NovaScale T810

User Guide

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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 14*

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 Electro-technical 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 is designed for use solely as a component of such electronic product and therefore does 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 reduce 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

The NovaScale T810 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® 3000 chipset.

■ The Intel® processor, either an Intel® Pentium® 4, Intel® Pentium® D, or an Intel® Xeon®.

■ The onboard RAID technology, offering support for RAID0, RAID1, RAID5 and RAID10 on Microsoft® Windows® and Linux operating systems.

■ A tower chassis that can also easily be installed into a standard EIA 19-inch rack cabinet.

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.

System Chassis Features

Front View

The following figure shows the location of the front system features

Front View Detail
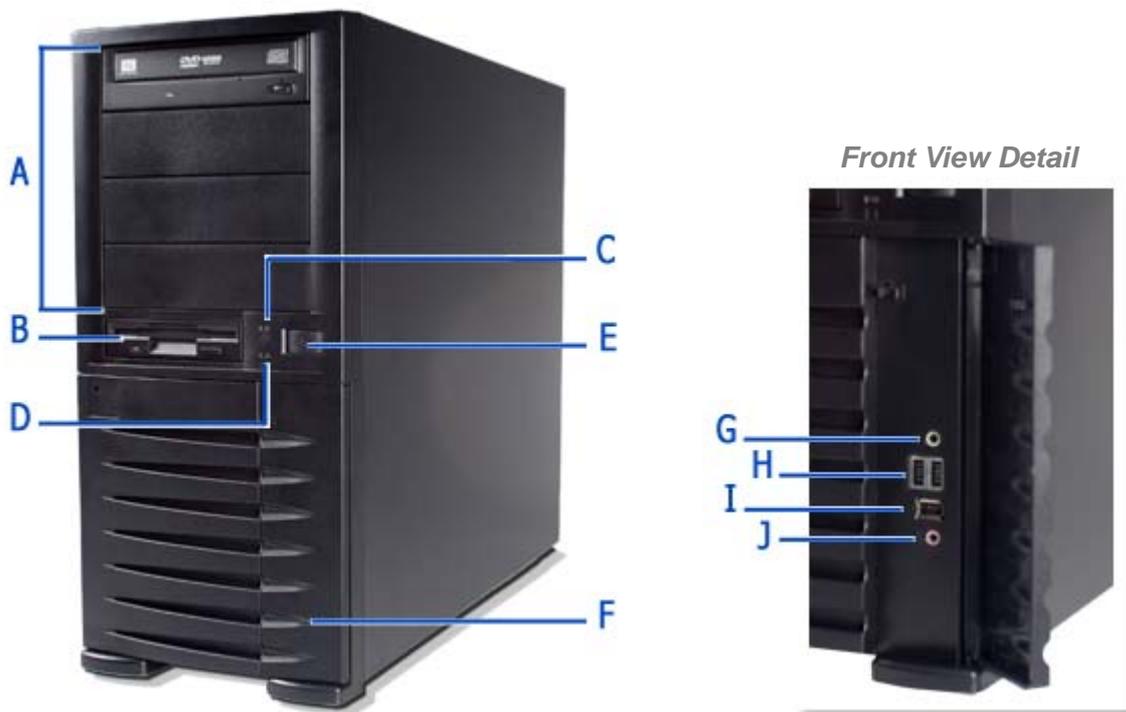
Figure 1: Front View

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 IDE 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.

Rear View
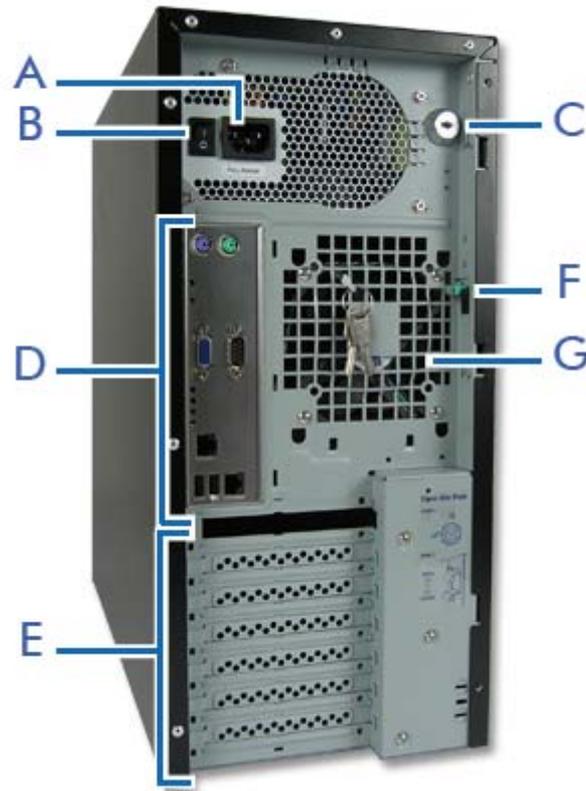
Figure 2: Rear View

A   **AC power connector**

Connect the power cord to this socket.

B   **Power switch**

C   **Key lock and intrusion switch**

Security feature that allows you to open the right side door and to be noticed when your chassis has been opened

D   **Connectors**

Refer to "Motherboard" on page 21

E   **Expansion boards slots**

Refer to "Expansion Slots" on page 27

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.

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 in 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 24*.

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**

Motherboard

Motherboard Layout
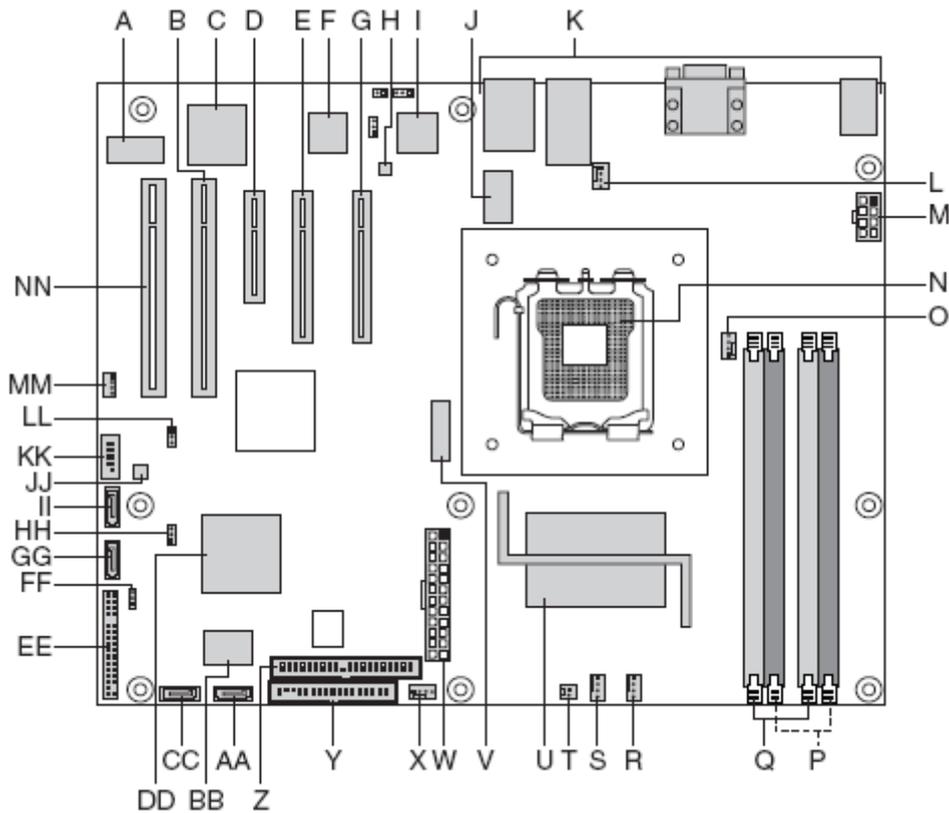
Figure 4: Motherboard Layout

Table 1: Server Board Connector and Component Locations

A: Video Memory	B: PCI 32/33 Slot 2	C: ATI ES1000 Video Controller
D: PCIe x4 Slot 3	E: PCIe x8 Slot 5	F: Intel® 82545PI LAN Controller
G: Intel® Adaptive Slot - Slot 6	H: LAN SPI Flash	I: Intel® 82573E LAN Controller
J: Clock Generator	K: Back Panel connectors	L: Rear System fan
M: 2x4 Power connector	N: Processor socket	O: Processor Fan
P: DIMM sockets (2A & 2B)	Q: DIMM sockets (1B & 1A)	R: System Front DIMM Blower header
S: System Front Processor Blower header	T: Chassis Intrusion header	U: Intel® S3000 MCH
V: Battery	W: 2x12 Main Power Connector	X: Front System fan
Y: Floppy Connector	Z: PATA IDE connector	AA: SATA Port 3
BB: SMSC SCH5027 Super IO	CC: SATA Port 2	DD: Intel® 82801 ICH7R
EE: Front Panel connector	FF: SCSI HDD LED header	GG: SATA Port 1
HH: Clear CMOS jumper	II: SATA Port 0	JJ: BIOS SPI Flash
KK: External USB connector	LL: SPI/FWH Select header	MM: SMBus connector
NN: PCI 32/33 Slot 1		

Motherboard Jumpers
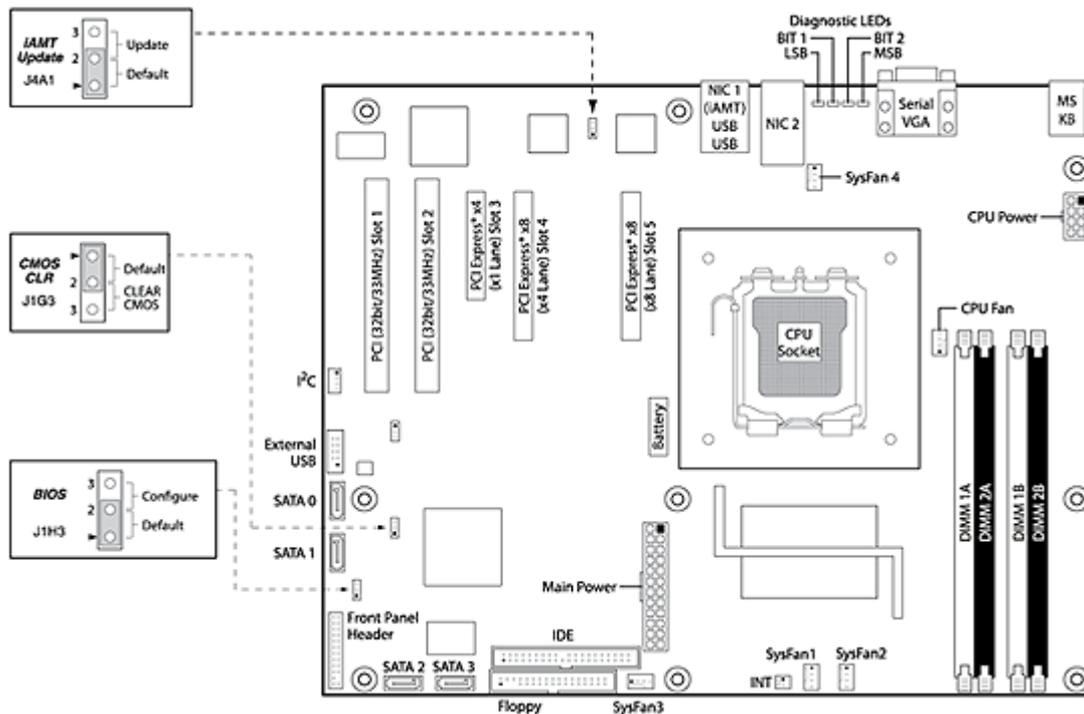
Figure 5: Motherboard Jumpers

Table 2: Motherboard Jumpers Description

Jumper Name	Jumper Purpose
IAMT Update	Reserved for the manufacturer.
CMOS Clear	If pins 2-3 are jumpered, the CMOS settings will be cleared on the next reset. These pins should be jumpered on 1-2 for normal operation.
BIOS Recovery	If pins 2-3 are jumpered, the BIOS in the lower bank will be selected on the next reset. These pins should be jumpered on 1-2 for normal operation.

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 (J1G3) from the normal operation position (pins 1 and 2) to pins 2 and 3 (Clear CMOS position), as indicated in the following diagram.
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 3: BIOS Recovery Jumper Descriptions

Pins	Jumper Purpose
1-2	System is configured for normal operation (bank 1) (Default)
2-3	On the next reset, the BIOS in the lower bank will be selected.

