Proceed as follows to install drivers or software:

1. When in Microsoft Operation System, insert the ExpressBuilder disc.
2. Click on **Setup**.
3. Select the appropriate option (driver or software).
4. Follow the on screen instructions

> **Note**: *Prepare a blank floppy disk. You will need it when installing a driver.*

Installing Microsoft Windows Server 2003

This section describes the procedures for installing Windows Server 2003 without using Express Setup tool.

Before Installing Windows Server 2003

Please read carefully the following information BEFORE beginning your Windows Server 2003 Installation.

Installing Service Pack

You can install the Service Pack on the system. When the Service Pack is not delivered with your system, prepare it by yourself.

Updating System

If you change the configuration of the system, update your system with the ExpressBuilder disc delivered with your system.

Re-installing to the Hard Disk which has been upgraded to Dynamic Disk

If you want to leave the existing partition when installing the system on the hard disk upgraded to Dynamic Disk, note the following issue:

■ Do not select the partition where the operating system had been installed as the partition to install the operating system newly.

■ Select "Use the current File System" for the format of operating system partition.

Manual Installation when the Disk Array Controllers are Connected

If you keep the disk array controllers connected during installation process, po-up messages may appear. This does not affect on system behavior. Click [YES] and continue the isntallation.

Magneto-Optical device

If you specify the file system as NTFS with a MO Device connected during the installation, the file system will not be converted normally. Disconnect the MO device and restart the installation from the beginning.

Partition Size

The minimum required partition size for installation of Windows Server 2003 is:

■   2900 MB + Paging file size + Dump file size

■   Paging file size (recommended) = installed memory * 1.5

■   Dump file size = Installed memory size + 12 MB

⚠ **Caution**

■ The above paging file size is necessary for collecting debug information (memory dump). If you set the default value of paging file size smaller than the 'recommended' value, the accurate debug information (memory dump) may not be collected.

■ The maximum paging file size which can be set on one partition is 4095 MB. If the above paging file size exceeds 4095 MB, specify 4095 MB for the paging file size.

■ The dump file size for a system with more than 2 GB memory installed is '2048 MB + 12 MB'.

For example, if installed memory size is 512 MB, the minimum required partition size is:

2900 MB + (512 MB * 1.5) + (512 MB + 12 MB) = 4192 MB.

Dividing into the partition of the recommended size into multiple disks as written below will solve problem that it cannot be reserved in one disk.

1. Set the "Size required for installation + Paging file size".

2. See Appendix F and set that debugging information (equivalent to the dump file size) is to be written to a separate disk.

   (If the disk does not have enough free space to enable the file size to be written, then after installing the system using the "Size required for installation + Paging file size," install an additional new disk.)

Installing
Microsoft Windows Server 2003

You will need the following for Windows Server 2003 installation:

■   ExpressBuilder disc

■   Microsoft Windows Server 2003 Standard Edition (disc)

■   User's Guide

■   Getting Started

■   Windows Server 2003 OEM-DISK for ExpressBuilder

Before installing, create Windows Server 2003 OEM-DISK for ExpressBuilder.

Creating "Windows 2003 OEM-DISK for ExpressBuilder"

You can create Windows 2003 OEM-DISK for ExpressBuilder with the following two procedures:

Creating from the menu which appears when running this Server with ExpressBuilder

Use this procedure if you have only this Server to create Windows 2003 OEM-DISK for ExpressBuilder.

■   If you have only this Server to create Windows Server 2003 OEM-DISK for ExpressBuilder, use this procedure.

   1.   Prepare a 3.5-inch floppy disk.
   2.   Turn on your Server.
   3.   Insert the ExpressBuilder disc in the optical device drive.
   4.   Press the **RESET** switch or press **Ctrl** + **Alt** + **Delete** to reboot the server.(You may also turn off and then on again to reboot the server.)
        The system will boot from the disc and ExpressBuilder starts.
   5.   Select [Create Support Disk] from [Tools].
   6.   Select [Windows Server 2003 OEM-DISK for ExpressBuilder] from [Create Support Disk] menu.
   7.   Insert a diskette in the floppy disk drive according to the on-screen instruction.
        Windows Server 2003 OEM-DISK for ExpressBuilderwill be created.
   8.   Write-protect and label the diskette, then keep it in a safe place.

Creating Windows 2003 OEM-DISK from [Master Control Menu]

Use this procedure if Windows Server 2003 or Windows 2000 can be operated on this Server.

[Master Control Menu] runs on the following operating systems.

- Windows Server 2003
- Windows 2000
- Windows Me/98/95
- Windows NT 4.0
- Windows XP

You can create Windows Server 2003 OEM-DISK for ExpressBuilder from [Master Control Menu], if you have the computer on which one of the above operating system operates.

Follow the steps below:

1. Prepare a 3.5-inch floppy disk.
2. Run the operating system.
3. Insert the ExpressBuilder disc in the optical device drive.
     [Master Control Menu] is displayed.
4. Click [Setup] with left mouse button and click [Make OEM-DISK] and then [for Windows Server 2003].

📑 **Note***: You can do the same operation using the menu displayed by a right-click.*

---

5. Insert the floppy disk into the floppy disk drive according to the message.
     Windows Server 2003 OEM-DISK for ExpressBuilder will be created.
6. Write-protect and label the diskette, then keep it safely.

Windows Server 2003 Clean Installation

This section explains how to perform a clean installation of Windows Server 2003.

1. Turn the system on.
2. Insert the Windows Server 2003 disc in the optical device drive.
3. Press **Ctrl** + **Alt** + **Delete** to reset the system.

   After a bootable operating system has been installed on the hard disk, press **Enter** while the message "Press any key to boot from CD..." is displayed at the top of the screen.

   If no bootable operating system exists on the hard disk, this step is unnecessary.

   The Windows Server 2003 setup screen will be displayed.

   If the screen is not displayed, **Enter** was not pressed properly.

   Retry after turning the system off then on again.

4. If the RAID controller (including embedded HostRAID feature) or SCSI controller is installed, press **F6** in a few seconds when the window is in one of the following states:

   – "Setup is inspecting your computer's hardware configuration..." is displayed.

   – A screen with a solid blue background is displayed.

   ▤ **Note**: *There is no visible indication on screen when F6 has been pressed.*

5. When the following message is displayed, press **S**.

Setup could not determine the type of one or more mass storage devices installed in your system, or you have chosen to manually specify an adapter. Currently, Setup will load support for the following mass storage devices.

   The following message is displayed.

Please inert the disk labeled manufacturer-supplied hardware support disk into Drive A: *Press ENTER when ready.

6. Insert the Windows Server 2003 OEM-DISK for ExpressBuilder into the floppy drive, and press **Enter**.
   SATA Model: A list of mass storage devices is displayed.

       SCSI Model: Select the [Adaptec Ultra320 SCSI Cards (WinXP/Server 2003 IA-32)] and press **Enter**.

7. Select the proper SCSI Adapter and press **Enter**.

8. Follow the on-screen instructions to complete the installation.

9. After installation is completed, be sure to follow the procedures described in "Driver Installation and Advanced Settings" and "Updating the System" later in this guide.

Upgrade installation

Procedures below upgrade the installed Windows 2000 to Windows Server 2003.

1. Power on the system and start Windows 2000.

2. Log on as an administrator.

3. Insert the Windows Server 2003 disc into the optical device drive.
   [Select an operation] dialog box is displayed.

> *Note: If the [Select an operation] dialog box does not appear, start \SETUP.EXE from optical device drive.*

4. Select [Install Windows Server 2003].
   A dialog box asks to select the upgrade or clear installation.

5. Select "Upgrade (recommended)" and click **Next**.

   Follow the messages and continue.
   The system will restart after copying the files.

> *Note: You can leave the Windows Server 2003 disc in the optical device drive.*

6. If the RAID controller (including embedded HostRAID feature) is installed, press **F6** while the message "Setup is inspecting your computer's hardware configuration..." is displayed.

> *Note: There is no visible indication on screen when F6 has been pressed.*

7. When the following message is displayed, press **S**.

```
Setup could not determine the type of one or more mass storage devices

installed in your system, or you have chosen to manually specify an adapter.

Currently, Setup will load support for the following mass storage devices.
```

The following message is displayed.

```
Please insert the disk labeled

manufacturer-supplied hardware support disk

into Drive A:

*Press ENTER when ready.
```

8. Insert the Windows Server 2003 OEM-DISK for ExpressBuilder in the floppy
    disk drive, and press **Enter**.
    A list of mass storage devices is displayed.
    SCSI Model: Select the [Adaptec Ultra320 SCSI Cards (WinXP/Server 2003
    IA-32)] and press **Enter**.

9. If the optional board is installed, select the proper SCSI Adapter and press
    Enter.

10. Follow the on-screen instructions.

11. Update the system.

12. Install the driver and make detailed settings.

    ■ SCSI controller
      The following message may appear on the display during the upgrade
      installation to Windows Server 2003. Inthis case;
      Please type D:/i386 and click OK. (D: CD-Drive)
      Insert disk
      The file 'adpu160m.sys' on Adaptec Windows 2000 Family Manager set
      V1.12 S2 is needed.

    ■ Type the path where the file is located, and then click OK.

    ■ If PROSET II is already installed, uninstall the PROSET II before
      upgrading.
      If the teaming function is enabled, disable the function before
      uninstalling PROSET II.

    ■ During upgrade installation, [Disk Insert] dialog box may be displayed.
      If it is displayed, click **Cancel**.

    ■ When the upgrade installation is completed, [Device Driver Wizard]
      dialog box may be displayed.
      If it is displayed, click **Cancel**, then update the system.

Reinstallation to Multiple Logical drives

This section describes the procedure for reinstalling the operation system if the multiple logical drives exist.

Before Re-installing the Operation System

Be sure to make backup copies before re-installing the operation system just in case.

Re-installing the Operation System

1. Start the clean installation following the procedure described in this guide.
2. Specify the partition in which you want to install the operating system when the following message appears:

> The following list shows the existing partitions and unpartitioned space on this computer.
>
> Use the UP and DOWN ARROW keys to select an item in the list.
>
> * Cannot modify the drive letter of your system or boot volume. Confirm the proper drive letter is assigned and then, continue the setup.

3. Continue the clean installation following the procedure described earlier in this chapter.

   * The drive letter of the re-installed system may differ from the one of the previous system. If you need to modify the drive letter, follow the procedure "Modifying the Drive Letter".

Modifying the Drive Letter

Be careful that the drive letter of the system or boot volume cannot modify with the following procedure.

1. Click Start menu, right-click [My Computer], and specify [Manage] to start [Computer Management].
2. Specify the [Disk Management] in the left side of the window.
3. Right-click the volume you want to modify the drive letter and specify the [Change Drive Letter and Path...].
4. Click [Yes].
5. Choose the [Assign a drive letter] and specify the drive letter you want to assign.
6. Click [OK].
7. If the following message appears, click [Yes]:

> Changing the drive letter of a volume may cause programs to no longer run.
>
> Are you sure you want to change this drive letter?

8. Close the [Computer Management].

Updating the System

To ensure normal system operation you should update your system using the following procedures.

1. Logon to the system using the administrator account or other account which is a member of the Administrators group.
2. Insert the ExpressBuilder disc into the optical device drive.
    [Master Control Menu] is displayed on the screen.
3. Click [Setup] with left mouse button and click **U** [Update system] section.
4. Follow the on-screen instructions to continue system update.
5. Click [Restart Computer] to restart the system.
6. Remove the ExpressBuilder disc from the optical device drive immediately after clicking [Restart Computer].

⚠ **Caution**

If you change the configuration of the system (by adding or removing hardware or Operating system software components) or repair the system, you must run the system update again.

Driver Installation and Device Settings

This section describes how to install and setup various standard drivers mounted on the device.

For information on installing and setting up a driver that is not described in this section, please refer to the document delivered with the driver.

PROSet

PROSet is a utility that checks the function of network contained in network driver.

Using PROSet enables the following items:

■   Verify detailed information of the adapter.

■   Diagnose loop back test, packet transmission test and so on.

■   Setup of teaming.

Configuring several network adapters as one team provides the server a tolerant environment on any trouble and enhance throughput between the switches.

PROSet is necessary to use these features.

To install PROSet:

1. Insert the ExpressBuilder disc into the optical device drive.
2. The [Windows Explorer] dialog starts.
    a. In the case of the standard start menu, click Start menu and click [Windows Explorer].
    b. In the case of the classic start menu, click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "PROSet.exe" in the following directory:
    <Optical Disc DriveLetter>:\WINNT\DOTNET\BC1\PROSet\WS03XP32
    The [Intel(R) PROSet - InstallShield Wizard] dialog starts.
4. Click [Next].
5. Choose "I accept the terms in the license agreement" and click [Next].
6. Choose "Typical" and click [Next].
7. Click [Install].
8. When [InstallShield Wizard Completed] window is displayed, click [Finish].
9. Restart the system.

Network Driver

Specify the details of network driver.
One standard network driver that is mounted will be installed automatically, but the link speed and duplex mode need to be specified manually.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box is displayed.

■ Procedure with the standard start menu: click Start menu, [Control Panel], [Network Connections], and [Local Area Connection].

■ Procedure with the classic start menu:

   a. Click Start menu, Click [Settings] and Click [Network Connections]. The [Network Connections] dialog box is displayed.

   b. Right-click [Local Area Connection] and click [Properties] from pop-up menu.

2. Click [Configure].
The property dialog box for network adapter is displayed.

3. Click [Advanced] and specify the [Link Speed & Duplex] value the same as the value specified for HUB.

4. Click [OK] on the property dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box is displayed.

■ Procedure with the standard start menu: click Start menu, point to [Control Panel] and click [Intel PROSet].

■ Procedure with the classic start menu:

   a. Click Start menu, point to [Settings] and click [Control Panel].

   b. Double-click [Intel(R) PROSet] on the [Control Panel] window.

2. Click [(Network Adapter Name)] in the list.

3. Click [Speed] and specify the [Link Speed & Duplex Settings] value the same as the value specified for HUB.

4. Click [Apply] and click [OK].

Also, add or delete any protocols and services if necessary.

You can operate the process on the property dialog box for local area network which can be displayed from [Network and Dial-up Connection].

> 📑**Note**: *We recommend you to add [Network Monitor] at [AddingServices]. [Network Monitor] can monitor the frame (or the packet) that the computer installing [Network Monitor] sends or receives. This tool is valuable when analyzing network trouble. For information on how to install the tool, see the "Setup for TroubleProcess" later in this document.*

Re-install the Network Driver

The network driver will be installed automatically.

Graphics Accelerator Driver

Update Graphics Accelerator Driver Mounted in Standard.

1. Insert the ExpressBuilder disc into the optical disc drive.
2. Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer]
3. Run "SETUP.EXE" in the following directory.

<Optical disc drive Letter>:\WINNT\VIDEO\RADEON7000\W2K3\SETUP.EXE

*Install the graphics accelerator driver in the following directory if you communicate your server with the remote KVM console. (Optional advanced remote management card must be installed in your server to use the remote KVM console.)

<Optical disc Drive Letter>:\N8115-02\VIDEO\RADEON7000\SETUP.EXE

4. Follow the message to continue the installation.
5. Remove the ExpressBuilder disc from the optical disc drive, follow the direction on the screen and restart the system.

Installing SCSI Controller Driver

If you use SCSI controller driver, install it according to the following procedure:

1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools] → [Computer Management].
2. Double-click the SCSI Controller driver which Device Manager lists as unknown device.
3. Click [Update Driver].
4. When the "Update Device Driver Wizard" appears, select "Install from a list or specific location [Advanced]" and click [Next].
5. Select "Don't search. I will choose the driver to install" and click [Next].
6. Click [Have Disk..].
7. Insert "Windows Server 2003 OEM-DISK for ExpressBuilder" into the floppy disk drive, enter "a:\" into "copy manufacturer's file from:" and click [OK].
8. Specify the relevant driver and click [Next].

The installation of the driver is completed.

Restart the system according to the message appeared on the screen.

Installing RAID Controller Driver

To additionally install a RAID controller in a system containing Windows 2003, connect the controller and take the following steps to install the driver:

1. When the [Found New Hardware Wizard] dialog box appears, click [Next].

2. When the [Install Hardware Device Drivers] dialog box appears, select [Search for a suitable driver for my device (Recommended)], and click [Next].

3. When the [Locate Driver Files] dialog box appears, select [Floppy disk drives], insert "Windows Server 2003 OEM-DISK for ExpressBuilder" into the floppy disk drive, and click [Next].

4. When the [Driver Files Search Results] dialog box appears, click [Next].

5. Copying of the driver is completed, and the [Completion of the new hardware detection wizard] dialog box below appears. Click [Complete].

Available Switch Options for Windows Server 2003 Boot.ini File

Many different switches will be available if you edit Boot.ini file.

For the available switch options, refer to the following information:

■   Microsoft Knowledge Base - Article ID: 833721

"Available switch options for the Windows XP and the Windows Server 2003 Boot.ini files"

If your system has a memory capacity in excess of 4GB in its installing, adding /PAE switch in Boot.ini file will enable the system to be installed with over 4GB of memory.

However, the Microsoft operating system products which support /PAE switch option are limited.

Refer to the following article in Microsoft Knowledge Base to check the supported products.

■   Microsoft Knowledge Base - Article ID: 291988

"A description of the 4GB RAM tuning feature and the Physical Address Extension switch"

Below is the example on how to add /PAE switch to Boot.ini file.

1. Click [Start], point to [Settings], and then click [Control Panel].

2. In [Control Panel], double-click [System].

3. Click the [Advanced] tab, and then click [Settings] under [Setup and Recovery].

4. Under [System Setup], click [Edit] to open [Boot.ini].

5. Add "/PAE" to [Operating Systems] section in [Boot.ini] file, and then save it.
    <Example of Boot.ini file>
    [boot loader]
    timeout=30
    default=multi(0)disk(0)rdisk(0)partition(2)\WINDOWS
    [operating systems]
    multi(0)disk(0)rdisk(0)partition(2)\WINDOWS="Windows   Server   2003, Standard" /fastdetect
    multi(0)disk(0)rdisk(0)partition(2)\WINDOWS="Windows   Server   2003, Standard, PAE" /fastdetect /PAE

C:\CMDCONS\BOOTSECT.DAT="Microsoft Windows Recovery Console" / cmdcons

This is the end of editing Boot.ini file.

📑**Note**: *If you choose one of the items in the "Default operating system" drop-down list box in [Setup and Recovery] group box, you can make your system start automatically from the switch you specified.*

Setting for Collecting Memory Dump (Debug Information)

Set for collecting memory dump.

NovaScale R410 E1 Security with Mechanical Locks and Monitoring

Front Bezel Lock

Lock the front bezel (optional) to prevent unauthorized access to the inside of the chassis.
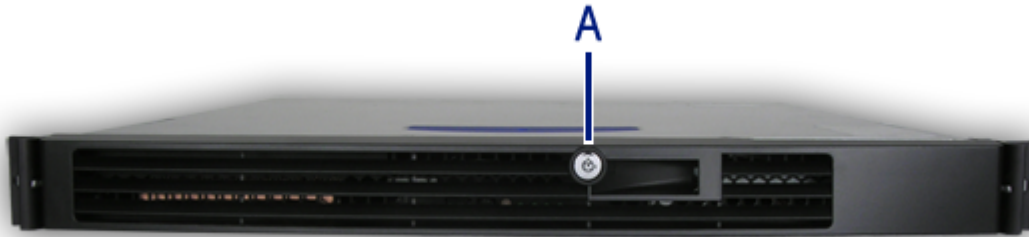
Figure 179: Front Door Lock (A)

⎙ *Note: the keys can be found on the front panel.*

NovaScale T830 E1 Security with Mechanical Locks and Monitoring

AF000308
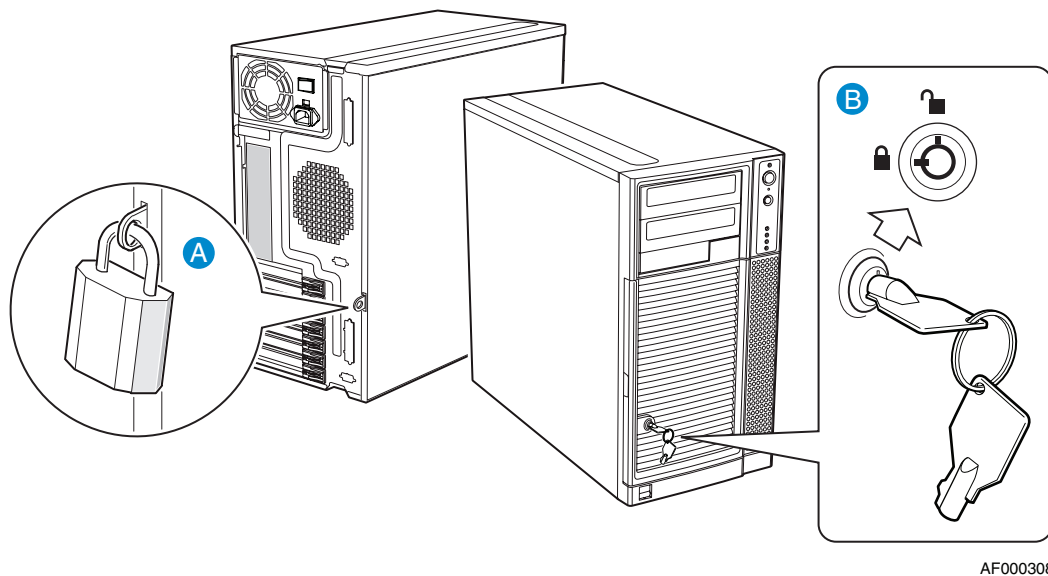
Figure 180: WA2500/SA2500 Security Features

A: Padlock loop
B: Two-position mechanical lock

📃 **Note**: *the keys can be found on the front panel.*

Front Door Lock

Lock the front door to prevent unauthorized access to the hard drives and the inside of the chassis.

Rear Door Padlock Loop

Attach a padlock to the loop to prevent unauthorized access to the inside of the chassis.