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

Back Panel Connectors
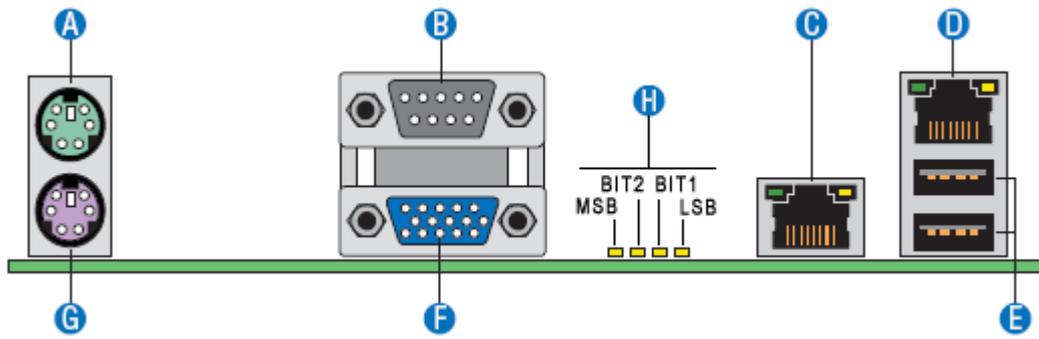
Figure 6: Back Panel Connectors

Table 4: Back Panel Connectors

A.	Mouse	B.	Serial Port B
C.	NIC 1 (10/100/1000 Mb)	D.	NIC 2 (10/100/1000 Mb) IAMT compliant
E.	USB 0-1	F.	USB 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 5: NIC LED Descriptions

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

Memory Configuration

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

- Channel A consists of DIMM sockets 1A and 2A.

- Channel B consists of DIMM sockets 1B and 2B.
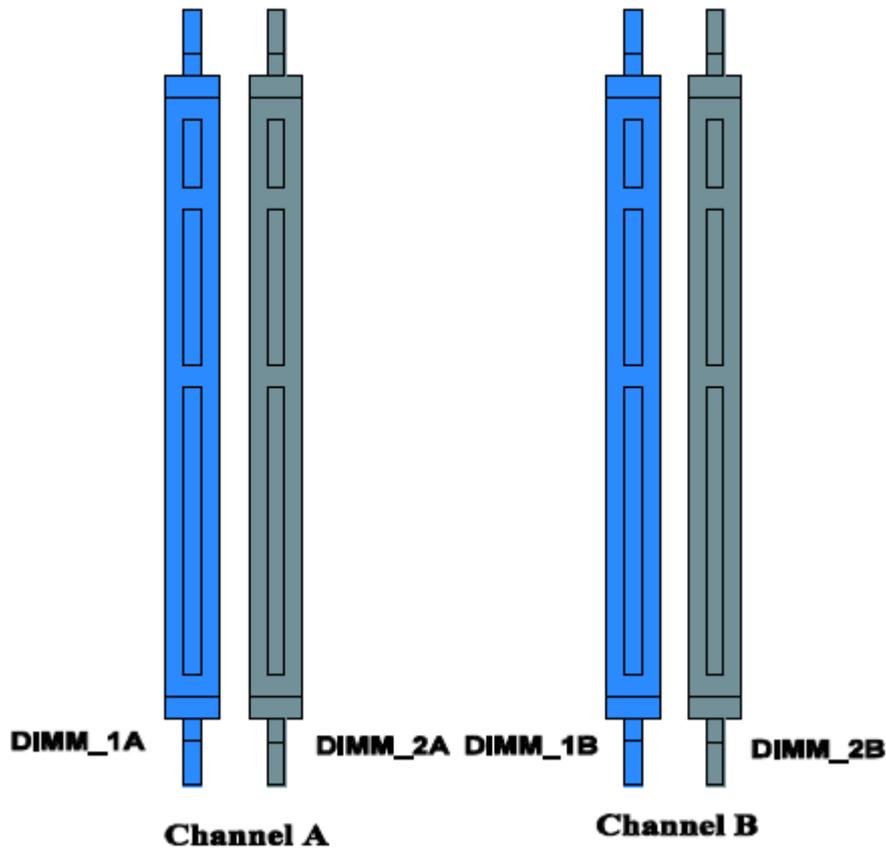
Figure 7: Memory Channels

DIMM Population Rules

To ensure the dual channel operating mode, install either:

■   two modules, in the slots DIMM_1A and DIMM_1B,

■   or four modules.

✑ **Note**:

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

■ *The motherboard BIOS supports single DIMM mode opera-*
tion although this is generally not recommended for "perfor-
mance" applications. This configuration is only supported
with a 512MB DIMM installed in DIMM slot 1A.

Use DIMMs of identical size and speed.

Supported memory

DIMMs must meet the following requirements:

- Use only DIMMs with DDR2 DRAM technology.

- Use only DDR2-533 and DDR2-667 stacked DIMM modules.

Standard Features

Processor

The system board can accommodate either an Intel® Pentium® 4, Intel® Pentium® D, or an Intel® Xeon® quad-core Intel® Xeon® processor.

Memory

The system board provides four 240-pins DIMM slots each supporting DDR2 533 or DDR2 667 ECC memory. You may install a minimum of 512MB and as much as 8GB (4 x 2GB).

Your system supports dual-channel memory architecture. Refer to for details.

Expansion Slots

■ Two full length 32-bit/33MHz, 3.3V PCI connectors.

■ One x8 PCI Express connector.

■ One physical x4 PCI Express connector (operating at 1x).

■ One physical x8 PCI Express connector (operating at 4x).

Video

The motherboard features an on-board ATI ES1000 video controller with 16MB external video memory.

Network Controller

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

The motherboard features the Intel® 82573E dual port controller for 10/100/1000 Mbit/s Ethernet LAN connectivity.

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.

Peripheral Bays

Your system features four 5,25-inch bays that you can use with an optical device or a tape backup unit.

The 3.5-inch bay may be fitted with an optional floppy disk drive.

RAID Support

The motherboard features two onboard controllers providing RAID support for S-ATA configurations.

■ Intel controller

- 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 71*.

■ LSI controller

- 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 74*.

Refer to the *"IDE Controller Submenu" on page 208* for more information on how to select the controller that will be active in your system.

Intel® Active Management Technology (Intel AMT) Support

The Intel® Active Management Technology (Intel AMT), which is a feature of Intel® vPro™ technology, is a new step toward greater Information Technology efficiency. Using built-in platform capabilities and popular third-party management and security applications, Intel AMT allows IT to better discover, heal, and protect their networked computing assets.

Refer to *"Intel® Advanced Management Technology (AMT) Web Interface" on page 134* for more information, and to *"Back Panel Connectors" on page 24* to identify the IAMT compliant network port on your system.

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 720KB and 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 S-ATA or SCSI hard disk drives.

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.

Optional Features

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 +R9 Combination Drive

■ Emergency Eject: Pin-hole on front panel to release tray.

■ Form Factor: 5.25" half height

■ Enhanced IDE Interface

■ Multifunction device:

■ Data buffer: 2MB

■ Compatibility:

- Reads data in each CD-ROM, CD-ROM XA, CD-I, Video CD, CD-Extra, CD-Text, Photo CD (Single and Multi session), DVD-ROM, DVD-R(Ver.1.0, Ver. 2.0 for Authoring), CD-DA

- Reads and writes CD-Audio, CD-R, CD-RW, DVD-R (Ver. 2.0), DVD-RW, DVD+R and DVD+RW

■ Access time (max):

- CD-ROM: 200ms

- DVD-ROM: 230ms

■ Performance:

Table 6: Combo Drive Performance

	Reading Speed	Writing Speed
CD-ROM		48x
CD-R	48x	48x
DVD	16x (single layer) 12x (dual layer)	
CD-RW	40x	32x
DVD+R	16x	16x
DVD-R	16x	16x
DVD-R-DL		4x
DVD+R-DL	7x	4x
DVD+RW	12x	8x

■ Environmental Specifications:

Table 7: Combo Drive Environmental Specifications

	Operating	Non-operation
Temperature	5°C to 45°C	-30°C to +60°C
Humidity (% relative humidity)	15% to 80%	15% to 95%
Vibration	0.30 G (5-500 Hz)	2.0 G (5-500 Hz)

DAT72 Tape Backup Unit (USB)

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

Intel Pro/1000 PT Single Port LAN Board

One gigabit copper server connection in a PCI Express slot.

Interface

■ PCI Express.

Connectors

■ One RJ-45.

IEEE standards / network topology:

■ 10BASE-T, 100BASE-TX, 1000BASE-T.

Features

■ High-performance, self-configuring 10/100/1000 Mbps connection for PCI Express slots

■ Multi-Gigabit scalability and increased uptime through advanced server features

■ Load balancing on multiple CPUs: Increases performance on multi-processor systems by efficiently balancing network loads across CPU cores.

■ Interrupt moderation: Delivers increased performance while significantly reducing CPU utilization.

■ Compatible with x1, x4, x8, and x16 full-height and low-profile PCI Express slots.

■ Remote management support.

■ Intel® PROSet Utility for Microsoft Device Manager: Provides point-and-click power over individual adapters, advanced adapter features, connection teaming, and VLAN configuration.

■ Advanced cable diagnostics: Dynamically tests and reports network problems (error rate, cable length) and automatically compensates for cable issues (cross-over cable, wrong pin-out/polarity).

Intel Pro/1000 PT Dual Port LAN Board

Two gigabit copper server connections in a single PCI Express slot.

Interface

■ PCI Express.

Connectors

■ Two RJ-45.

IEEE standards / network topology:

■ 10BASE-T, 100BASE-TX, 1000BASE-T.

Features

■ Intel® PROSet Utility and Intel® PRO Intelligent Install for easy installation.

■ Intel® lead-free1 technology.

■ Plug and play specification support Standard.

■ Auto-negotiation, full-duplex capable.

■ Integrated media access control (MAC) and physical layer (PHY).

■ Includes a full-height bracket.

■ Cable distance: 100m in Category-5 for 100/1000 Mbps and Category-3 for 10 Mbps.

Network Management

■ Wired for Management (WfM) baseline v2.0 enabled for servers.

■ DMI 2.0 support, Windows Management Instrumentation (WMI) and SNMP-manageable SMBus support.

■ Remote Installation Services (RIS).

■ Diagnostics (loopback, testability, PHY register access).

■ Advanced Configuration and Power Interface (ACPI) 1.0 power management.

■ Wake on LAN support over PCI Express.

■ PXE 2.0 enabled through boot read-only memory (ROM).

Advanced Software Features

■ Adapter Fault Tolerance (AFT).

■ Switch Fault Tolerance (SFT).

■ Adaptive Load Balancing (ALB).

■ Fast EtherChannel (FEC).

■ Gigabit EtherChannel (GEC).

■ Teaming support : Scales up to 8 connections.

■ Multiple teams: Supports 4 separate teams, maximum.

■ IEEE 802.3ad (link aggregation control protocol).

■ PCIe Hot Plug/Active peripheral component interconnect (PCI).

■ IEEE 802.1Q VLANs.

■ IEEE 802.3 (z, ab, u, x) flow control support.

■ TCP checksum offload — transmission control protocol (TCP), user datagram protocol (UDP), Internet protocol (IP).

■ IEEE 802.1p.

■ TCP segmentation/large send offload.

■ Interrupt moderation.

Adaptec SCSI Card 29160ALP

The Adaptec SCSI Card 29160 delivers the maximum throughput for a single channel Ultra160 SCSI card by using a 64-bit PCI interface.

The Adaptec SCSI Card 29160 provides the ideal connection to external Ultra160 SCSI (LVD) hard disks and devices.

Highlights

■ 160 MByte/sec performance

■ SpeedFlex technology ensures top performance of all connected devices, regardless of SCSI generation

■ Seamless backwards compatibility protects legacy devices

■ Industry-leading compatibility, reliability*

■ CRC (Cyclical Redundancy Checking) improves data integrity

■ Domain Validation intelligently verifies system configuration for improved reliability

Specifications

■ 1-channel, 64-bit (32-bit compatible), ideal for internal and external hard disk drive configurations

■ Data Transfer Rate: 160MB/sec

■ External Connectors

  - One 68-pin for LVD SCSI devices

■ Internal Connectors

  - One 68-pin for LVD SCSI

  - One 68-pin for Ultra Wide SCSI

  - One 50-pin for Ultra SCSI Bus Type 64-bit PCI (32-bit compatible)

■ Board Dimensions 6.87" x 3.87"

Adaptec SCSI Card 29320ALP

Highlights

■ Adaptec Seamless Streaming® ; this technology pushes the performance of Ultra320 SCSI to its theoretical limit by implementing in hardware three new design advances:

- Ultra Streaming Data Path

- Matrix Command Management

- Rapid Packet Protocol Engine

■ 320 MByte/sec performance per channel

■ Industry-leading compatibility and reliability

Specifications

■ Hardware Features

- 64-bit/ 133 MHz PCI/PCI-X interface

- Compatible with 32-bit PCI slots (thus running in the slower 32-bit mode)

- Single-channel Ultra320 SCSI card.

■ Connectors

- 68-pin internal connector

- 68-pin VHDCI external connector for Ultra320 SCSI (LVD) hard disks drives

■ Physical Specifications

- Size: 16,8cm x 6,4cm

SCSI Card SecuRAID 114

Highlights

With support for 64-bit addressing and a full RAID feature set, the SecuRAID 114 delivers unsurpassed data throughput and fault tolerance for your mid-range server or performance workstation.

Designed around LSI Logic's next-generation I/O technology - Fusion-MPT™- the SecuRAID 114 leverages a streamlined firmware-level programming interface and advanced hardware designs to offer unequalled I/O efficiency and performance. The SecuRAID 114 also incorporates a space-saving MD2 (low-profile PCI) form factor, increasing available space, even in the most limited server and workstation enclosures.