Maintenance

This chapter describes the daily maintenance of the system and precautions when relocating or storing the system.

Making Backup Copies

We recommend you make backup copies of your valuable data stored in hard disks of the system on a regular basis. For backup storage devices suitable for the system and backup tools, consult with your sales agent.

We also recommend you make a backup copy of the disk array configuration data if your system is in an array configuration. Perform the backup copy again if your hard disks have been auto-rebuilt due to a failure. To make a backup copy of the configuration data, use the configuration utility that is resident in the FLASH memory on the optional disk array controller board. Refer to the manual supplied with the board.

Cleaning

Clean the system on a regular basis to keep the system in a good shape.

⚠ Warning

■ Do not disassemble, repair, or alter the system.

■ Do not look into the optical device drive.

■ Do not remove the lithium battery.

■ Disconnect the power plug before working with the system.

Cleaning the External Surfaces of the system

⚠ Caution

■ To avoid altering the material and color of the system, do not use volatile solvents such as thinner and benzene to clean the system.

■ The power receptacle, the cables, the connectors on the rear panel of system, and the inside of the system must be kept dry. Do not moisten them with water.

For daily cleaning, wipe the external surfaces of the system with a dry soft cloth

If stains remain on the surfaces:

1. Make sure that the system is powered off (the POWER/SLEEP lamp is unlit).
2. Unplug the power cord of the system from a power outlet.
3. Wipe off the dust from the power cord plug with a dry cloth.
4. Soak a soft cloth in a neutral detergent diluted with cold or lukewarm water, and squeeze it firmly.
5. Rub off the stains from the system with the cloth prepared in Step 4.
6. Soak a soft cloth in water, squeeze it firmly, and wipe the system with it once again.
7. Wipe the system with a dry cloth.
8. Wipe off dust from the fan exhaust openings with a dry cloth.

Cleaning the Interior of the system

One of the most important items of a good maintenance program is a regular and thorough cleaning of the inside of the server, especially around the base board.

Dust buildup inside the server can lead to several problems. As dust acts as a thermal insulator, a buildup can prevent proper system cooling. Excessive heat will shorten the life of the server components. The dust may also contain conductive or corrosive materials that can cause short circuits or corrosion of the electrical contacts.

The frequency at which you should clean the inside of the server depends on the environment in which it is located. For most office environments, every 12 months is probably sufficient. For more severe environments, clean the inside every 6 months.

Cleaning the interior of the server implies powering off the server and removing the left side cover. You will need a small vacuum cleaner (with a plastic tipped nozzle and electrostatic protection), computer grade canned air, and a small brush.

⚠ Warning

Unplug all power cords before performing any maintenance. Voltage is present inside the system and display unit even after the power is turned off. All voltage is removed only when the power cord is unplugged.

⚠ Caution

Do not use a brush made of chemical fabric, it may generate static electricity.

To clean the interior of the system:

1. Turn off the system and unplug all the power cables.
2. Remove thecover.
3. Use a small brush to loosen any dust and debris on the motherboard.
4. Use computer grade canned air to blow dust off components on the motherboard.
5. Use a small vacuum cleaner with plastic tip to vacuum out the dust and debris from the inside of the system.
6. Reinstall the cover.
7. Reconnect all the power cables and turn on the system.

Cleaning the Keyboard

1. Power off the system and peripheral devices.
   The POWER/SLEEP lamp is unlit.
2. Wipe the keyboard surface with a dry cloth.

Cleaning the Mouse

Mechanical mouse

The mouse operation depends on the degree of smoothness of the internal ball rotation. To keep the mouse ball clean, use the mouse in a place with little dust.

1. Prepare cold or lukewarm water, neutral detergent, alcohol, two dry soft clothes, and cotton swabs.
2. Power off the system.
   The POWER/SLEEP lamp is unlit.
3. Turn the mouse upside down, and rotate the mouse ball cover counter clockwise to remove it.
4. Take out the ball from the mouse. Cover the bottom of the mouse with your hand, and turn your hand holding the mouse (the mouse is on your palm with the button upward). The mouse ball is released onto your palm.
5. Soak a soft cloth in neutral detergent that is diluted with cold or lukewarm water, and squeeze it firmly.
6. Rub off stains on the mouse ball. Softly wipe the mouse ball with the cloth prepared in Step 5.
7. Wipe the mouse ball with a dry soft cloth.
8. Wipe three small rollers inside the mouse with a cotton swab soaked with alcohol. Wipe stains slowly and carefully by rotating rollers with the tip of the cotton swab.
9. Blow out any dust from the mouse. Protect your eyes from the dust.
10. Put the mouse ball back into the mouse.
11. Place the mouse ball cover, and rotate it clockwise until it is locked.

Optical Mouse

An optical mouse is an advanced computer pointing device that uses a light-emitting diode (LED), an optical sensor, and digital signal processing (DSP). Movements of the mouse are detected by sensing changes in the reflected light, rather than by interpreting the motion of a rolling sphere as with a mechanical mouse.

Tips for correct use

The optical mouse takes microscopic snapshots of the working surface at a rate of more than 1,000 images per second. If the mouse is moved, the image changes. The smallest irregularities in the surface can produce images that are sufficient for the sensor and DSP to generate usable movement data.

Considering the way the optical mouse works:

■ Avoid mouse pads that are very glossy or highly reflective.

■ Avoid dark mouse pads.

■ Use your mouse on colors such as white, tan, or grey.

■ Use your mouse on surfaces with a flat, non-reflective finish.

■   Use your mouse on surfaces that reflect but also scatter the light, such a a white sheet of drawing paper.

🖹 **Note**: *If you experience erratic mouse behavior, test it on a plain white sheet of paper.*

Cleaning the Light-Emitting Diode (LED)

Turn the mouse over and inspect the light-emitting diode "LED" area to make sure it is clean. In practice, an optical mouse does not have the issues with debris build-up that the older, mechanical ball mice experience.

■   If there is a smudge on the lens area, gently clean with a plain cotton swab.

■   If there are some debris in the lens area, gently blow them away.

Cleaning the Soft Pads

Over time, dust may collect on the soft pads located on the bottom of the mouse.We recommend you remove the dust on each softpad using a coin. You can also place the mouse on a white sheet of paper, and run the mouse over it (apply soft pressure on the mouse while doing so).

🖹 **Note**: *Do not use a sharp instrument, it could damage the soft pads.*

Cleaning an Optical Disc Drive

A dust-accumulated tray or a dusty optical drive may cause the device not to read data correctly.

To Clean an Optical Drive:

1.   Power on the system.
     The POWER/SLEEP lamp is lit.
2.   Press the optical drive tray Open/Close button on the front of the optical drive.
     The tray opens.
3.   Hold the disc and take it out from the tray.

🖹 **Note**: *Do not touch the signal side of the disc with your fingers.*

---

4. Wipe the tray with a dry soft cloth.

⚠ Caution

Do not wipe the lens of the optical drive. Doing so may damage
the lens and may cause a malfunction of the drive.

---

5. Push on the tray front to close the tray.

To Clean an Optical Disc

Wipe the signal side of the disk with a dry soft cloth.

⚠ Caution

■ Wipe disks from the center to the outside.

■ Use only a specific disc cleaner if necessary. Cleaning a
disc with record spray/cleaner, benzene, or thinner causes
damage to the disk contents. At worst, inserting the disk into
the system may cause failure.

Care and Handling

Use the following guidelines to properly handle and care for your system.
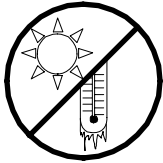
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.

Keep the system away from magnetic forces.

Keep the system dry. Do not wash the system with a wet cloth or pour fluid into it.
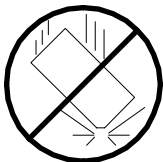
Protect the system from being bumped or dropped.

Check the system for condensation. If condensation exists, allow it to evaporate before powering on the system.

Keep the system away from dust, sand, and dirt.

Solving Problems

This chapter helps you identify and solve problems that may occur during system installation or while using your system. The first section of this chapter tells you how to reset your system in the event of problems. The next few sections provide troubleshooting checklists and procedural steps that help you isolate specific system problems. The last section includes BIOS and system user information.

⚠ Warning

The DC push-button on/off switch on the front panel does not turn off completely the system AC power. +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis.

Not disconnecting power before opening your system can result in personal injury and equipment damage

⚠ Caution

Running your system with the cover removed can damage your system components.

For proper cooling and airflow, always replace the covers before powering on your system.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Troubleshooting Guide

This section provides you a guide to identify a problem and locate its source.

⚠ Warning

The system power and any peripheral devices should be turned off before connecting or disconnecting peripheral devices to or from the system.

Otherwise, you could permanently damage the system or peripheral devices.

---

1. Turn off the system and any peripheral devices. Disconnect all external peripherals from the system, except for the keyboard and monitor. The system´s power cord must be plugged into a grounded electrical outlet.

2. Make sure your keyboard and monitor are properly connected to the system. Turn the monitor on, then adjust its brightness and contrast controls to suit your preference (see your monitor´s documentation).

3. Turn the system on. If the power indicator does not light up, but the system seems to be operating normally, the indicator may need replacement.

4. Monitor the power-on self test (POST) execution. Each time you turn on the system, the POST checks the system board, memory, keyboard, and certain peripheral devices.

5. Check the following during the POST:

    ■ (Error Message Line 1)

    ■ (Error Message Line 2)

    ■ Press <F1> to continue,

    ■ <DEL> to enter Setup

    ■ You should note the error and press **F1** to resume the boot-up process, or **DEL** to enter Setup.

6. Errors that prevent the boot process from continuing (fatal errors) are communicated by a series of audible beeps. If this type of error occurs, record the information and refer to the Error Messages: Beep Codes section.

System Viewers

Monitor the occurrence of fault with the Remote Manager (NEC ESMPRO, ASWM or another utility, depending on your system) during the system operation.

Especially take note on whether any alert is reported to the Remote Manager on the management PC.

Problems at initial System Start-up

Problems that occur at initial system start-up are often caused by incorrect installation of components or incorrect configuration. Hardware failure is a less frequent cause.

■   Are all cables properly connected and secure?

■   Is AC power available at the wall outlet?

■   Are the configuration settings correct in Setup? Are all drivers properly installed?

■   Are all the expansion cards fully seated in their slots on the motherboard?

■   Are all DIMMs installed correctly?

■   Is the processor fully seated in its socket on the motherboard?

■   Are switches and jumpers on the system board correct (if they have been changed from their original default settings)?

■   Are all jumper and switch settings on optional add-on cards and peripheral devices set correctly? Check the documentation included with these devices for details. Ensure that there are no system resource conflicts between hardware components. (For example, two add-on cards could inadvertently share the same interrupt, resulting in a conflict.)

■   Are adapter cards and disk drives correctly installed?

■   Is the keyboard properly connected to the system and is it connected in the right PS/2 port?

■   Is a bootable diskette installed in your system's floppy drive A:? (if a floppy disk drive is intalled).

■   Is the hard disk properly formatted or defined?

■   Is the operating system properly loaded? Check the operating system documentation.

Problems After the System Has Been Running Correctly

After the system hardware and software have been running correctly, problems can indicate equipment failure. Use the checklist below to try and correct the situation.

If the problem recurs after you have checked these items, refer to *"Troubleshooting Guide" on page 265*.

■ If you are running software from a diskette or CD, try using a new copy.

■ If you are running software from a hard disk drive, make sure that all of the necessary files are installed. There may be a problem with the copy on the hard disk. Reinstall the software on the hard disk and try again.

■ If problems appear intermittently, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), or other random component failures.

■ A transient voltage spike, power cut, or brownout may have occurred. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands. If necessary, exit any open applications and shut down your system power. Reboot the system, then load the software and try again.

■ Voltage spikes can occasionally cause the heads of the disk drive to contact the disk. This can corrupt or destroy data files. If you are experiencing voltage spikes on the AC electrical power line, install an uninterruptible power supply between the power outlet and the system's power cord.

Problems Running New Application Software

Problems occurring when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. Use the checklist below to see if the situation may be easily corrected. If the problem persists after you have checked these items, contact the software vendor's customer service.

■ Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.

■ Is the software an authorised copy? Unauthorised copies often do not work. Obtain an authorised copy of the software.

■ If you are running the software from a CD or diskette, is it a good copy?

■ If you are running the software from a CD, is the disc scratched or dirty?

■ Is the software correctly installed? Were all necessary procedures followed and files installed?

■ Are the correct device drivers installed?

■ Is the software correctly configured for the system?

■ Are you using the software correctly?

Problems and Suggestions

Contact your Authorised Service Representative if the suggested actions do not solve the problem.

Table 8: Problems and Suggestions

What to do	What to do
Application software problems	Make sure all cables are installed correctly.
	Verify that your system hardware configuration is set correctly. In Setup, check the values against the system settings that you previously recorded. If an error is evident (wrong type of drive specified, for example), make the change in Setup and reboot the system. Record your change.
	Make sure the software is properly configured for the system. Refer to the software documentation for information. Try a different copy of the software to see if the problem is with the copy you are using.
	If other software runs correctly on the system, contact the vendor of the failing software.
Characters on screen are distorted or incorrect	Make sure the brightness and contrast controls are properly adjusted. Make sure the monitor's video signal cable and power cables are properly installed. (Shut down system power before reconnecting cables.) Make sure your monitor is compatible with the video mode you have selected. (Check your monitor's documentation.)
Characters do not appear on screen	Make sure the monitor is plugged in and turned on. Are the brightness and contrast controls properly adjusted? Make sure that the video signal cable is properly connected. (Turn the system power off before reconnecting cables). Make sure your system's video adapter card is installed, enabled. Reboot the system.
CMOS RAM settings are wrong	If system settings stored in CMOS RAM change for no apparent reason (for example, the time of day is in error), the backup battery may no longer have enough power to maintain the settings. Replace the battery.
Diskette drive light does not go on when drive is in use or is tested by POST.	Make sure the power and signal cables for the drive are properly installed. Check that the drive is properly configured and enabled in Setup.
Hard drive light does not go on when drive is in use or is tested by POST.	Make sure the power and signal cables for the drive are properly installed. Make sure the front panel connector is securely attached to the system board headers. Check that the drive is properly configured and enabled in Setup. Check the drive manufacturer's manual for proper configuration for remote hard disk drive activity.
	If your HDDs are plugged onto a PCI card, this is normal. The LED will light only when detecting activity on the optical drives.
Power on light does not go on	If the system is operating normally, check the connector between the system board and the front panel. If OK, the light may be defective.

Problems with the System

Fail to power on the system:

■   Is the system is properly supplied with power?

- Check if the power cord is connected to a power outlet (or UPS) that meets the power specifications for the system.

- Check the power cord for broken shield or bent plugs.

- Make sure the power breaker for the connected power outlet is on.

- If the power cord is plugged to a UPS, make sure the UPS is powered and it outputs power. See the manual that comes with the UPS for details.

■   Did you press the POWER/SLEEP switch?

- Press the POWER/SLEEP switch on the front of the system to turn on the power (the POWER/SLEEP lamp lights).

Fail to power off the system

■   Is the power switch enabled?

- Restart the system and start the BIOS setup utility

No screen display appears and beep occurs.

■   Is the DIMM board installed securely?

- Check whether the DIMM board is inserted into the mating connector securely.

- Make sure the jumper switches have been returned to their original positions after CMOS clearing. for the positions of the jumper switches.

POST fails to complete:

■   Is the memory size large?

- The memory check may take a few seconds if the memory size is large. Wait for a while.

■   Did you perform any keyboard or mouse operation immediately after you started the system?

- If you perform any keyboard or mouse operation immediately after start-up, POST may accidentally detect a keyboard controller error and stops proceeding. In such a case, restart the system once again. Do not perform any keyboard or mouse operation until the BIOS start-up message appears when you restart the system.

■   Does the system contain appropriate memory boards or PCI devices?

- Operation of the system with unauthorized devices is not guaranteed.

Fail to access to internal or external devices (or such devices fail to operate):

■ Are cables properly connected?

- Make sure that the interface cables and power cord are properly connected. Also make sure that the cables are connected in the correct order.

■ Is the power-on order correct?

- When the system has any external devices connected, power on the external devices first, then the system.

■ Did you install drivers for connected optional devices?

- Some optional devices require specific device drivers. Refer to the manual that comes with the device to install its driver.

■ Is BIOS configuration correct?

- Some devices connected to the serial or parallel port may require I/O port address or operation mode settings. Refer to the manual that comes with the board for details to make correct settings.

The keyboard or mouse fails to operate:

■ Is the cable properly connected?

- Make sure that the cable is connected to the correct connector on the rear of the system.

- The keyboard or mouse does not operate if it is connected when the system is powered (not applicable to USB devices). Power of the system first and connect it properly.

■ Are the system drivers installed?

- Refer to the manual that comes with your OS to check that the keyboard and mouse drivers are installed. (These drivers are installed along with the OS.) Some OS's allow you to change the keyboard and mouse settings. Refer to manual that comes with your OS to check that the keyboard and mouse settings are correct.

Fail to access (read or write) to the floppy disk:

■ Does the floppy disk drive contain a floppy disk?

- Insert a floppy disk into the floppy disk drive until it clicks.

■ Is the floppy disk write-protected?

- Place the write-protect switch on the floppy disk to the "Write-enabled" position.

■ Is the floppy disk formatted?

- Use a formatted floppy disk or format the floppy disk in the floppy disk drive. Refer to the manual that comes with the OS for formatting a floppy disk.

Fail to access to the disc:

■   Is the disc properly set in the disc drive tray?

-   The tray is provided with a holder to secure the disc. Make sure that the disc is placed properly in the holder.

■   Is the disc applicable to the system?

-   The disc for Macintosh is not available for use.

-   For the disk which does not conform to the CD standard, the playback of such a disk with the CD drive is not guaranteed.

Inserted the correct disc but an error message is displayed:

> The CD-ROM is not inserted or the wrong CD-ROM is inserted.
> Please insert the correct CD-ROM.
> OK

■   Is the data side of the disc dirty or injured?

-   Take the disc out of the disc drive, check that it is not dirty or injured, reset and click [OK].

Fail to access the hard disk

(Refer to the documentation supplied with the disk array controller.)

■   Is the hard disk applicable to the system?

-   Operation of any device that we do not authorize is not guaranteed.

■   Is the hard disk properly installed?

■   Is the hard disk properly configured?

Fail to access the (internal or external) SCSI devices:

■   Is the SCSI device applicable to the system?

-   Operation of any SCSI device that we do not authorize is not guaranteed.

■   Is the cable connection changed?

■   Are SCSI devices properly configured?

-   When the system has external SCSI devices connected, devices settings, including SCSI ID and terminator, are required. Refer to the manual that comes with the SCSI device for details.

■   Is cable length exceeded?

-   Refer to the manual that comes with the SCSI device for details.

■   Are the optional SCSI controllers properly configured?

- When the system has an optional SCSI controller installed and SCSI devices connected to it, use the POST Setup utility that comes with the optional SCSI controller for proper configuration. See the manual that comes with the optional SCSI controller for details.

The system is not found on the network:

■ Is the LAN cable connected?

- Make sure to connect the LAN cable to the network port on the rear of the system. Also make sure that the LAN cable to use conforms with the network interface standard.

■ Is the BIOS configuration correct?

- The internal LAN controller may be disabled with the BIOS SETUP utility of the system. Check the setting with the BIOS SETUP utility.

■ Have the protocol and service already configured?

- Install the distinctive network driver for the system. Make sure that the protocol, such as TCP/IP, and services are properly specified.

■ Is the transfer speed correct?

- Open the network property dialog box in control panel to specify the "Link Speed & Duplex" value the same as the value specified for HUB.

Wake on LAN does not start from standby state.

■ Is Hub set to Auto-Negotiation? Or, Is the client set to Auto-Negotiation/optimum speed?

- For both hub and client, Wake on LAN does not start from the standby state if the speed is fixed to 1000Mbps.

Problems with Windows Server 2003

A log appears and no network cable is connected to the network port:

When network cable is not connected with a port, a log (see the example below) may be found in event log. But this has no affect on the behavior of Lan driver.
Event ID: 6
Source: E100B
Type: Error
Description: Hardware failure detected.
Machine: (Name of your system)
Lan: 100BASE
Solution: Connect a network cable in a port and then reboot the system or change the [Smart Power Down] value to "Off", the log will not be found in event log any more.

The system displays the message below and fails to log on:

This copy of Windows must be activated with Microsoft before you can continue. You cannot log on until you activate Windows. To shut down the computer click Cancel.

In Windows Server 2003, the above message will be displayed if you use the operating system without executing the license authentication. Select "Yes", and execute the procedure for license authentication.

Cannot install the operating system correctly.

■   Did you check the notes on installing the operating system?

During installation, the following warning is registered in the System Log of the Event Viewer:
Error detected on the device \Device\CdRom0 during the paging operation.

-   There is no problem on this issue.

Fail to start the OS:

■   Is a floppy disk in the floppy disk drive?

-   Take out the floppy disk and restart the system.

■   Is the ExpressBuilder disc in the disc drive?

-   Take out the ExpressBuilder disc and restart the system.

■   Is the OS broken?

-   Use the recovery process to recover the system.

The OS presents unstable operation:

■   Did you update the system?

-   Installing a network drive after installation of the OS may cause unstable operation. Use the ExpressBuilder disc to update the system.

The system does not restart automatically when a stop error occurs, though the system is adjusted to automatically restarting:

-   When the system does not restart automatically, restart it manually.

The system restarts automatically when a stop error occurs, though the system is NOT adjusted to automatically restarting:

-   There is no problem about this issue. Check the System Event Log to check that STOP error occurred.

Cannot turn the power OFF at the blue screen:

-   If you want to turn off the power at the blue screen, execute forced shutdown (forced shutdown: continue to press POWER/SLEEP switch for 4 seconds). The power will not be turned off if you press the switch for less than 3 seconds.

The PXE boot (network boot) fails or the system is not found on the network:

■ Is the cable connected properly?