■ One single-channel LSI53C1020 Ultra320 SCSI controller

■ IA-64 ready

■ Intel GC80302 integrated I/O processor

■ 64-bit, 66 MHz PCI

■ PCI 2.2 compliant

■ Integrated 64 MB ECC SDRAM cache memory

■ Advanced management and configuration utilities

■ Supports up to 40 logical drives per controller

■ Auto resume during array reconstruction

■ Background initialization for Quick RAID 5 setup

■ FlexRAID®:

  - Online capacity expansion

  - Online RAID level migration

Features

■ Disk Array Features

  - Supports RAID0/RAID1/RAID5/RAID10/RAID50

  - Supports up to 40 logical drives

  - Supports hot-swap of failed drives

  - Automatic rebuild of hot spare drives

  - Auto resume on array reconstruction

■ Hardware Features

  - 64-bit / 66MHz PCI interface compliant to PCI Rev2.2

  - A 64MB cache memory is soldered on the card.

  - Single-channel, PCI RAID controller card with an Ultra 320 SCSI interface

- Modes supported: SE or LVD mode, SCSI FAST, ULTRA, ULTRA2, 160M and 320M

■ Connectors:

- one internal 68-pin

- one external VHDCI-68-pin connector

■ Physical & Environmental Specifications

- Size: 16,76 x 6,45 cm

- Operating temperature: up to 55°C

- Voltage: 5V± 0.25V

Setting Up Your System

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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.

After removing the contents of the containers, 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.

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 91 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 91 for details.

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

■ Do not provide the wiring exceeding the rating power.

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

■ Place of uneven or slanting floor

■ Place of drastic temperature change (near a heater, air conditioner, or refrigerator)

■ Place where intense vibration may be generated

■ Place where corrosive gas is generated, chemicals are nearby, or chemicals may be accidentally sprayed over

■ Place where a carpet not subject to anti-static process is laid.

■ Place near a device generating intense magnetic field (such as a TV, radio, broadcast/communication antenna, power transmission wire, and electromagnetic crane) is placed (If unavoidable, contact your sales agent to request proper shield construction.)

■ Place where the power cord of the system 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 system close to such equipment, request your sales agent for separate power cabling or noise filter installation.

Setting Up Your Server (Rack)

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.

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 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 the trouble or after replacing the system board.

Selecting Server Site

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

Refer to the documentation attached to the rack or contact your sales agent for the installation of the server on 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 91 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 91 for details.

■ Do not carry or install the server only by a single person.

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

■ Do not install any component on the server only by a single person.

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

■ Do not leave more than one device being pulled out from the rack.

■ Do not provide the wiring exceeding the rating power.

Do not install the rack in the places listed below. Installing the rack or mounting the server on the rack in such a place may cause some malfunction to occur.

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

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

■ Place where 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 of drastic temperature change (near a heater, air conditioner, or refrigerator)

■ Place where intense vibration may be generated

■   Place where corrosive gas is generated, chemicals are nearby, or chemicals may be accidentally sprayed over

■   Place where a carpet not subject to anti-static process is laid.

■   Place where some objects may be fallen on the rack

■   Place near a device generating intense magnetic field (such as a TV, radio, broadcast/communication antenna, power transmission wire, and electromagnetic crane) is placed (If unavoidable, contact your sales agent to request proper shield construction.)

■   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 your sales agent for separate power cabling or noise filter installation.

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 8: 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 9: Self-tapping screws**
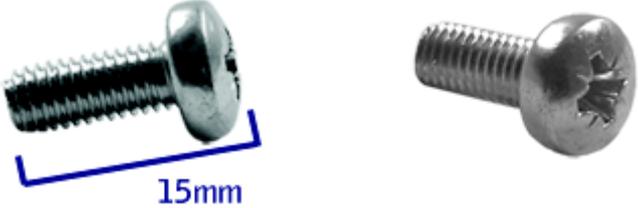
6 (minimum) washers, to be used with the 6 self-tapping screws (*"Figure 9: Self-tapping screws"*)	*Figure 10: Washers for the self-tapping screws*
8 (minimum) flange head screws (M5x12) used to fix the support rail assemblies to the rack	*Figure 11: Flange head screws*
4 washer plates, to be used with the flange head screws (*"Figure 11: Flange head screws"*)	*Figure 12: Washer plates*
Rack mounting frame	*Figure 13: Rack-mounting frame (A)*
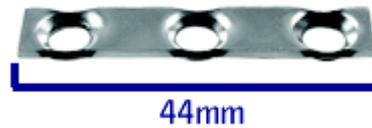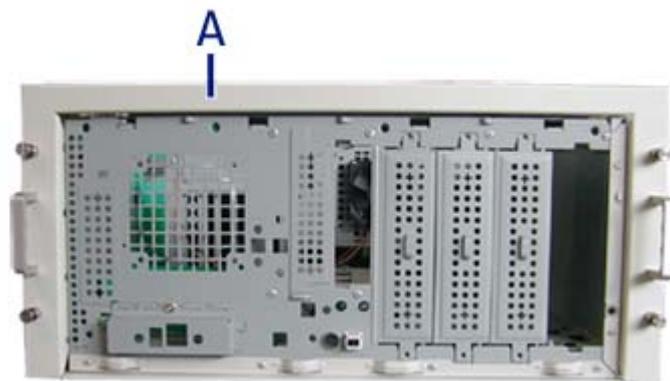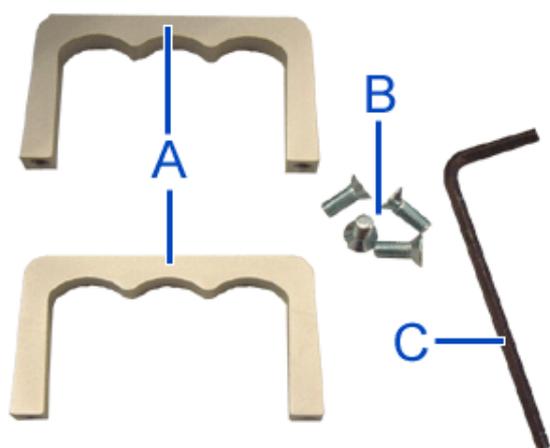
2 Handles (A)	
4 Handles fixing screws (B)	
1 Hex key for frame grub-screws (C)	
	Figure 14: Handles (A), screws (B) and hex key (C)

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)	13,5mm *Figure 15: Screws*
8 (minimum) washers	12mm *Figure 16: 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 200*.

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 pro-
vide 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 com-
monly spaced in a 5/8 x 5/8 x 1/2-inch sequence. Perform the
following steps carefully; brackets must be mounted with preci-
sion 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.
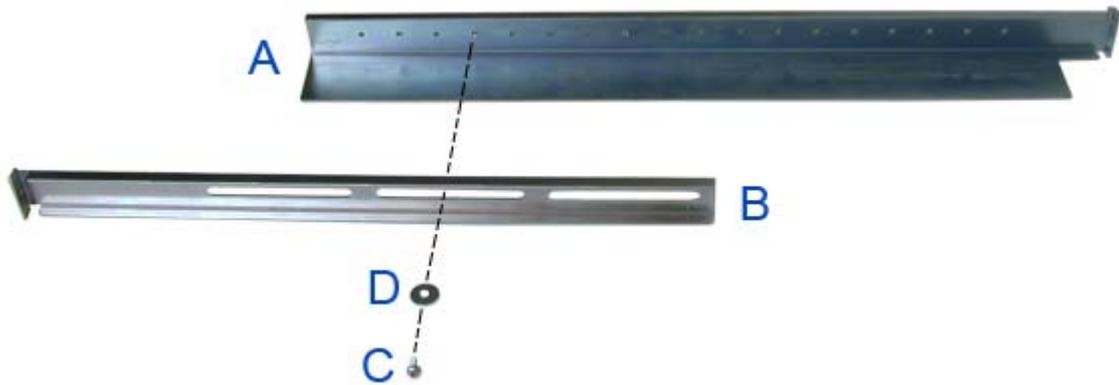
Figure 17: Right support rail front and rear parts, fixing screws and washers

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).
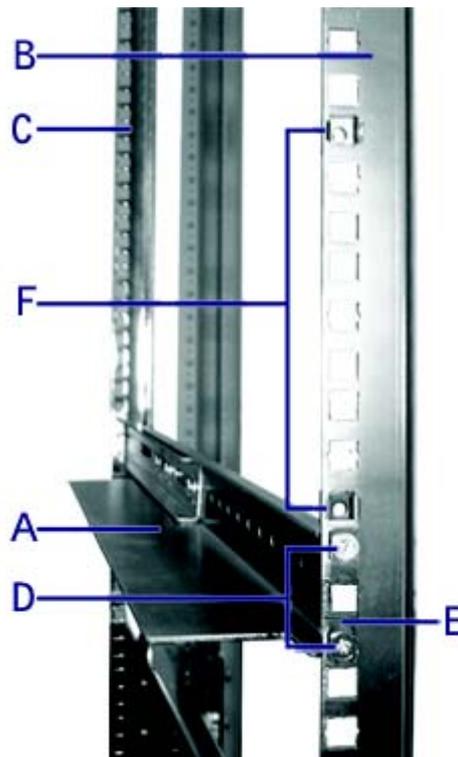
Figure 18: Installing the right support rail

3. Insert two caged nuts (F) as shown in the figure above. One in the hole just above the support rail, the other one eight holes above. Insert the caged nuts in the front mounting rail as follows (*see "Figure 19: Inserting a caged nut"*):

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

   ■ 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.

■ Repeat for each caged nut.
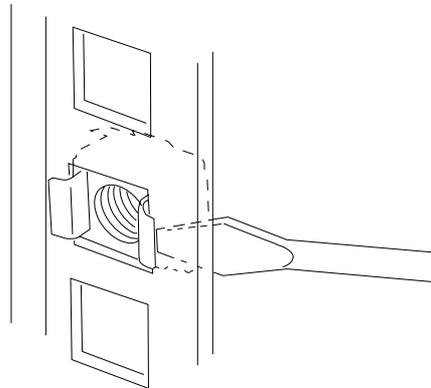
Figure 19: Inserting a caged nut

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 14: Handles (A), screws (B) and hex key (C)")* to the rack mounting frame with two screws *(B in "Figure 14: 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 *"Removing the Right Side Door" on page 94*.

2. Remove the front panel as described in *"Removing the Front Panel" on page 96*.

3. Install the rack mounting frame *(A)* on the server *(B)* as shown in the figure below.
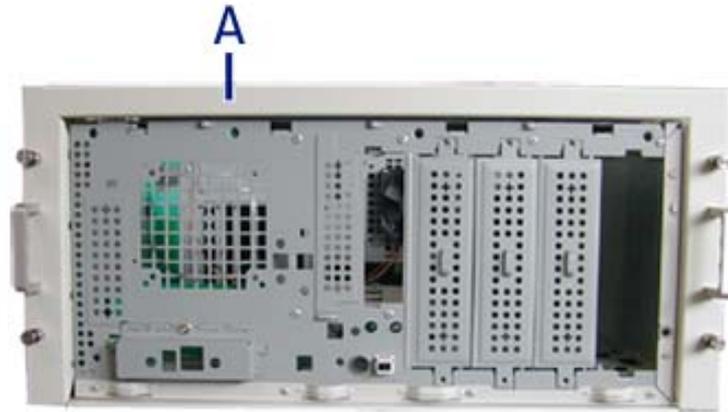
Figure 20: Installing the rack mounting frame on the server

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 14: 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.
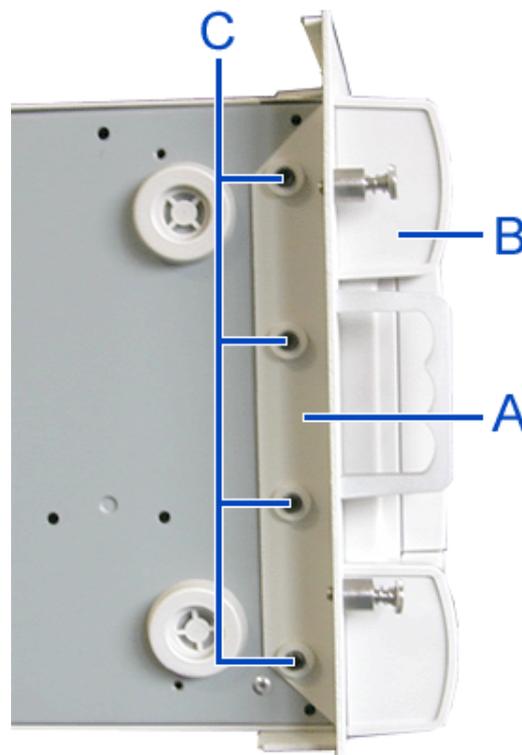
Figure 21: Securing the rack mounting frame

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 22: Securing the server to the rack cabinet

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 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.

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.

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.

■ Verify that the access lamp on the diskette drive is unlit before turning off the system or ejecting the floppy disk. Turning off the system or ejecting the floppy disk while the access lamp is lit may damage data being stored on the floppy disk.

■ After turning off the system, wait at least 10 seconds before turning it on again. Cycling the power immediately may cause malfunction or failures of the system.