   - Connect the proper cable to the network port on the rear of the Express server.
      In addition, make sure that the used cable conforms to the network interface
      standard.

■ Is BIOS configuration correct?

   - The internal LAN controller may be disabled with the CMOS Setup utility of
      the system. Check the setting with the BIOS setup utility.

■ Have the protocol and service already configured?

   - Install the distinctive network driver for the system. Make sure that the proto-
      col, such as TCP/IP, and services are properly specified.

■ Is the transfer speed correct?

   - Open the network property dialog box in control panel to specify the link speed
      and duplex value the same as the value specified for HUB.

Problems with ExpressBuilder

When the system does not boot from the ExpressBuilder disc, check the following:

■ Did you set the ExpressBuilder during POST and restart the system?

   - If you do not set the ExpressBuilder during POST and restart the system, an
      error message will appear or the OS will boot.

■ Is BIOS configuration correct?

   - The boot device order may be specified with the CMOS Setup utility of the sys-
      tem. Use the CMOS Setup utility to change the boot device order to boot the
      system from the disc drive first.
      <Menu to check: [Boot]>

■ Has an error message appeared?

   - When an error occurs while the ExpressBuilder is in progress, the following
      message appears. After this message appears, check the error and take the
      appropriate corrective action according to the message listed in the table below.

Table 9: Error Messages

Message	Cause and Solution
This machine is not supported	This ExpressBuilder version is not designed for this system. Execute the ExpressBuilder on the compliant system.
Hard disk access error	The hard disk is not connected or has failed. Check whether the hard disk is correctly connected.

Table 9: Error Messages (Continued)

Message	Cause and Solution
NvRAM access error	An access to the non-volatile memory (NvRAM) has failed.
The system-specific information does not exist on the baseboard. Please restore the backup data or write the data by using [System Information Management] of the Off-line Maintenance Utility. Only the authorized personnel are allowed to do this operation.	The system-specific information can't be acquired on the mother board.

Problems with Express Setup

■ Following message appears when you try to install Express Setup to the hard disk that has smaller capacity than the specified partition size:

"The specified partition size has exceeded the capacity of the hard disk. The setup created the partition at the maximum size that can be reserved on the hard disk. Setup will continue the process."

Then the system displays the OK button.

- It is not an abnormal condition. Press Enter to continue the installation.

■ The message "Press R to retry" can not be displayed correctly when copying the files from disc or checking disc:

- Press R. When the message appears again even if you press R, restart the Express Setup from the beginning. In case the same result occurred after the restart of installation, contact Maintenance Service Company and ask them to check the disc drive.

■ Express Setup terminated and asks to input setup information.

- There are some errors on the specified setup information. Follow the instruction to input the correct value. It is not necessary to cancel the installation.

■ Specified to join the Domain, but the system is installed as Workgroup.

- When the setup fails to join the Domain during the installation, it will install the system as Workgroup. Open [System] in Control Panel to specify joining the Domain.

■ Entered the incorrect Product ID/CD key.

- Even if you entered the incorrect Product ID/CD key, Express Setup will start. However, the setup will stop and asks you to re-enter the correct value. Also in this case, input request will occur when rebooting after GUI setup completed during Express Setup. If these 2 inputs are done correctly, there is no problem on Windows setup.

■ Unable to specify the details of Network adapter.

- In Express Setup, you can not specify the details of Network adapter. Specify them from Control Panel after starting Windows.

Problems with Disk Array Configuration

Refer to the manual supplied with the RAID controller.

Problems with Master Control Menu

The master control menu fails to appear:

■ Is your system Windows NT 4.0 or later, or Windows 95 or later?

- The disc Autorun feature is supported by Windows NT 4.0 and Windows 95. The older versions do not automatically start from the disc.

■ Is Shift pressed?

- Setting the disc with Shift pressed down cancels the Autorun feature.

Problems with Disk Array Configuration

Refer to the manual that comes with the disk array controller for any trouble occurring with the disk array in this system.

Collecting Event Log

This section describes on how to collect the log of various events that occurred on the system.

⚠ Caution

If STOP error, system error, or stall occurred, follow the procedure below after restarting the system.

---

1. Click [Management Tool]: [Event Viewer] from the Control Panel.
2. Select the type of the log to collect.
   On [Application Log], the events related to the running application is archived. On [Security Log], the events related to the security is archived. On [System Log], the events occurred at the item which configures Windows system is archived.
3. Click [Save as...] in the [Run] menu.
4. Input the file name of archived log in the [File Name] box.
5. Select the type of the log file you want to save in the [File Type] list box and click [OK].

For more information, refer to Windows Online Help.

Collecting Configuration Information

This section describes how to collect the information on hardware configuration and inside specification.

In order to collect information, "Diagnostic Program" is used.

⚠ Caution

If STOP error, system error, or stall occurred, follow the procedure below after restarting the system.

---

1. Point to [Settings] in Start menu, and click [Control Panel].
   The [Control Panel] dialog box appears.
2. Double-click [Management Tool], and double-click [Computer Management].
   The [Computer Management] dialog box appears.
3. Click [System Tool]: [System Information].
4. Click [Save as System Information File] in the [Operation] menu.
5. Enter the file name to save in the [File Name] box.
6. Click [Save].

Collecting Dr. Watson Diagnostic Information

Dr. Watson collects diagnostic information related to application errors. The location to save the information can be specified as you like.

Memory Dump (depending on your configuration)

If an error occurs, the dump file should be saved to acquire necessary information.

If you saved the dump to DAT, write down that it is saved as "NTBackup" or "ARCServe" on the label. You can specify the location to save the diagnostic information as you like...

⚠ Caution

■ Consult with your sales agent before dumping the memory. Dumping the memory while the system is in process may affect the system operation.

■ Restarting the system due to an error may display a message indicating insufficient virtual memory. Ignore this message and proceed. Restarting the system may result in dumping improper data.

If You Need Assistance

If you have a problem with your computer, first review the sections of *"Solving Problems" on page 264*.

📑 **Note**: *Refer to the warranty booklet delivered with your system to find out how to contact the local office in your country.*

For technical support such as BIOS upgrades, consult our Web site at the following address: *http://support.bull.com*

Error Messages

This section details the POST error codes and messages, and the meaning of the diagnostic LEDs colour combinations.

POST Error Messages

Whenever a recoverable error occurs during POST, BIOS displays a message on the video display screen and causes the speaker to beep as the message appears. BIOS also issues a beep code (one long tone followed by two short tones) during POST if the video configuration fails or if an external ROM module does not have the correct checksum.

The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

The Response section in the following table is divided into two types:

■ Pause: the message is displayed in the Error Manager screen, an error is logged to the SEL, and user input is required to continue. The user can take immediate corrective action or choose to continue booting.

■ Halt: the message is displayed in the Error Manager screen, an error is logged to the SEL, and the system cannot boot unless the error is resolved. The user needs to replace the faulty part and restart the system.

Table 10: POST Error Messages and Handling

Error message	Response
CMOS date / time not set	Pause
Configuration cleared by jumper	Pause
Configuration default loaded	Pause
Password check failed	Halt
PCI resource conflict	Pause
Insufficient memory to shadow PCI ROM	Pause
Processor 01 thermal trip error on last boot	Pause

POST Error Beep Codes

The following table lists POST error beep codes. Prior to system Video initialization, BIOS uses these beep codes to inform users on error conditions. The beep code is followed by a user visible code on the diagnostic LEDs.

Table 11: POST Error Beep Codes

Beeps	Error Message	Description
3	Memory error	System halted because a fatal error related to the memory was detected.

POST Error Pause Option

For POST error(s) that are listed as Pause, the BIOS enters the error manager and waits for the user to press an appropriate key before booting the operating system or entering BIOS Setup.

The user can override this option by setting POST Error Pause to disabled in the BIOS Setup utility Main menu page. If POST Error Pause is set to disabled, the system will boot the operating system without user-intervention. The default value is set to enabled.

Diagnostic LEDs

During the system boot process, BIOS executes several platform configuration processes, each of which is assigned a specific hex POST code number. As each configuration routine is started, the BIOS will display the POST code on the POST code diagnostic LEDs found on the back edge of the server board. To assist in troubleshooting a system hang during the POST process, the diagnostic LEDs can be used to identify the last POST process to be executed.
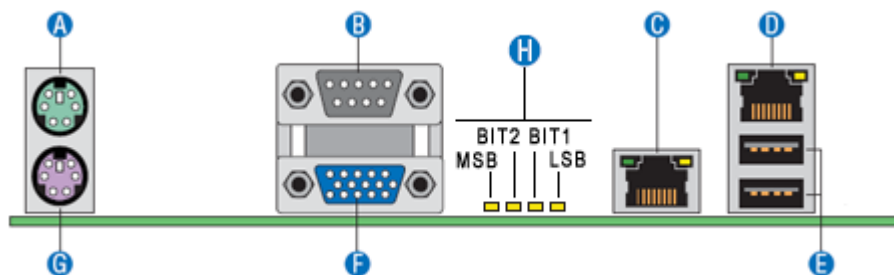
Figure 181: Diagnostic LEDs (A)

Each POST code is represented by a combination of colors from the four LEDs. The LEDs are capable of displaying three colors: green, red, and amber.

Table 12: POST Progress Code LED Example

	8h		4h		2h		1h	
LEDs	Red	Green	Red	Green	Red	Green	Red	Green
ACh	1	1	0	1	1	0	0	0
Result	Amber		Green		Red		Off	
	MSB						LSB	

Table 13: Diagnostic LEDs Codes

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			**LSB**	
Host Processor					
0x10h	OFF	OFF	OFF	R	Power-on initialization of the host processor (bootstrap processor)
0x11h	OFF	OFF	OFF	A	Host processor cache initialization
0x12h	OFF	OFF	G	R	Starting application processor initialization

Table 13: Diagnostic LEDs Codes (Continued)

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			LSB	
0x13h	OFF	OFF	G	A	SMM initialization
Chipset					
0x21h	OFF	OFF	R	G	Initializing a chipset component
Memory					
0x22h	OFF	OFF	A	OFF	Reading configuration data from memory (SPD on DIMM)
0x23h	OFF	OFF	A	G	Detecting presence of memory
0x24h	OFF	G	R	OFF	Programming timing parameters in the memory controller
0x25h	OFF	G	R	G	Configuring memory parameters in the memory controller
0x26h	OFF	G	A	OFF	Optimizing memory controller settings
0x27h	OFF	G	A	G	Initializing memory, such as ECC init
0x28h	G	OFF	R	OFF	Testing memory
PCI Bus					
0x50h	OFF	R	OFF	R	Enumerating PCI busses
0x51h	OFF	R	OFF	A	Allowing allocations to PCI busses
0x52h	OFF	R	G	R	Hot plug PCI controller initialization
0x53h	OFF	R	G	A	Reserved for PCI bus
0x54h	OFF	A	OFF	R	Reserved for PCI bus
0x55h	OFF	A	OFF	A	Reserved for PCI bus
0x56h	OFF	A	G	R	Reserved for PCI bus
0x57h	OFF	A	G	A	Reserved for PCI bus
USB					
0x58h	G	R	OFF	R	Resetting USB bus
0x59h	G	R	OFF	A	Reserved for USB devices
ATA / ATAPI / SATA					
0x5Ah	G	R	G	R	Begin PATA / SATA bus initialization
0x5Bh	G	R	G	A	Reserved for ATA
SMBUS					
0x5Ch	G	A	OFF	R	Resetting SMBUS
0x5Dh	G	A	OFF	A	Reserved for SMBUS
Local Console					
0x70h	OFF	R	R	R	Resetting the video controller (VGA)
0x71h	OFF	R	R	A	Disabling the video controller (VGA)
0x72h	OFF	R	A	R	Enabling the video controller (VGA)
Remote Console					
0x78h	G	R	R	R	Resetting the console controller
0x79h	G	R	R	A	Disabling the console controller
0x7Ah	G	R	A	R	Enabling the console controller
Keyboard (PS2 or USB)					
0x90h	R	OFF	OFF	R	Resetting the keyboard
0x91h	R	OFF	OFF	A	Disabling the keyboard
0x92h	R	OFF	G	R	Detecting the presence of a keyboard

Table 13: Diagnostic LEDs Codes (Continued)

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			LSB	
0x93h	R	OFF	G		Enabling the keyboard
0x94h	R	G	OFF	R	Clearing keyboard input buffer
0x95h	R	G	OFF	A	Instructing keyboard controller to run Self Test (PS2 only)
Mouse (PS2 or USB)					
0x98h	A	OFF	OFF	R	Resetting the mouse
0x99h	A	OFF	OFF	A	Detecting the mouse
0x9Ah	A	OFF	G	R	Detecting the presence of a mouse
0x9Bh	A	OFF	G	A	Enabling the mouse
Fixed Media					
0xB0h	R	OFF	R	R	Resetting fixed media device
0xB1h	R	OFF	R	A	Disabling fixed media device
0xB2h	R	OFF	A	R	Detecting presence of a fixed media device (IDE hard drive detection, etc.)
0xB3h	R	OFF	A	A	Enabling/configuring a fixed media device
Removable Media					
0xB8h	A	OFF	R	R	Resetting removable media device
0xB9h	A	OFF	R	A	Disabling removable media device
0xBAh	A	OFF	A	R	Detecting presence of a removable media device (IDE CD-ROM drive detection, etc.)
0xBCh	A	G	R	R	Enabling/configuring a removable media device
Boot Device Selection					
0xD0	R	R	OFF	R	Trying boot device selection
0xD1	R	R	OFF	A	Trying boot device selection
0xD2	R	R	G	R	Trying boot device selection
0xD3	R	R	G	A	Trying boot device selection
0xD4	R	A	OFF	R	Trying boot device selection
0xD5	R	A	OFF	A	Trying boot device selection
0xD6	R	A	G	R	Trying boot device selection
0xD7	R	A	G	A	Trying boot device selection
0xD8	A	R	OFF	R	Trying boot device selection
0xD9	A	R	OFF	A	Trying boot device selection
0xDA	A	R	G	R	Trying boot device selection
0xDB	A	R	G	A	Trying boot device selection
0xDC	A	A	OFF	R	Trying boot device selection
0xDE	A	A	G	R	Trying boot device selection
0xDF	A	A	G	A	Trying boot device selection
Pre-EFI Initialization (PEI) Core					
0xE0h	R	R	R	OFF	Started dispatching early initialization modules (PEIM)
0xE2h	R	R	A	OFF	Initial memory found, configured, and installed correctly
0xE1h	R	R	R	G	Completed dispatching an PEIM
0xE3h	R	R	A	G	Reserved for initialization module use (PEIM)
Driver eXecution Environment (DXE) Core					

Table 13: Diagnostic LEDs Codes (Continued)

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			**LSB**	
0xE4h	R	A	R	OFF	Entered EFI driver execution phase (DXE)
0xE5h	R	A	R	G	Started dispatching drivers
0xE6h	R	A	A	OFF	Started connecting drivers
0xEBh	A	R	A	G	Started dispatching a driver
0xECh	R	A	A	OFF	Completed dispatching a driver
DXE Drivers					
0xE7h	R	A	A	G	Waiting for user input
0xE8h	A	R	R	OFF	Checking password
0xE9h	A	R	R	G	Entering BIOS setup
0xEAh	A	R	A	OFF	Flash update
0xEEh	A	A	A	OFF	Calling Int 19. One beep unless silent boot is enabled
0xEFh	A	A	A	G	Reserved for DXE Drivers use
Runtime Phase / EFI Operating System Boot					
0xF4h	R	A	R	R	Entering sleep state
0xF5h	R	A	R	A	Exiting sleep state
0xF8h	A	R	R	R	Operating system has requested EFI to close boot services (ExitBootServices ( ) has been called)
0xF9h	A	R	R	A	Operating system has switched to virtual address mode (SetVirtualAddressMap ( ) has been called)
0xFAh	A	R	A	R	Operating system has requested the system to rest (ResetSystem ( ) has been called)
Pre-EFI Initialization Module (PEIM) / Recovery					
0x30h	OFF	OFF	R	R	Crisis recovery has been initiated because of a user request
0x31h	OFF	OFF	R	A	Crisis recovery has been initiated by software (corrupt flash)
0x34h	OFF	G	R	R	Loading Crisis recovery capsule
0x35h	OFF	G	R	A	Handing off control to the crisis recovery capsule
0x3Fh	G	G	A	A	Unable to complete crisis recovery

BIOS Setup Utility

The BIOS Setup Utility is used to change system configuration parameters. The utility is resident in the system FLASH memory and does not require a diskette or an operating system present to run.

Using the BIOS Setup Utility

You access the BIOS Setup utility when you turn on or reboot your system. To run the BIOS Setup Utility, perform the following procedure:

1. Power-on or reboot the system. "Press <F2> to enter SETUP" displays.
2. Press **F2**. The BIOS Setup Utility starts and the Main Menu is displayed. The menu bar at the top of the Main Menu lists the following selections:

Use the arrow keys to select a menu or an item on a displayed menu. Press the value keys (listed in the table below) to cycle through the allowable values for the selected field. Use the Exit menu's "Save Changes" selection to save the current values on all the menus.

To display a submenu, position the cursor on a selection that has a submenu and press **ENTER**. An arrow precedes selections with submenus.

Refer to the following table for information on the keys that you use with BIOS Setup. These keys are also listed at the bottom of the Setup menu.

Table 14: BIOS Setup Keys

Key	Function in Setup Menu
F1	Get Help about an item.
ESC	The <Esc> key provides a mechanism for backing out of any field. This key will undo the pressing of the Enter key.
	When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered.
	When the <Esc> key is pressed in any sub-menu, the parent menu is re-entered.
	When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded. If "No" is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where he/she was before <Esc> was pressed, without affecting any existing any settings. If "Yes" is selected and the <Enter> key is pressed, setup is exited and the BIOS returns to the main System Options Menu screen.
Left or right arrow keys	The left and right arrow keys are used to move between the major menu pages. The keys have no affect if a sub-menu or pick list is displayed.

Table 14: BIOS Setup Keys (Continued)

Key	Function in Setup Menu
Up or down arrow keys	The up/down arrow is used to select the previous/next value in a pick list, or the previous/next option in a menu item's option list. The selected item must then be activated by pressing the <Enter> key.
-	The minus key on the keypad is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
+	The plus key on the keypad is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list.
Enter	The <Enter> key is used to activate sub-menus when the selected feature is a submenu, or to display a pick list if a selected option has a value field, or to select a sub-field for multi-valued features like time and date. If a pick list is displayed, the <Enter> key will select the currently highlighted item, undo the pick list, and return the focus to the parent menu.
Tab	The <Tab> key is used to move between fields. For example, <Tab> can be used to move from hours to minutes in the time item in the main menu.
F9	Load default configuration values.
F10	Save configuration values and exit.

BIOS Setup Configuration Settings

The BIOS Setup Configuration tables show the default settings for the BIOS Setup Utility and provide a place for you to record any changes you make to these settings. Recommended values are bold in the following tables.

Main Menu

Table 15: Standard BIOS Features Menu

Feature	Choices or Display Only	Description	Your Setting
BIOS Version	Display only	Information only. Displays the BIOS version. yy = major version xx = minor version zzzz = build number	
BIOS Build Date	Display only	Information only. Displays the BIOS build date.	
Processor Core Frequency	Display only		
Memory Size	Display only		
Quiet Boot	**Enabled** Disabled	If enabled, BIOS splash screen is displayed. If disabled, BIOS POST messages are displayed.	
POST Error Pause	Enabled **Disabled**	If enabled, the system will wait for user intervention on critical POST errors. If disabled, the system will boot with no intervention, if possible.	
System Date	[MM/DD/YYYY]	Month valid values are 1 to 12. Day valid values are 1 to 31. Year valid values are 1998 to 2099.	
System Time	[HH:MM:SS]	Hours valid values are 0 to 23. Minutes valid values are 0 to 59. Seconds valid values are 0 to 59.	

⊟**Note**: *The BIOS may display more options that presented here.*

Advanced Menu

Table 16: Advanced Menu

Feature	Choices or Display Only	Description	Your Setting
Processor	Press Enter	Press **Enter** to open the submenu	
Memory Configuration	Press Enter	Press **Enter** to open the submenu	
SATA Controller Configuration	Press Enter	Press **Enter** to open the submenu	
Serial Port Configuration	Press Enter	Press **Enter** to open the submenu	
USB Configuration	Press Enter	Press **Enter** to open the submenu	
PCI Configuration	Press Enter	Press **Enter** to open the submenu	

Advanced Menu

Processor Submenu

Table 17: Processor Submenu

Feature	Choices or Display Only	Description	Your Setting
Processor Family	Display only	Family designation of the processor	
Core Frequency	Display only	Frequency at which the processor currently runs.	
Maximum Frequency	Display only	Highest frequency at which the processor can run.	
System Bus Frequency	Display only	Current frequency of the processor system bus.	
L2 Cache Size	Display only	L2 Cache Size	
Processor Stepping	Display only	Stepping number of this processor	
CPUID Register	Display only	CPUID	
Enhanced SpeedStep	Enabled **Disabled**	Enables or disables the Enhanced Intel SpeedStep® Technology on the processors. This technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production.	
Core Multi-processing	**Enabled** Disabled	Sets the state of logical processor cores in a package. When set to **Disabled**, only the logical processor core 0 is enabled. The Hyper-Threading Technology is automatically disabled.	
Virtualization Technology	Enabled **Disabled**	When enabled, allows a platform to run multiple operating systems and applications in indepedent partitions. Power off and on again the system to implement any change made to this setting.	
Execute Disable Bit	**Enabled** Disabled	When enabled, helps prevent certain classes of malicious buffer overflow attacks.	