■ Before relocating the system, turn off the power and unplug the power cord from the outlet. Moving the system when it is powered may cause malfunction or failures of the system.

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

■ Lightning may cause a momentary voltage drop. To prevent this problem, an uninterruptible power supply unit is recommended.

■ Only use options qualified for the system. A non-qualified option may be mounted or connected to the system, but it may fail to operate normally or even cause failures. These types of failures are not covered under 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 the 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 messages of the BIOS setup utility during execution.

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, .*

⚠ **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

When the system is powered on, pressing the power on/off switch on the front panel of the system turns the power off.

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

⚠ 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.

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 .

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

For more information, please refer to the documentation included on the ExpressBuilder disc.

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 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 "BIOS Setup Utility" on page 203.*

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 RAIDConfiguration Utility.

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 203.*

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 *SCSISelect* Utility

Installing the Hard Disk Drives

Install the required SCSI hard disk drives to your system.

⚠ **Caution**

■ Use two hard disk drives of the same revolution (rpm).

■ To configure RAID 1, use also two hard disk drives of the same capacity.

Enabling the RAID Feature using the SCSISelect Utility

Two or more of the installed hard disk drives can be used either as a single disk or a RAID drive.

📑 **Note**: The factory-set value is to use the hard disk drive as a single disk drive.

To configure a disk drive connected to the onboard SCSI connector with the SCSISelect Utility:

1. Start the SCSISelect Utility. See .

```
AIC-7902 A at Slot 23 02:03:00
AIC-7902 B at Slot 23 02:03:01
```

2. Select the channel to set HostRAID to open the *Options* window.

3. Select [Configure/View SCSI Controller Settings] and press **Enter.**

```
━━━━━━━━━━ Options ━━━━━━━━━━

Configure/View SCSI Controller Settings
         SCSI Disk Utilities
```

4. Select [Disabled] of Host RAID on Configuration menu and press **Enter.**

```
┌ Configuration ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
│
│  SCSI Bus Interface Definitions
│  SCSI Controller ID ·····················7
│  SCSI Controller Parity ················Enabled
│  SCSI Controller Termination ···········Enabled
│
│  Additional Options
│  Boot Device Configuration ·············Press<Enter>
│  SCSI Device Configuration ·············Press<Enter>
│  Advanced Configuration ················Press<Enter>
│  Host RAID ······························Disabled
│
│         <F6> - Reset to SCSI Controller Defaults
│
└───────────────────────────────────────────────

┌ BIOS Information ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
│
│  Interrupt(IRQ) Channel ················10
│  I/O Port Addresses ····················2400h, 2000h
└───────────────────────────────────────────────
```

5. Change it to [Enabled].

```
┌ Configuration ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
│
│  SCSI Bus Interface Definitions
│  SCSI Controller ID ·····················7
│  SCSI Controller Parity ················Enabled
│  SCSI Controller Termination ···········Enabled
│
│  Additional Options
│  Boot Device Conf┌─────────────────┐·····Press<Enter>
│  SCSI Device Conf│     Enabled     │·····Press<Enter>
│  Advanced Configu│    Disabled     │·····Press<Enter>
│  Host RAID ·······└─────────────────┘·····Disabled
│
│         <F6> - Reset to SCSI Controller Defaults
│
└───────────────────────────────────────────────

┌ BIOS Information ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
│
│  Interrupt(IRQ) Channel ················10
│  I/O Port Addresses ····················2400h, 2000h
└───────────────────────────────────────────────
```

6. Press **Esc**. The confirmation message [Save Changes Mode?] appears. Select [Yes].

7. Select [Configure/View HostRAID Settings] and press **Enter**.

```
                 ┌──── Options ────┐
       Configure/View SCSI Controller Settings
       Configure/View HostRAID Settings
             SCSI Disk Utilities
```

8. Select [Configure/View HostRAID] and press **Enter**.

```
               ──── Options ────

      Configure/View SCSI Controller Settings
              SCSI Disk Utilities
```

Main Menu

When you select [Configure/View HostRAID Settings], the *Main* Menu as shown below appears upon completion of the device scan.

```
════ AIC-7902 B at slot 23, 02:03:01 ════
┌ Create, Spare, Delete, Rebuild, Verify, Bootable ┐

   ID  Type              Vendor   Product           Size    Status

    0   Hard Drive        MAXTOR   ATLASU320_36_SCA  36GB    Free
    1   Hard Drive        IBM      IC35L036UCDY10-0  36GB    Free
    2   Hard Drive        IBM      IC35L036UCDY10-0  36GB    Free
    3   Hard Drive        SEAGATE  ST336753LC        36GB    Free
```

Main Menu Display

ID	Indicates either the SCSI ID of the hard disk drive or the ID of the array.
Type	Indicates the RAID level for the array, and any available disk drive that is not in the array. - Hard Drive: Available hard disk drive that is not in the array. - Striped (R0): Array configured in RAID0. - Mirrored (R1): Array configured in RAID1. - Stripe/Mirror (R10): Array configured in RAID 10 (spanning of RAID1). - Spare: Hard disk drive assigned as a spare disk.
Vendor	Indicates the manufacturer of the hard disk drive or HostRAID (Adaptec).
Product	Indicates the model name of the hard disk drive or the array name.
Size	Indicates the capacity of the hard disk drive or that of the array.
Status	Indicates the status of the hard disk drive or array. - Free: Available hard disk drive that is not in the array. - Optimal: Array is in normal state. - Degraded: One of the RAID1 or RAID10 hard disk drives is failed. - Dead: One or more RAID0 hard disk drives is failed. Two or more RAID1 or RAID10 hard disk drives are failed. - Building: The array is in build process. - Verify: The array is in verify process. - Rebuild: The array is in rebuild process.

When you select the array on Main Menu, the detailed information of the hard disk drives in array is displayed.

```
════════ AIC-7902 B at slot 23, 02:03:01 ════════
┌─ Create, Spare, Delete, Rebuild, Verify, Bootable ──────

    ARRAY Name: Haaa - Striped - 64K stripe size

    ID  Type              Vendor   Product          Size  Status

     0  Striped (R0)      MAXTOR   ATLASU320_36_SCA  36GB  Optimal
     1  Striped (R0)      IBM      IC35L036UCDY10-0  36GB  Optimal
```

Detailed indications

ID	Indicates the SCSI ID of the hard disk drives that configures the array
Type	Indicates the RAID level for the array. - Striped (R0): Array configured in RAID0 - Mirrored (R1): Array configured in RAID1 - Stripe/Mirror (R10): Array configured in RAID 10 (spanning of RAID1)
Vendor	Indicates either the manufacturer of the hard disk drive or HostRAID (Adaptec).
Product	Indicates the model name of the hard disk drive or the array name.
Size	Indicates the capacity of the hard disk drive or that of the array.
Status	Indicates the status of the hard disk drive or that of the array. - Optimal: the hard disk drive is operating normally. - Degraded: the hard disk drive is degraded. - Failed: the hard disk drive is failed. - Building: the hard disk drive is being built. - Verify: the hard disk drive is being verified. - Replaced: the hard disk drive is being rebuilt. - Missing: the hard disk drive is hidden from the controller.

Exiting the Utility

To exit the utility, press **Esc** until a message prompts you to exit.

Select [Yes] to exit and press any key to restart the computer. The changes you have made become valid after the system restarts.

Creating Arrays

Follow the procedures below to create an array.

Requirements

Before creating arrays, make sure the disks for the array are connected and installed in your system.

1. Start the SCSISelectUtility.

    Select [Configure/View HostRAIDSettings] from *Options* menu of the channel to create an array.

```
┌──────── Options ────────┐
│                         │
│ Configure/View SCSI Controller Settings │
│  Configure/View HostRAID Settings  │
│       SCSI Disk Utilities       │
│                         │
└─────────────────────────┘
```

2. Press **C** on the main menu to create an array..
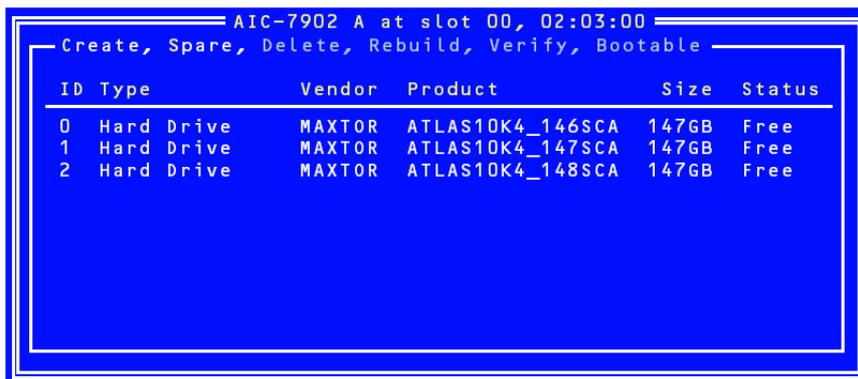
```
┌═══════ AIC-7902 A at slot 00, 02:03:00 ═══════┐
│ ┌─ Create, Spare, Delete, Rebuild, Verify, Bootable ─┐ │
│ │                                                    │ │
│ │  ID Type          Vendor   Product       Size  Status │ │
│ │  0  Hard Drive    MAXTOR   ATLAS10K4_146SCA  147GB  Free │ │
│ │  1  Hard Drive    MAXTOR   ATLAS10K4_147SCA  147GB  Free │ │
│ │  2  Hard Drive    MAXTOR   ATLAS10K4_148SCA  147GB  Free │ │
│ │                                                    │ │
│ │                                                    │ │
│ │                                                    │ │
│ │                                                    │ │
│ │                                                    │ │
│ └────────────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────────┘
```

📇 **Note:** *Some characters may not be displayed correctly when the console redirection is used. It is safe to bypass this issue.*

⚠ **Caution**

■ At least two hard disk drives are required to create an array.

■ If hard disk drives of different capacities are used, the array capacity is determined according to the smaller one.

■ Use only hard disk drives which models are supported by the system.

■ The hard disk drive which has been configured as an array
   disk drive cannot be selected.

3. Select a RAID type in [Select RAID Type] window and press **Enter**.

Put a cursor to the selected item, another window opens indicating the minimum and maximum number of disks to create an array and a message for assigning a spare disk.

> 📑 **Note:** *To set the RAID level, see or* <u>*"Creating RAID1 Array"*</u>
> *on page 83 and* <u>*"Creating RAID0 Array" on page 81*</u>.

⚠ **Caution**

After creating an array, set the boot priority for the created array according to "Boot Priority".
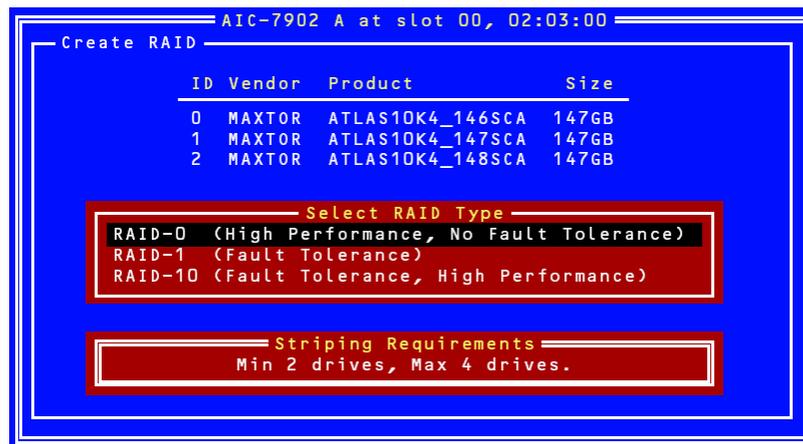
Creating RAID0 Array

To create a RAID0 array:

1. Select [RAID-0] on the [Select RAID Type] window.

2. Use the cursor key to highlight the desired hard disk drives, press **Space** to select them (an [X] mark is placed next to the selected hard disk drive) and when the selection is finished, press **Enter** to validate it.

```
════════════ AIC-7902 A at slot 00, 02:03:00 ════════════
 ┌─ RAID-0: Select RAID members ─

             ID Vendor    Product           Size

             0  MAXTOR    ATLAS10K4_146SCA  147GB   X
             1  MAXTOR    ATLAS10K4_147SCA  147GB   X
             2  MAXTOR    ATLAS10K4_148SCA  147GB
```

.

3. Select the desired stripe size and press **Enter**. Available stripe sizes are 16, 32, and 64 KB.

4. Enter the desired RAID Name in [Assign RAID Name] window and press **Enter**.

⚠ **Caution**

■ A RAID Name must be unique, and up to 15 characters are acceptable.

■ If a valid partition information or a boot block is detected in the selected hard disk drive, a warning message will be displayed. Select [Yes] to continue creating an array, or [No] to cancel the array creation.

■ Take to select the appropriate hard disk drives. If not, the data will not be restored.

5. The message "Do you want to make this array as bootable?". Select either [YES] or [NO], and then press **Enter**.

📰 *Note: The boot priority can be changed after the arrays have been created. Refer to* *.*

6. When prompted with the message [Create Array?], select [Yes] and press **Enter**.

Selecting [No] cancels the array creation and returns to the *Main* menu.

7. When prompted with the message [Are you sure?], select [Yes] and press **Enter**.

Selecting [No] cancels the array creation and returns to the *Main* menu.

8. When the message [Build Completed] is displayed, press **Esc** to return to the *Main* menu.

📄 **Note:** *On the Main menu, make sure that "Optimal" is indicated for the status of the created array.*

Creating RAID1 Array

To create a RAID1 array, perform either of the followings:

■ Create a new RAID1 array.

■ Migrate to RAID1 array using the data stored in an existing single disk. (Migration)

Creating RAID1 array using an existing single hard disk drive is called "migration". During the migration, the source hard disk drive must have been used as the boot disk in the standard SCSI connection.

Refer to the "HostRAID Setup Card" documentation for details on the migration.

To create a RAID1 array:

1. Select [RAID-1] on the [Select RAID Type] window.


```
                    Select RAID Type
RAID-0  (High Performance, No Fault Tolerance)
RAID-1  (Fault Tolerance)
RAID-10 (Fault Tolerance, High Performance)
```

2. Use the cursor key to highlight the desired hard disk drives, press **Space** to select them (an [X] mark is placed next to the selected hard disk drive) and when the selection is finished, press **Enter** to validate it.


```
                AIC-7902 A at slot 00, 02:03:00
 RAID-1: Select RAID members

       ID Vendor  Product              Size

        0  MAXTOR  ATLAS10K4_146SCA   147GB  X
        1  MAXTOR  ATLAS10K4_147SCA   147GB  X
        2  MAXTOR  ATLAS10K4_148SCA   147GB
```
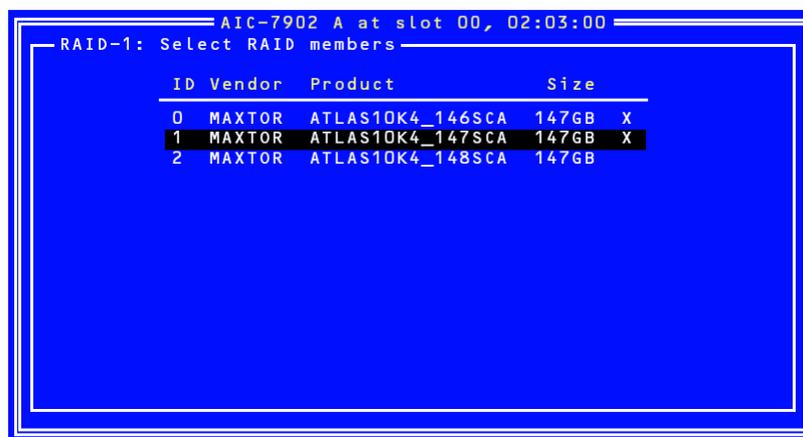
Select one of the options in the [RAID-1 Build Option] window and press **Enter**.

Available options are as follows:

```
┌────── RAID-1 Build Option ──────┐
│      Create new RAID-1          │
│      Copy from (X) to (Y)       │
│      Copy from (Y) to (X)       │
└─────────────────────────────────┘
```

- Create new RAID-1:Default

- Copy from (X) to (Y):Copy data from the disk of ID X to that of ID Y.

- Copy from (Y) to (X):Copy data from the disk of ID Y to that of ID X.

⚠ **Caution**

Double-check the copy source and copy destination. If they are incorrect, the data will no longer be restored.

3. Enter the desired RAID Name in [Assign RAID Name] window and press **Enter**.

⚠ **Caution**

■ A RAID Name must be unique, and up to 15 characters are acceptable.

■ If a valid partition information or a boot block is detected in the selected hard disk drive, a warning message will be displayed. Select [Yes] to continue creating an array, or [No] to cancel the array creation.

■ Take to select the appropriate hard disk drives. If not, the data will not be restored.

4. The message "Do you want to make this array as bootable?". Select either [YES] or [NO], and then press **Enter**.

▤ *Note: The boot priority can be changed after the arrays have been created. Refer to "Boot Priority" on page 89.*

5. When prompted with the message [Create Array?], select [Yes] and press **Enter**.
Selecting [No] cancels the array creation and returns to the *Main* menu.

6. When prompted with the message [Are you sure?], select [Yes] and press **Enter**.
Selecting [No] cancels the array creation and returns to the *Main* menu.

When an array has been created, the build operation starts.

⚠ **Caution**

Be sure to complete the Build process. Do not stop the process by pressing **Esc**. The OS only detects arrays which have been completely built, and their status set to "Optimal". In addition, no OS can be installed in that array.

7. When the message [Build Completed] is displayed, press **Esc** to return to the *Main* menu.

📝 *Note: On the Main menu, make sure that "Optimal" is indicated for the status of the created array.*

Creating RAID10 Array

1. Select [RAID-10] on [Select RAID Type] window and press **Enter**.

```
────────────── Select RAID Type ──────────────
RAID-0  (High Performance, No Fault Tolerance)
RAID-1  (Fault Tolerance)
RAID-10 (Fault Tolerance, High Performance)
```

2. Use the cursor key to highlight the desired hard disk drives, press **Space** to select them (an [X] mark is placed next to the selected hard disk drive) and when the selection is finished, press **Enter** to validate it.

```
═══════════ AIC-7902 B at slot 23, 02:03:01 ═══════════
┌ RAID-0: Select RAID members ─────────────────────────

        ID  Vendor   Product           Size

         0  MAXTOR   ATLASU320_36_SCA  36GB   X
         1  IBM      IC35L036UCDY10-0  36GB   X
         2  IBM      IC35L036UCDY10-0  36GB
         3  SEAGATE  ST336753LC        36GB
```

3. Select the desired stripe size and press **Enter**. Available stripe sizes are 16, 32, and 64 KB.

4. Enter the desired RAID Name in [Assign RAID Name] window and press **Enter**.

⚠ **Caution**

■ A RAID Name must be unique, and up to 15 characters are acceptable.

■ If a valid partition information or a boot block is detected in the selected hard disk drive, a warning message will be displayed. Select [Yes] to continue creating an array, or [No] to cancel the array creation.

■ Take to select the appropriate hard disk drives. If not, the data will not be restored.

---

5. The message "Do you want to make this array as bootable?". Select either [YES] or [NO], and then press **Enter**.

📑 *Note: The boot priority can be changed after the arrays have been created. Refer to .*

---

6. When prompted with the message [Create Array?], select [Yes] and press **Enter**.

   Selecting [No] cancels the array creation and returns to the *Main* menu.

7. When prompted with the message [Are you sure?], select [Yes] and press **Enter**.

   Selecting [No] cancels the array creation and returns to the *Main* menu.

8. When the message [Build Completed] is displayed, press **Esc** to return to the *Main* menu.

Deleting Arrays

To delete an array:

⚠ **Caution**

Before deleting an array, back up the hard disk drive data. Deleted arrays cannot be restored.

---

1. On the main menu, highlight the array you wish to delete and press **Enter**.

```
═══════════ AIC-7902 A at slot 00, 02:03:00 ═══════════
── Create, Spare, Delete, Rebuild, Verify, Bootable ──

   ID Type              Vendor   Product           Size   Status
   0  Striped(RO)       ADAPTEC  raid              109GB  Optimal
```

2. Press **D** on the screen shown below.

> 📃 **Note**: Some characters may not be displayed correctly when the console redirection is used. It is safe to bypass this issue.

```
═══════════ AIC-7902 A at slot 00, 02:03:00 ═══════════
── Create, Spare, Delete, Rebuild, Verify, Bootable ──
   ARRAY Name: raid - Striped - 64K stripe size (Bootable)

   ID Type              Vendor   Product           Size   Status
   0  Striped(RO)       MAXTOR   ATLAS10K4_146SCA  147GB  Optimal
   1  Striped(RO)       MAXTOR   ATLAS10K4_147SCA  147GB  Optimal
   2  Hard Drive        MAXTOR   ATLAS10K4_148SCA  147GB  Free
```

3. Select [Yes] when prompted with the message [Delete Array?] and press **Enter.** Selecting [No] returns to the main menu without deleting any array.

4. Depending on your RAID level:
   - ■ <RAID0>
     The [Deleting information] window appears, select the hard disk drive from which you wish to delete a partition or boot block, or select [None], then press **Enter**.
     <Example>
     Drive ID 0:Data in drive 0 is entirely erased. Data in drive 1 is reserved.
     Drive ID 1:Data in drive 1 is entirely erased. Data in drive 0 is reserved.
     Drive ID 0 & 1:All the data in both drives is erased.
     None:Array is deleted, but the data is reserved in both drives.

   - ■ <Other than RAID0>
     The [Deleting information] window is not displayed, proceed to the next step.

⚠️ **Caution**

The partition or boot block of the selected hard disk drive will be deleted.

5. Select [Yes] when prompted with the message [Are you sure?] and press **Enter**. Selecting [No] returns to the main menu without deleting any array.

Creating Spare Disks

Up to two spare disks can be assigned for one channel.

Spare disk is available for RAID1 and RAID10 (spanning of RAID1) only.

📄 **Note:** *Spare disks must have a larger capacity than the hard disk drives configuring the array.*

To assign a spare disk:

1. Press **S** on the *Main* Menu.

📄 **Note**: *Some characters may not be displayed correctly when the console redirection is used. It is safe to bypass this issue.*

```
═══════════ AIC-7902 B at slot 23, 02:03:01 ═══════════
┌─ Create, Spare, Delete, Rebuild, Verify, Bootable ─────

    ID  Type              Vendor   Product           Size   Status

    0   Hard Drive        MAXTOR   ATLASU320_36_SCA  36GB   Free
    1   Hard Drive        IBM      IC35L036UCDY10-0  36GB   Free
    2   Hard Drive        IBM      IC35L036UCDY10-0  36GB   Free
    3   Hard Drive        SEAGATE  ST336753LC        36GB   Free
```

2. Select [Add Spare] on the *Option* window as shown below.

```
┌──── Option ────┐
│  Add  Spare    │
│ Delete  Spare  │
└────────────────┘
```

3. Select the spare disk from the list of available disks, and press **Enter**.

4. Select [Yes] when prompted with the message [Are you sure?] and press **Enter.**

    Selecting [No] returns to the *Main* menu without assigning any spare disk.

5. On the *Main* menu, make sure that the type of the selected hard disk drive is set to "Spare", and its status "Optimal".

```
┌═══════════ AIC-7902 B at slot 23, 02:03:01 ═══════════┐
│┌─ Create, Spare, Delete, Rebuild, Verify, Bootable ──┐│
││                                                      ││
││   ID  Type          Vendor   Product      Size  Status│
││                                                      ││
││    0  Spare         MAXTOR   ATLASU320_36_SCA  36GB  Optimal│
││    1  Hard Drive    IBM      IC35L036UCDY10-0  36GB  Free│
││    2  Hard Drive    IBM      IC35L036UCDY10-0  36GB  Free│
││    3  Hard Drive    SEAGATE  ST336753LC        36GB  Free│
││                                                      ││
└└──────────────────────────────────────────────────────┘┘
```

To un-assign a spare disk, take the same steps from 1 to 4, using "Delete Spare" instead of "Add Spare".

Boot Priority

To specify boot priority to an array:

1. Select the desired array, and press **Enter**.

2. Press **B** on the window showing the array details.

> 📄 **Note**: *Some characters may not be displayed correctly when the console redirection is used. It is safe to bypass this issue.*

RAID Configuration using the MegaRAID Configuration Utility

Please refer to the documentation included on the *MegaRAID Ultra 320 Disk Array Controller* disc.

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 top covers removed can damage your system components.

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

⚠ Warning

Avoid burns: If the system has been running, any installed processor 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 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 61.*). 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.

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 91*).

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

3. Unlock the key lock.

Figure 23: Key lock

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

Figure 24: 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 94*

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

Figure 25: 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 4 remaining tabs are securely inserted into their slots.

3. Replace the right side door. See *"Replacing the Right Side Door" on page 95*.

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. Before installing a 5.25-inch device, read section *"Preparing IDE Devices" on page 125*.

Adding a 5.25-inch Device

1. Remove the right side door. *See "Removing the Right Side Door" on page 94.*
2. Remove the front panel. *See "Removing the Front Panel" on page 96.*
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 26: Attaching the Slide Rails

7. Slide in the 5.25-inch device until it clicks into place.
8. Connect the data cable to the device with the marked edge toward pin 1 of the drive. *See "Cabling IDE Devices" on page 118.*
9. Connect the power cable to the drive. *See "Cabling IDE Devices" on page 118.*
10. Replace the front panel. *See "Replacing the Front Panel" on page 96.*
11. Replace the right side door. *See "Replacing the Right Side Door" on page 95.*

   📄 **Note**: Modify the BIOS Setup program to recognise the additional device. For additional information, refer to *"BIOS Setup Utility" on page 203*.