Memory Configuration Submenu

Table 18: Memory Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Total Memory	Display only	Displays the amount of memory available in the system in the form of installed FBDIMMs, in units of MB or GB.	
Effective Memory	Display only	Displays the amount of memory available to the operating system in MB or GB. The Effective Memory is the difference between the Total Physical Memory and the sum of all the memory reserved for internal usage. This difference also includes the sum of all the DIMMs that failed the Memory Test during POST.	
Current Configuration	Display only	Displays one of the following: - **Single-channel Mode**: System memory is functioning in a special, reduced efficiency mode. - **Dual-channel Mode**	
Current Memory Speed	Display only	Displays the current memory speed.	
DIMM information DIMM_A1 DIMM_A2 DIMM_B1 DIMM_B2	Display only	Displays the state of each DIMM socket present on the board. Each DIMM socket field reflects one of the following possible states: - **Size info:** there is a DIMM installed on this slot and the size information is displayed. - **Not installed**: there is no DIMM installed on this slot.	
Memory Correction	Non-ECC **ECC**	Select either ECC or Non-ECC depending on the installed memory type.	

SATA Controller Configuration Submenu

Table 19: IDE Controller Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard SATA Controller	**Enabled** Disabled	When enabled, the SATA contoller can be configured in IDE, RAID, or AHCI Mode. RAID and AHCI modes are mutually exclusive.	
Configure SATA as	IDE **RAID** AHCI	Configures SATA as RAID, IDE or AHCI.	

Table 19: IDE Controller Submenu (Continued)

Feature	Choices or Display Only	Description	Your Setting
SATA RAID OPROM	LSI **Intel Matrix Storage**	Select the onboard RAID chipset of your choice (RAID must be configured). - LSI: support for RAID0, RAID1 and RAID10 under Microsoft Windows and Linux. - Intel Matrix Storage: support for RAID0, RAID1, RAID5, and RAID10 under Microsoft Windows.	
SATA 0		Information only.	
SATA 1		Information only.	
SATA 2		Information only.	
SATA 3		Information only.	
SATA 4		Information only.	
SATA 5		Information only.	

Serial Port Configuration

Table 20: Serial Port Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
SERIAL A Enable	**Enabled** Disabled	Enables or disables the serial Port A.	
Address	**3F8h** 2F8h 3E8h 2E8h	Selects the base I/O address for the serial Port A.	
IRQ	3 **4**	Selects the Interrupt Request line for the serial Port A.	
SERIAL B Enable	**Enabled** Disabled	Enables or disables the serial Port B.	
Address	3F8h **2F8h** 3E8h 2E8h	Selects the base I/O address for the serial Port B.	
IRQ	**3** 4	Selects the Interrupt Request line for the serial Port B.	

USB Configuration Submenu

Table 21: USB Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Module version		USB driver version.	
Detected USB Devices <Total USB Devices in System>		Shows the number of USB devices in the system.	
USB Controller	**Enabled** Disabled	When **Disabled**, all of the USB controllers will be turned off and inaccessable by the OS.	
Legacy USB Support	**Enabled** Disabled Auto	Enables the Legacy USB support. The **Auto** option disables the legacy support if no USB devices are connected.	
Device Reset Timeout	10s **20s** 30s 40s	Defines the USB mass storage device Start Unit command timeout.	
USB 2.0 Controller	**Enabled** Disabled	When **Disabled**, all the USB2.0 controllers will be turned off and inacessable by the operating system.	

PCI Configuration Submenu

Table 22: PCI Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Dual Monitor Video	Enabled **Disabled**	When **Enabled**, both the onboard video controller and an add-in video adapter will be enabled for system video. The onboard video controller will be the primary video device.	
Onboard NIC ROM	**Enabled** Disabled	When **Enabled**, loads the embedded option ROM for the onboard network controllers. If it is **Disabled**, NIC1 and NIC2 cannot be used to boot or wake the sytem.	

Security Menu.

Table 23: Security Menu

Feature	Choices or Display Only	Description	Your Setting
Administrator Password Status	Installed **Not Installed**	Indicates whether the administrator password is set (display only).	
User Password Status	Set **Not Installed**	Indicates whether the user password is set (display only).	
Set Administrator Password	Up to 7 alphanumeric characters	Press **Enter** to display the supervisor password entry screen. With the supervisor password, all SETUP menus are available for access. This option is available only when you log into the SETUP utility with the supervisor password.	
Set User Password	Up to 7 alphanumeric characters	Press **Enter** to display the user password entry screen. With a user password, only certain menus are accessible. This option is available only if the Supervisor Password is set.	
Front Panel Lockout	**Disabled** Enabled	Locks the power button on the system front panel. When set to **Enabled**, power and reset must be controlled via a system management interface.	

Server Management Menu

Table 24: Server Management Menu

Feature	Choices or Display Only	Description	Your Setting
Assert NMI on SERR	**Enabled** Disabled	When **Enabled**, on SERR, generate an NMI and log an error.	
Assert NMI on PERR	**Enabled** Disabled	(Displayed only when Assert NMI on SERR is **Enabled**.) When **Enabled**, on PERR, generate an NMI and log an error.	
Resume on AC Power Loss	**Stay Off** Last State Reset	Defines the system action to take on an AC power loss recovery. When set to **Stay Off**, the system stays off. When set to **Last State**, the system returns to the same state before the AC power loss. When set to **Reset**, the system powers on.	
Clear System Event Log	Enabled **Disabled**	Clears the System Event Log. All the current entris will be lost. This option will be reset to Disabled after reboot	
FRB-2 Enable	**Enabled** Disabled	When **Enabled**, the BMC will reset the system if the BIOS does not complete the Power On Self Test before the FRB-2 timer expires.	
O/S Boot Watchdog Timer	Enabled **Disabled**	When **Enabled**, the BIOS sets the watchdog timer with the timeout value selected. If the OS does not complete booting before the timer expires, the BMC will reset the system and an error will be logged.	
O/S Boot Watchdog Timer Policy	Reset **Power Off**	If the OS watchdog timer is **Enabled**, this is the system action taken if the watchdog timer expires.	
O/S Boot Watchdog Timer Timeout	5 minutes **10 minutes** 15 minutes 20 minutes	If the OS watchdog timer is **Enabled**, this is the timeout value the BIOS will use to configure the watchdog timer.	
Console Redirection	Press **Enter**		
System Information	Press **Enter**		

Console Redirection Submenu

Table 25: Console Redirection submenu

Feature	Choices or Display Only	Description	Your Setting
Console redirection	**Disabled** Serial Port A Serial Port B	Enables and disables the ability of the system to redirect screen data across serial connection.	

System Information Submenu

Table 26: System Information submenu

Feature	Choices or Display Only	Description	Your Setting
Board Part Number			
Board Serial Number			
System Part Number			
Sytem Serial Number			
Chassis Part Number			
Chassis Serial Number			
BMC Firmware Revision			
HSC Firmware Revision			
SDR Revision			
UUID			

Boot Options Menu

Table 27: Boot Options Menu

Feature	Choices or Display Only	Description	Your Setting
Boot Timeout	**0** Any figure	Sets the default timeout value before system boot. The 656535 value will disable the timeout completely.	
Boot Option #N	List of the boot devices	Sets the system boot order.	
Network Device Order		Press **Enter** to set the network device boot order by selecting the boot option for this position. Add-in or onboard network devices with a PXE option ROM are two examples of network boot devices.	
Boot Option Retry	**Disabled** Enabled	When set to **Enabled**, continually retries NON-EFI based boot options without waiting for user input.	

Boot Manager Menu

Allows you to boot the system using one of the items listed in the menu.

Error Manager Menu

The Error Manager Menu displays any errors encountered during POST.

Exit Menu

You can make the following exit selections on the Main Menu. Select an option using the up or down arrow keys, then press <Enter> to execute the option.

You must select one of the items from the menu or menu bar to exit.

Table 28: Exit Menu

Choices	Description
Save Changes and Exit	Exits after writing all modified Setup item values to NVRAM. F10 key can be used for this operation.
Discard Changes and Exit	Reads previous values of all Setup items from NVRAM and exits the BIOS Setup. ESC key can be used for this operation.
Save Changes	Saves all modified Setup item values to NVRAM.
Discard Changes	Reads previous values of all Setup items from NVRAM.
Load default Values	Load default values for all SETUP items. F9 key can be used for this operation.
Save as User Default Values	Saves current values so that they can be restored later. Settings will be reset to factory defaults if the ocnfiguration is cleared.
Load User Default Values	Restores previously saved user default values.

Updating the BIOS

The update utility allows you to update the BIOS stored in the flash memory. The code and data in the update file include the following:

■ On-board system BIOS, including the recovery code, BIOS Setup Utility, and strings.

■ On-board video BIOS, and other option ROMs for devices embedded on the server board.

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:

    Press <F2> Key if you want to run SETUP

2. Write down the current settings in the BIOS Setup program.

> 📝 **Note**: *Do not skip step 2. You will need these settings to configure your computer at the end of the procedure.*

Performing the BIOS Update

We recommend you update your system BIOS using the Bull Boot CD.

1. Consult our Web site at the following address: **http://support.bull.com** and type **Boot CD** in the *Search* field.

2. Click on Boot_CD to open the Flash CD page.

3. Download and read the text files, and download the Boot CD compressed file.

4. Extract the ISO file and burn the image on a CD.

5. Insert the Boot CD in the optical disc drive, and reboot your system.

6. Follow the instructions in the Read Me file to choose the group in which your system's file is located, and press **Enter**.

7. Type **CRC** to run a CRC check, and press **Enter** to reboot your system when prompted to do so.

8. Type the system name as listed on the screen, and follow the on-screen instructions until the system has been successfully updated.

How to Identify BIOS Revision Level

To identify your system's current BIOS revision level, perform the following procedure:

1. Power-on or reboot the system.

   "Press <F2> to enter SETUP" is displayed.

2. Press **F2**.

3. In the **Main** menu, check the value that appears in the BIOS Version field.

Recovering BIOS

If at any point in time the BIOS appears to malfunction, clear the CMOS to return to a default configuration. If this does not help, process with the BIOS recovery as described below.

1. Remove the BIOS jumper.
2. Update the BIOS.
3. Power off the server.
4. Remove the A/C power.
5. Replace the jumper to the Normal position (1-2).
6. Plug in AC power.
7. Wait for thirty seconds and power on.

For more information on the BIOS Recovery jumper, refer to .