Removing a 5.25-inch device

1. Remove the right side door. *See "Removing the Right Side Door" on page 94.*

2. Remove the front panel. *See "Removing the Front Panel" on page 96.*

3. Unconnect the power cable and the data cable 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 96.*

7. Replace the right side door. *See "Replacing the Right Side Door" on page 95.*

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 94.*
2. Remove the front panel. *See "Removing the Front Panel" on page 96.*
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 96.*
7. Replace the right side door. *See "Replacing the Right Side Door" on page 95.*
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 94.*
2. Remove the front panel. *See "Removing the Front Panel" on page 96.*
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 27: 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. *See "Cabling IDE Devices" on page 118.*
7. Connect the power cable to the drive. *See "Cabling IDE Devices" on page 118.*
8. Replace the front panel. *See "Replacing the Front Panel" on page 96.*
9. Replace the right side door. *See "Removing the Right Side Door" on page 94.*

> ⊟ **Note**: Modify the BIOS Setup program to recognise the additional device. For additional information, refer to *"BIOS Setup Utility" on page 203.*

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 94.*
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 28: 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 29: 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 and master/slave/cable select pin configurations. *See "Preparing IDE Devices" on page 125.*

2. Remove the right side door. *See "Removing the Right Side Door" on page 94.*

3. If applicable, disconnect the data and power cables 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 30: 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 data and power cables to their respective hard disk drives. *See "Preparing IDE Devices" on page 125.*

11. Replace the right side door. *See "Replacing the Right Side Door" on page 95.*

📝 ***Note****: Modify the BIOS Setup program to automatically recognise the hard disk drive. For additional information, refer to "BIOS Setup Utility" on page 203.*

Installing and Removing the Hard Disk Drive Cage

Please note that the colors of the devices shown in the pictures may not be accurate. Pictures are not contractual.

Installing the Hard Disk Drive Cage

1. Remove the right side door. *See "Removing the Right Side Door" on page 94.*
2. Remove the front panel. *See "Removing the Front Panel" on page 96.*
3. If necessary, remove the already installed 5.25-inch devices. *See "Removing a 5.25-inch device" on page 97.*
4. If necessary, 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.
5. Pivot the cache until it gets released from the frame.

📑 **Notes**:

■ *Two 5.25-inch slots are necessary to install a hard disk drive cage.*

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

---

6. Take four slide rails marked as "CD-ROM". Slide rails come with the system in a plastic bag.
7. Attach two slide rails onto both sides of the hard disk drive cage as shown in the picture below.

Figure 31: Attaching the Slide Rails

8. Connect the cables getting out of the hard disk drive cage slot to the hard disk drive cage. *See "Cabling the SCSI Hard Disk Drive Cage" on page 104.*

9. Slide in the hard disk drive cage until it clicks into place.
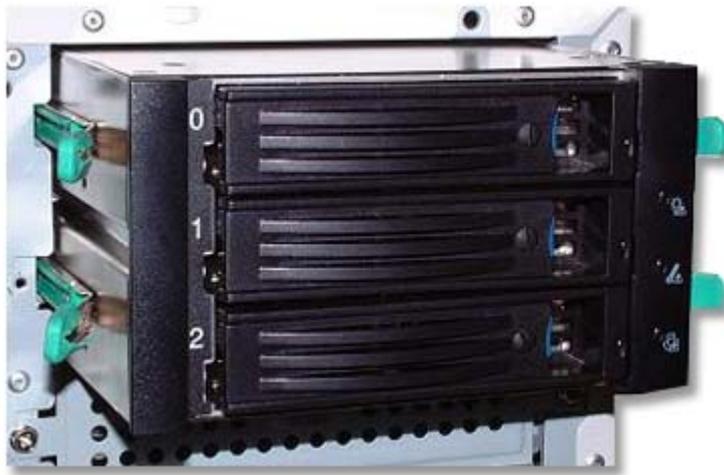
Figure 32: Installing the Hard Disk Drive Cage

10. Replace the front panel. *See "Replacing the Front Panel" on page 96.*

11. Replace the right side door. *See "Replacing the Right Side Door" on page 95.*

📝 **Note**: *Modify the BIOS Setup program to recognise the additional device. For additional information, refer to "BIOS Setup Utility" on page 203.*

Removing the Hard Disk Drive Cage

1. Remove the right side door. *See "Removing the Right Side Door" on page 94.*

2. Remove the front panel. *See "Removing the Front Panel" on page 96.*

3. Unconnect the cables from the hard disk drive cage.

4. Press both slide rails ends on each side of the hard disk drive cage to release it and pull the hard disk drive cage out of the frame.

5. Replace the front panel. *See "Replacing the Front Panel" on page 96.*

6. Replace the right side door. *See "Replacing the Right Side Door" on page 95.*

Cabling the SCSI Hard Disk Drive Cage

■ Connect the power cable to the power connector (A)

■   Connect the SCSI cable to the SCSI connector (B)

■   Connect the RAID cable to the RAID connector (C)
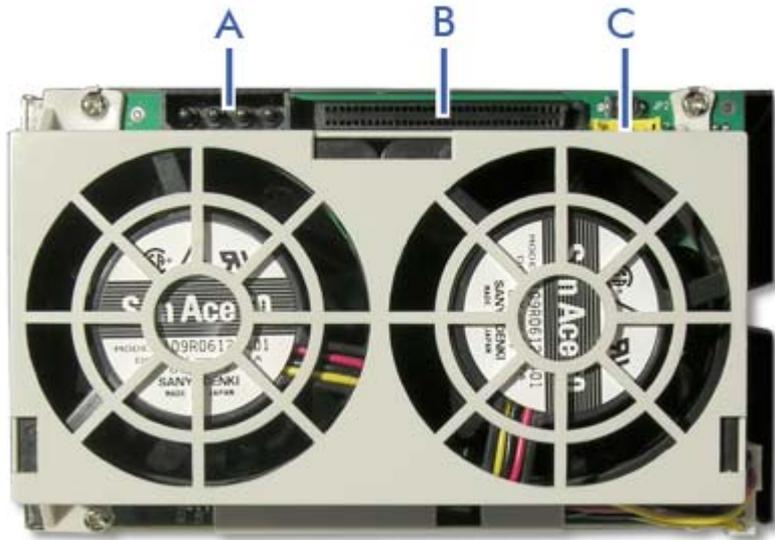
Figure 33: SCSI Hard Disk Drive Cage

Hard Disk Drive Cage Configuration

Backplane Jumpers

There are 2 jumpers on the backplane. Please refer to the table below for their configuration
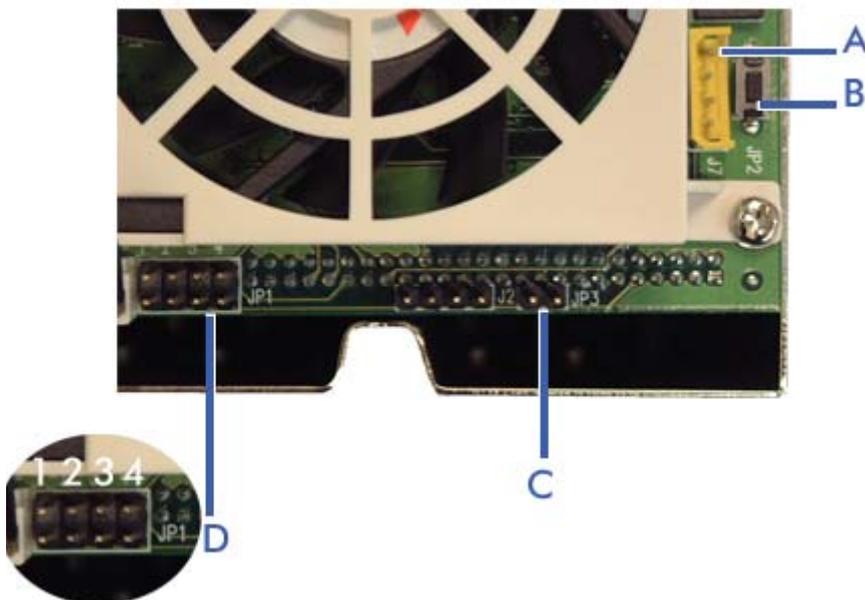
A - IPMB connector
B - Stop buzzer
C - JP3
D - JP1

Table 8: Backplane Jumpers

JP 1.3	SAF-TE ID
	open: 5

Table 8: Backplane Jumpers

	short: 6
JP 1.4	**BAY ID**
	open: 0, 1, 2
	short: 8, 9, 10
JP3	**FAN DISABLE**
	short: fan-disable

LEDs Explanation
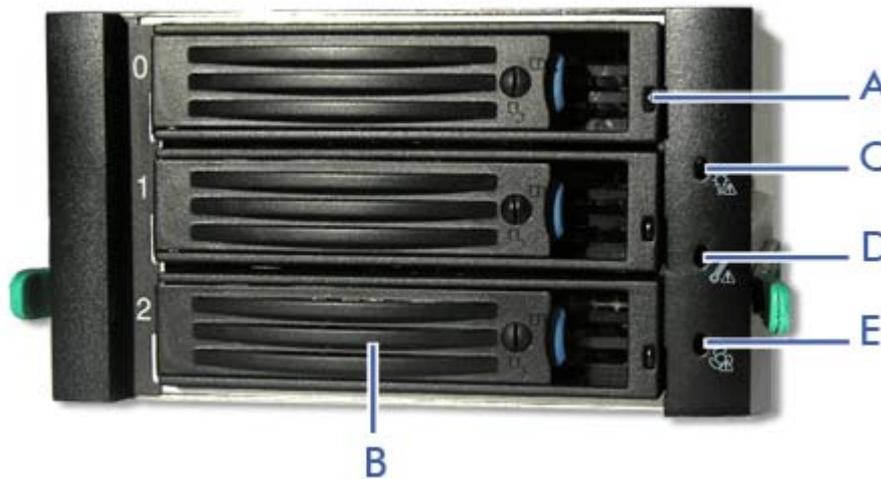
Figure 34: Hot-Swap SCSI Drive Cage LEDs

A - SAF-TE LED
B- Drive Tray
C - Power Status/ Voltage LED
D - Temperature LED
E - Fan LED

SAF-TE LED

> 📄 **Note**: Check that your SCSI (or RAID) controller supports SAF-TE instructions before trying to use this feature.

The SAF-TE controls status indicators for up to three device slots. Please refer to the table below for more information on the displayed states.

Table 9: SAF-TE LEDs

Device Status	Indicator Light
No error	Off
Faulty or rebuild stopped	Steady On
Rebuild	Slow blink (~1/sec)
Identify	Fast blink (~3/sec)

Power Status/ Voltage LED

Lights green when power is on and normal.
Blinks green if the 5V or the 12V power supply is below alarm value.

Temperature LED

Blinks red when the internal temperature rises above the alarm setting.

Fan LED

Blinks red when a fan problem occurs.

Upgrading Microprocessor

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

Removing a Processor

1. Remove the right side door. *See "Removing the Right Side Door" on page 94.*

1. Lay the server on its left side (this is not mandatory, but it will make the process easier to follow).

2. Disconnect the fan cable(s) from the processor fan connector(s) on the motherboard.

3. 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.*

---

4. 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°.
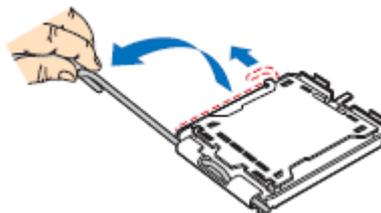
Figure 35: Opening the processor socket

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

6. Lift the processor straight and away.

7. 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 36: 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.
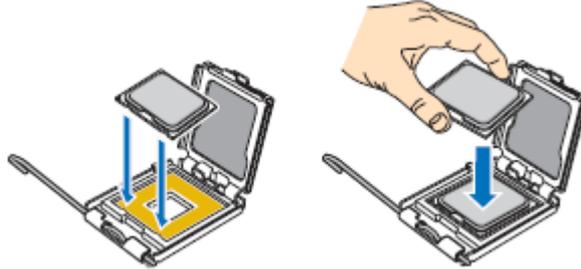
Figure 37: Installing the processor

⚠ 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 right side door. *See "Replacing the Right Side Door" on page 95.*

Upgrading Random Access Memory (RAM)

Recommended Memory Configuration

Refer to *"Specifications" on page 224* and to *"Memory Configuration" on page 25* 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 38: 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 Right Side Door" on page 94.*
2. Remove the front panel. *See "Removing the Front Panel" on page 96.*
3. Locate the memory upgrade sockets on the motherboard.
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. 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. IAlign 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.
6. Press the module firmly into the socket. 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. 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 96.*

9. Replace the left side cover. *See "Replacing the Right Side Door" on page 95.*

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

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 67.*

■ 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 21.*

⚠ 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

1. Remove the computer right side door. *See "Removing the Right Side Door" on page 94.*

2. Locate the add-on card holder near the slot you mean to fit with an expansion card.

Figure 39: 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.
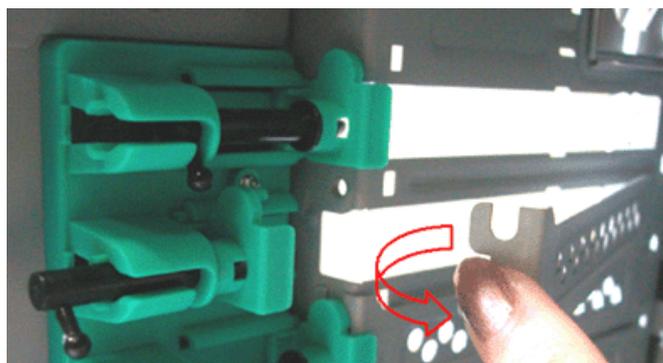
Figure 40: Removing the Expansion Slot Cover

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 95.*

Removing an Expansion Card from Your System

1. Remove the computer right side door. *See "Removing the Right Side Door" on page 94.*

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

Figure 41: 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 21*.

Cabling IDE Devices

The IDE Cable

The following figure shows a typical three-connector IDE cable. If the IDE cable is not keyed with a connector tab, align the coloured edge (Pin 1) of the cable with the pin 1 side of the drive connector.
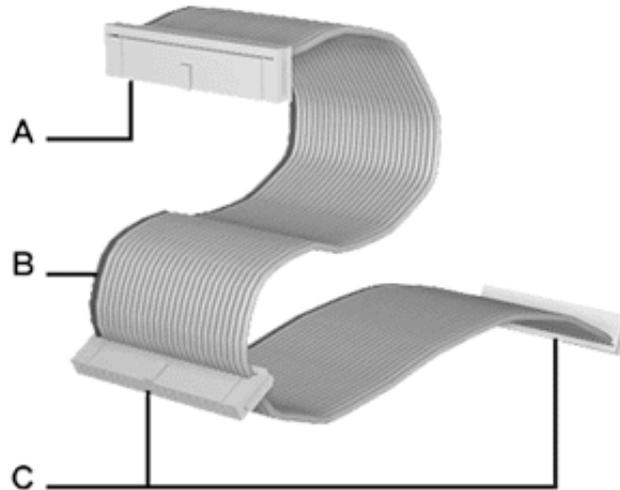
Figure 42: Three-connector IDE Cable

A - Connects to the motherboard IDE port
B - Red edge (Pin 1)
C - Connects to IDE devices

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.

Figure 43: IDE Storage Device Power Cable Connector

Cabling an Optical Disk Drive

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

The following procedure explains how to attach the cables to an optical drive.

1. Connect the IDE cable connector (B) 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 (D) to the power connector on the storage device.
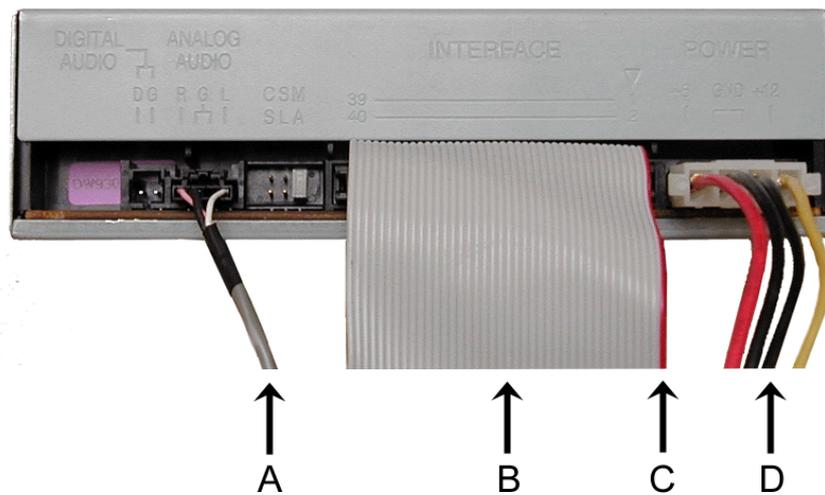
Figure 44: Cabling an IDE Optical Device

A - Audio Cable - N/A
B - IDE cable
C - Red edge (Pin 1)
D - Power cable

Note: Audio Cable is not available on this system.

Cabling SCSI Devices

Cabling a SCSI Hard Disk Drive

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

The following procedures explain how to attach the cables to a hard disk drive.

SCSI Hard Disk Drive

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

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

1. Connect one of the relevant SCSI cable connectors (A) 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 (B) to the power connector on the storage device.
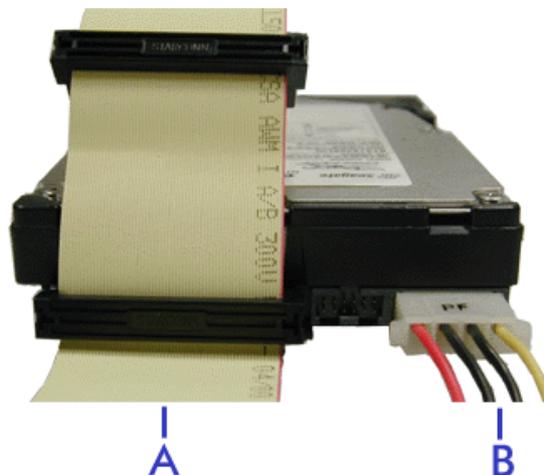
Figure 45: Cabling a SCSI Hard Disk Drive

A - SCSI cable
B - Power cable

Cabling SATA Devices

The S-ATA Cable

Your system comes equipped with two S-ATA cables.

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

Figure 46: S-ATA Cable

> 📰 **Note***: The color of the S-ATA cable 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.

Figure 47: S-ATA Storage Device Power Cable Adaptor

Cabling a Hard Disk Drive

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

The following procedures explain how to attach the cables to a hard disk drive.

S-ATA Hard Disk 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. Black side goes to hard disk drive; blue side goes to motherboard. Refer to S-ATA Hard Disk Drive picture hereafter.

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.
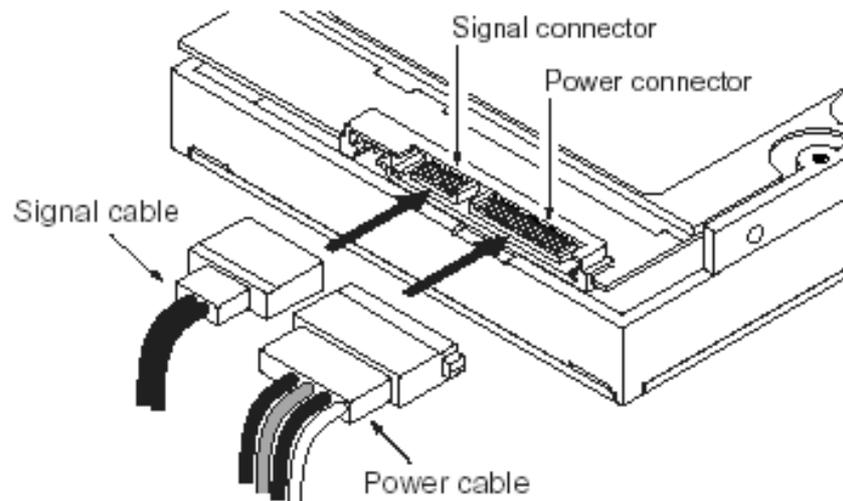
Figure 48: S-ATA Hard Disk Drive

Cabling a Floppy Disk 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 floppy disk drive.

1. Connect the data cable connector (A) 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 (C) to the power connector on the storage device.
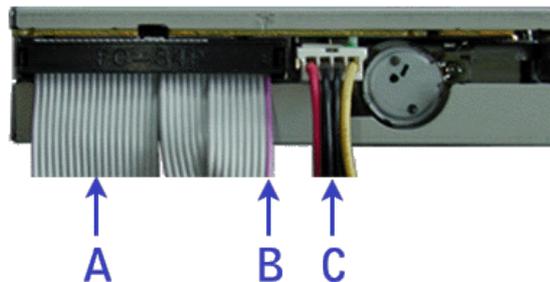
Figure 49: Cabling a Floppy Disk Drive

A - Data cable
B - Purple edge (Pin 1)
C - Power cable

Preparing IDE Devices

> ✎ **Note**: *Please note that in normal operation mode, the 'cable select' position is recommended for all IDE devices.*

Preparing an IDE Optical Drive

Before installing a CD/DVD-ROM drive in the system, the jumper on the back of the drive must be set as "cable select".

Refer to the "Jumper settings (example)" hereafter for details about configuring IDE drives as master or slave.

Refer to the instructions printed on the device for further jumper setting information.
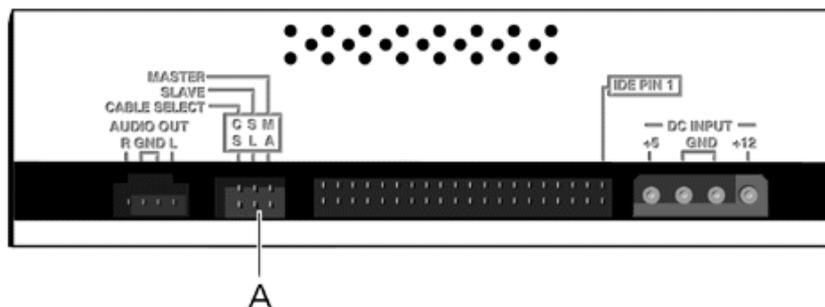
Figure 50: Connectors on the Back of an Optical Drive (example)

A - Jumper block
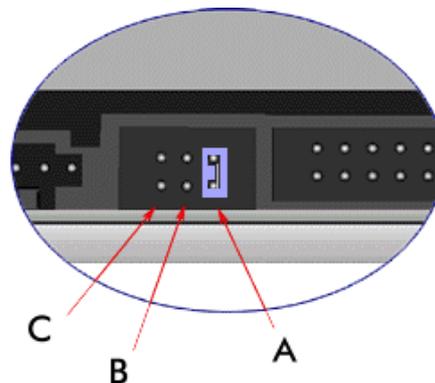
Figure 51: Jumper settings (example)

A - Master
B - Slave
C - Cable select

⚠ **Caution**

Always connect IDE optical drives to the secondary IDE con-
nector.

Preparing an IDE Tape Drive

Before installing a tape drive in the system, it should be set as a master or a slave
device using the drive select jumper at the back of the drive.

Refer to the "Connectors on the Back of a Tape Drive (example)" hereafter for details
about configuring IDE drives as master or slave.

Refer to the instructions printed on the device for further jumper setting information.
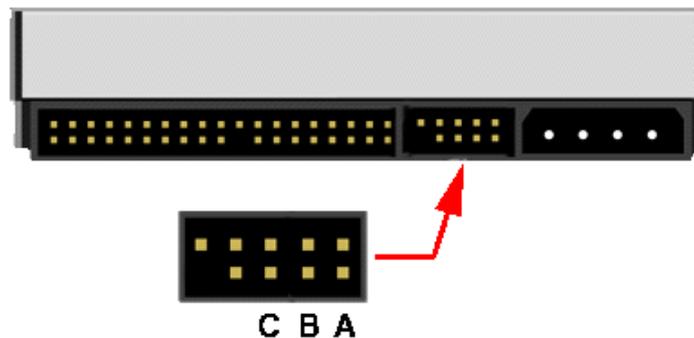
Figure 52: Connectors on the Back of a Tape Drive (example)

A - Master Setting
B - Slave Setting
C - Cable Select

⚠ **Caution**

Always connect IDE tape drives to the primary IDE connector.
IDE tape drives must not be connected to a data cable on which
an optical disc drive is also connected.

Preparing SCSI Devices

Preparing a SCSI Hard Disk Drive

Before installing a SCSI hard disk drive in the system, it should be set as ID0, ID1, ID2 or ID3.

Refer to the instructions printed on the device for further jumper setting information.

Preparing a SCSI Tape Drive

Before installing a SCSI tape drive in the system, it should be set as ID4.

Refer to the instructions printed on the device for further jumper setting information.

Preparing SATA Devices

Preparing a S-ATA Hard Disk Drive

S-ATA hard disk drives do not need to be prepared.

Interrupt Requests

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

Table 10: 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.

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 CD 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 151.*

■ 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.
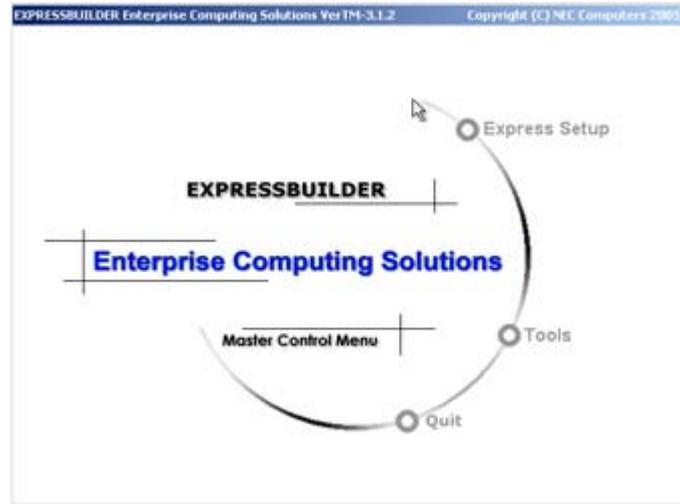
ExpressBuilder for Windows-Based (Master Control Menu)

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.
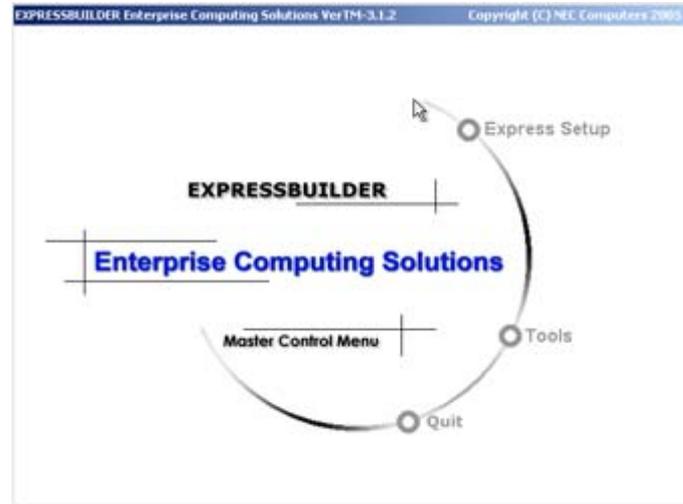
To use Master Control Menu,

■   Click on [Online Document], [Setup] or [Quit], or

■   Click the right mouse button on Master Control Menu window.