NovaScale T810 E1 Specifications

Table 29: NovaScale T810 E1 Specifications

Item		Description	
Cabinet design		Tower or Rack (with the optional conversion kit)	
Chipset		Intel® 3210	
CPU	Type	Intel® Pentium® dual-core, Dual-Core Intel® Xeon®, or Quad-Core Intel® Xeon®	
	Number of processors	1 (max: 1)	
	Packaging	Socket LGA775	
Memory	Minimum	1 GB	
	Maximum	8 GB (4x2GB)	
	Connectors	4 slots	
	Memory module	DDR2 800	
	Error check	ECC	
Hard Disk Drive	Technology	S-ATA	SAS
	RPM	7,200	15,000
External accessible bays		Four 5.25-inch bays	
		One 3.5-inch bay	
Hard Disk Drive bays		4 slots	
External interface	Keyboard	PS/2 (1 port)	
	Mouse	PS/2 (1 port)	
	USB	2.0 (4 ports - 2 on the front, 2 on the rear)	
	Serial	FIFO compatible (1 port)	
	Network	RJ-45 (2 ports)	
	VGA	Standard VGA connector (1 port)	
I/O bus	PCI	2 slots, 32-bit/33MHz, 3.3V	
	PCI-E x8	2 slots, one of which operates at 4x	
	PCI-E x16	1 slot which operates at 1x	
LAN	Intel® 82541PI (Pro/1000 MT)	10/100/1000 Fast Ethernet support	
	Intel® 82566DM	Compliant with IEEE 802.3 (10BASE-T, 100BASE-TX, 1000BASE-T) specifications	
Video		Integrated VGA Graphics Accelerator Matrox® G200e	
BIOS	Award BIOS	ISA Flash ROM 4 MB	
		Power On Self Test (POST)	
External dimensions		425 (height) × 198 (width) mm × 465 (depth)	
Weight		14 Kg	
Power supply (depending on your configuration)		Input voltages 220 to 240 VA	

Table 29: NovaScale T810 E1 Specifications (Continued)

Item		Description
Power consumption (maximum)		Output: 400W
		Input: 550W
Environmental requirements	Temperature	10 to 35°C
	Humidity	20 to 80% RH (no condensation)

NovaScale R410 E1 Specifications

Table 30: NovaScale R410 E1 Specifications

Item		Description	
Cabinet design		Rack	
Chipset		Intel® 3210	
CPU	Type	Intel® Pentium® dual-core, Dual-Core Intel® Xeon®, or Quad-Core Intel® Xeon®	
	Number of processors	1 (max: 1)	
	Packaging	Socket LGA775	
Memory	Minimum	1 GB	
	Maximum	8 GB (4x2GB)	
	Connectors	4 slots	
	Memory module	DDR2 800	
	Error check	ECC	
Floppy Disk Drive		No	
Hard Disk Drive	Technology	S-ATA	SAS
	RPM	7,200	15,000
External accessible bays		One 5.25-inch bay	
Hard Disk Drive bays		2 slots (non hot-swappable)	
External interface	Keyboard	PS/2 (1 port)	
	Mouse	PS/2 (1 port)	
	USB	2.0 (4 ports - 2 on the front, 2 on the rear)	
	Serial	FIFO compatible (1 port)	
	Network	RJ-45 (2 ports)	
	VGA	Standard VGA connector (1 port)	
I/O bus	PCI-E x8	1 slot (on the PCI riser card)	
LAN	Intel® 82541PI (Pro/ 1000 MT)	10/100/1000 Fast Ethernet support Compliant with IEEE 802.3 (10BASE-T, 100BASE-TX, 1000BASE-T) specifications	
	Intel® 82566DM		
Video		Integrated VGA Graphics Accelerator Matrox® G200e	
BIOS	Award BIOS	ISA Flash ROM 4 MB	
		Power On Self Test (POST)	
External dimensions		42,4 (height) × 430 (width) mm × 648 (depth)	
Weight		9 Kg	
Power supply (depending on your configuration)		350W Input voltages 110 to 220 V +/-10% 50/60Hz +/- 1Hz	
Environmental requirements	Temperature	10 to 35°C	
	Humidity	20 to 80% RH (no condensation)	

NovaScale T830 E1 Specifications

Table 31: NovaScale T830 E1 Specifications

Item		Description	
Cabinet design		Tower or Rack (with optional conversion kit)	
Chipset		Intel® 3210	
CPU	Type	Intel® Pentium® dual-core, Dual-Core Intel® Xeon®, or Quad-Core Intel® Xeon®	
	Number of processors	1 (max: 1)	
	Packaging	Socket LGA775	
Memory	Minimum	1 GB	
	Maximum	8 GB (4x2GB)	
	Connectors	4 slots	
	Memory module	DDR2 800	
	Error check	ECC	
Hard Disk Drive	Technology	S-ATA	SAS
	RPM	7,200	15,000
External accessible bays	5.25-inch bay	2 slots	
	3.5-inch bay	1 slot	
Hard Disk Drive bays	Hot-swap	6 slots	
External interface	Keyboard	PS/2 (1 port)	
	Mouse	PS/2 (1 port)	
	USB	2.0 (6 ports - 2 on the front, 4 on the rear)	
	Serial	FIFO compatible (1 port)	
	Network	RJ-45 (2 ports)	
	Video	VGA connector (1 port)	
I/O bus	PCI	2 slots, 32-bit/33MHz, 3.3V	
	PCI-E x8	2 slots, one of which operates at 4x	
	PCI-E x16	1 slot which operates at 1x	
LAN	Intel® 82541PI (Pro/1000 MT)	10/100/1000 Fast Ethernet support	
	Intel® 82566DM	Compliant with IEEE 802.3 (10BASE-T, 100BASE-TX, 1000BASE-T) specifications	
Video		Integrated VGA Graphics Accelerator Matrox® G200e	
BIOS	Award BIOS	ISA Flash ROM 4 MB	
		Power On Self Test (POST)	
External dimensions		452 (height) × 236 (width) mm × 483 (depth)	
Weight		58 kg (max)	

Table 31: NovaScale T830 E1 Specifications (Continued)

Item	Description		
Power supply (depending on your system)	Type	Hot-swappable	Fixed
	Input voltages	110 to 220V	110 to 220V
	Power consumption	Output: 650W	Minimum Output : 550W
Environmental requirements	Temperature	10 to 35°C	
	Humidity	20 to 80% RH (no condensation)	

Equipment Logs

NovaScale T810 E1

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as a power supply, hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system board. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Hardware

Main Unit					
	Model name		Serial No.		Date installed	

CPU					
#1	Clock		Serial No.		Date installed	

Memory					
#3, #4	Size		Serial No.		Date installed	
#1, #2	Size		Serial No.		Date installed	

Monitor					
	Type		Model name		Serial No.	
					Date installed	

Fixed SAS Hard Disks				
ID0	Type		Serial No.	
	Capacity		Date installed	
	Type number			
ID1	Type		Serial No.	
	Capacity		Date installed	
	Type number			
ID2	Type		Serial No.	
	Capacity		Date installed	
	Type number			
ID3	Type		Serial No.	
	Capacity		Date installed	
	Type number			

Fixed SATA Hard Disks				
#1	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#2	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#3	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#4	Type		Serial No.	
	Capacity		Date installed	

	Type number					

5.25-inch Device #1						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	

5.25-inch Device #2						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	

5.25-inch Device #3						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	

5.25-inch Device #4						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	

PCI Slot #1				
	Model name		Serial No.	
			Date installed	

PCI Slot #2				
	Model name		Serial No.	
			Date installed	

PCI-E 1x Slot				
	Model name		Serial No.	
			Date installed	

PCI-E 4x Slot				
	Model name		Serial No.	
			Date installed	

PCI-E 8x Slot				
	Model name		Serial No.	
			Date installed	

Printer				
	Model name		Serial No.	
	Manufacturer		Date installed	

External USB Device 1				
	Model name		Serial No.	
	Manufacturer		Date installed	

External USB Device 2				
	Model name		Serial No.	

	Manufacturer			Date installed	
External USB Device 3					
	Model name			Serial No.	
	Manufacturer			Date installed	
External USB Device 4					
	Model name			Serial No.	
	Manufacturer			Date installed	
External USB Device 5					
	Model name			Serial No.	
	Manufacturer			Date installed	
External USB Device 6					
	Model name			Serial No.	
	Manufacturer			Date installed	
External Serial Device 1					
	Model name			Serial No.	
	Manufacturer			Date installed	

Software

Firmware version				
OS	Apply	Name:		Version
Application of RUR media		Name:		Version
File system	FAT	HPFS	NTFS	
	Others (			)
Bundled software installed				
Licensed software installed				
Application running when a failure occurred				

NovaScale R410 E1

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as a power supply, hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system board. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Hardware

Main Unit						
	Model name		Serial No.		Date installed	
CPU						
#1	Clock		Serial No.		Date installed	
Memory						
#3, #4	Size		Serial No.		Date installed	
#1, #2	Size		Serial No.		Date installed	
Monitor						
	Type		Model name		Serial No.	
					Date installed	
Fixed SATA Hard Disks						
#1	Type			Serial No.		
	Capacity			Date installed		
	Type number					
#2	Type			Serial No.		
	Capacity			Date installed		
	Type number					
5.25-inch Device #1						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	
PCI-E 8x Slot						
	Model name				Serial No.	
					Date installed	
Printer						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 1						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 2						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 3						
	Model name				Serial No.	
	Manufacturer				Date installed	

External USB Device 4				
	Model name		Serial No.	
	Manufacturer		Date installed	
External Serial Device 1				
	Model name		Serial No.	
	Manufacturer		Date installed	

Software

Firmware version				
OS	Apply	Name:		Version
Application of RUR media		Name:		Version
File system	FAT	HPFS	NTFS	
	Others (			)
Bundled software installed				
Licensed software installed				
Application running when a failure occurred				

NovaScale T830 E1

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as a power supply, hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system board. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Hardware

Main Unit						
	Model name		Serial No.		Date installed	
CPU						
#1	Clock		Serial No.		Date installed	
#2	Clock		Serial No.		Date installed	
Memory						
#1	Size		Serial No.		Date installed	
#2	Size		Serial No.		Date installed	
#3	Size		Serial No.		Date installed	
#4	Size		Serial No.		Date installed	
Monitor						
	Type		Model name		Serial No.	
					Date installed	
HDD cage						
	Model name				Serial No.	
					Date installed	
Hot-swap SATA Hard Disks						
#1	Type			Serial No.		
	Capacity			Date installed		
	Type number					
#2	Type			Serial No.		

	Capacity		Date installed	
	Type number			
#3	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#4	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#5	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#6	Type		Serial No.	
	Capacity		Date installed	
	Type number			
Hot-swap SAS Hard Disks				
#1	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#2	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#3	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#4	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#5	Type		Serial No.	
	Capacity		Date installed	
	Type number			
#6	Type		Serial No.	
	Capacity		Date installed	
	Type number			

5.25-inch Device #1							
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	

5.25-inch Device #2						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	
PCI Slot #1						
	Model name				Serial No.	
					Date installed	
PCI Slot #2						
	Model name				Serial No.	
					Date installed	
PCI-E 1x Slot						
	Model name				Serial No.	
					Date installed	
PCI-E 4x Slot						
	Model name				Serial No.	
					Date installed	
PCI-E 8x Slot						
	Model name				Serial No.	
					Date installed	
Printer						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 1						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 2						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 3						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 4						
	Model name				Serial No.	
	Manufacturer				Date installed	
External USB Device 5						
	Model name				Serial No.	
	Manufacturer				Date installed	

External USB Device 6				
	Model name		Serial No.	
	Manufacturer		Date installed	
External Serial Device 1				
	Model name		Serial No.	
	Manufacturer		Date installed	

Software

Firmware version				
OS	Apply	Name:		Version
Application of RUR media		Name:		Version
File system	FAT	HPFS	NTFS	
	Others (			)
Bundled software installed				
Licensed software installed				
Application running when a failure occurred				

Technical publication remarks form

Title:	NovaScale T810 E1, T830 E1, R410 E1 User's Guide

Reference:	86 A1 15FA 01	Date:	June 2008

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