Intel® Advanced Management Technology (AMT) Web Interface

Introduction

This computer is provided with the ability to be managed out-of-band, even when it is powered off, using a chipset based on Intel's *Active Management Technology* (AMT). This management is accessible through any web browser.

Configuring the AMT IP Address

Before accessing this management facility it is necessary to configure the AMT chip with an IP address.

This out-of-band address must be different than any other IP address configured within the operating system of the computer.

To configure the IP address, follow the steps below:

1. Boot the server, and enter the BIOS Setup utility.

2. Depending on your configuration,

    ■ Select the *Server Management* screen, or

    ■ select the *Advanced* screen, and then the *Management Configuration* screen.

3. Move to the *Enter AMTBx Setup* entry and select *Enabled* (see below).

4. Save these changes and reboot the server. The server will boot into the *AMT BIOS Extension* screen.

Figure 53: AMT BIOS Extension screen

5. Enter the required password.
    The default password is *admin*.

6. Before accessing other options in this menu, you need to change the *admin* password to a new password.

Please keep in mind that you will need a strong password. A strong password will be something like "Intel@98". It needs at least 8 characters, including a capital letter, a number and a special character like !, @, #, $, %, ^, &, *. In this case, you can use "Intel@99". Goto the first option of "Change Password" to change it. After changing the password, you will be able to access all other available options.

7. Select the *TCP/IP* option and enter the appropriate IP address details. (if required, you can also disable this interface or have its' IP address allocated automatically using DHCP).

8. Reboot the server. .

Accessing the AMT interface

Access to the AMT features in done through a web browser, via the following URL:

http://ip-address:16992

When connected, the computer will prompt for a password. The password previously configured in the AMT BIOS screen was for the *admin* user ID. Login using this name and enter the required password. The *System Status* screen is displayed.
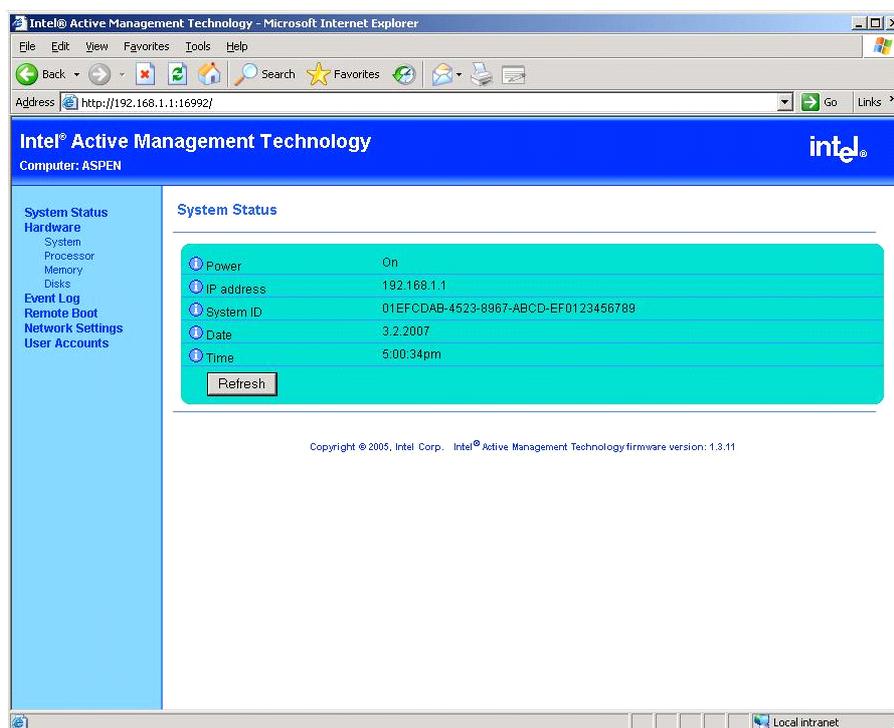
Figure 54: System Status screen

Viewing hardware details

Select **Hardware** to view the status of the system.
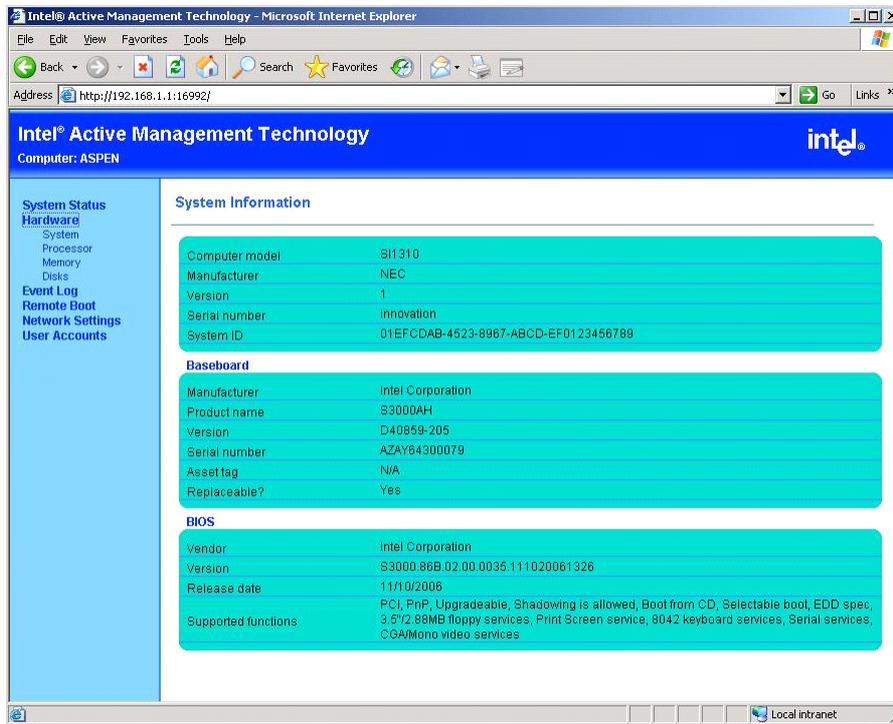
Figure 55: Hardware System Information screen

Details of certain hardware components are also available:

Processor
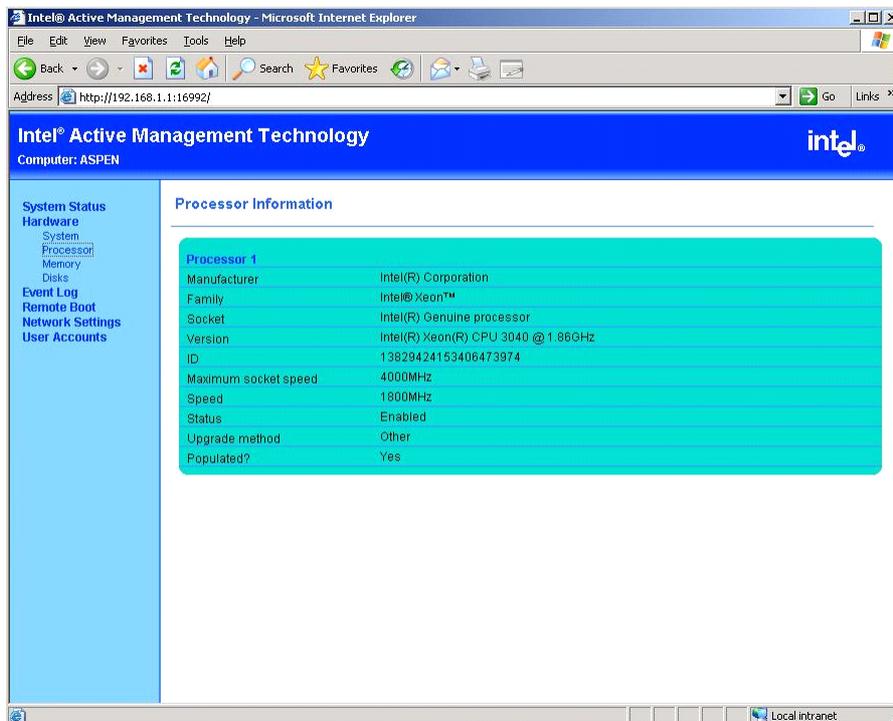
Figure 56: Processor screen

Memory
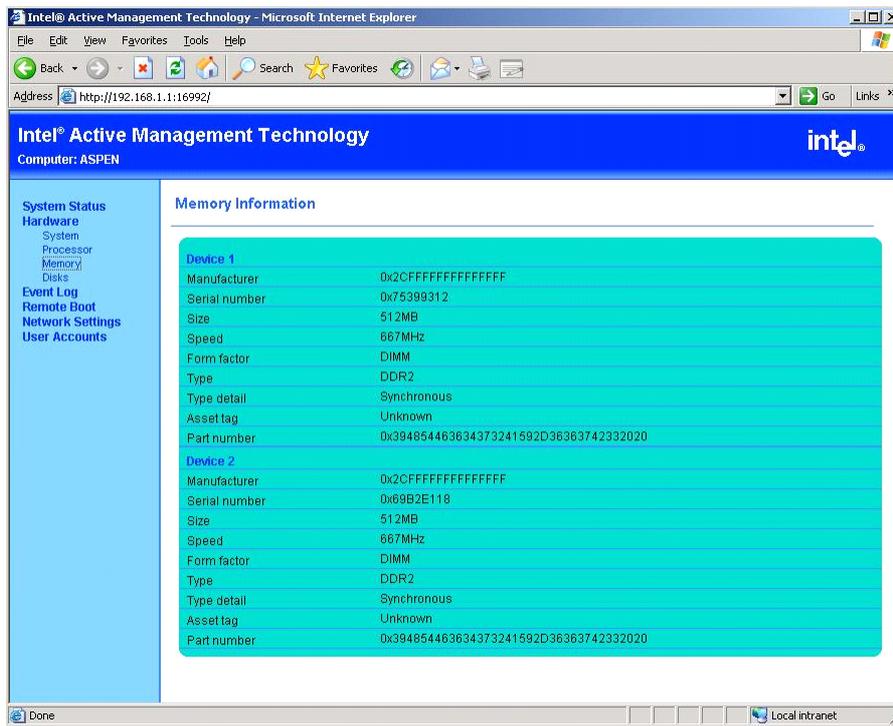
Figure 57: Memory screen

Disks

Select **Disks** to see the status of any IDE or SCSI disks installed in the system.
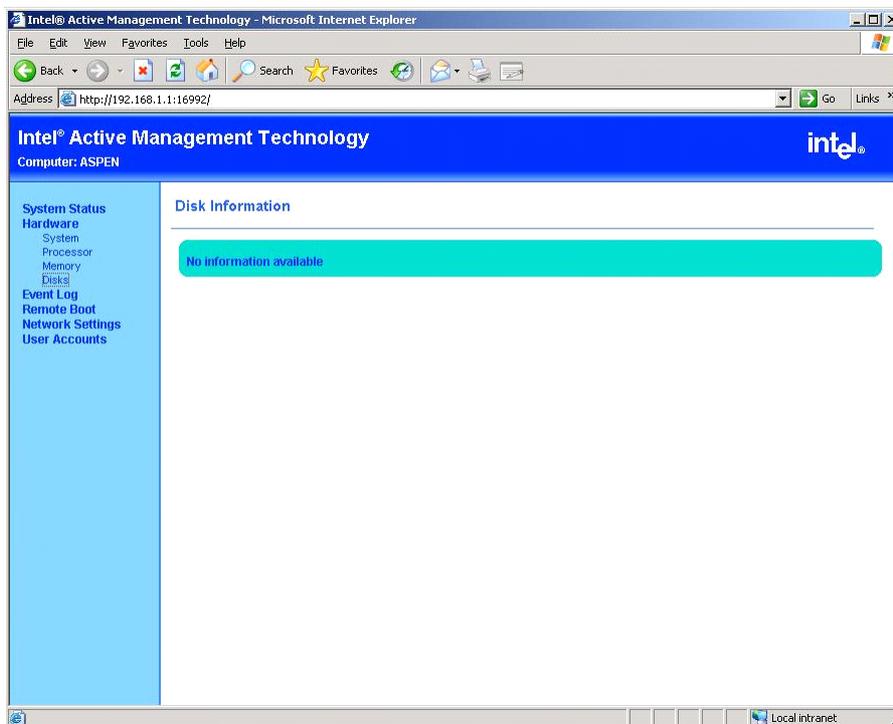
Figure 58: Disks screen

Event log

Select **Event Log** to view historical information on hardware events.
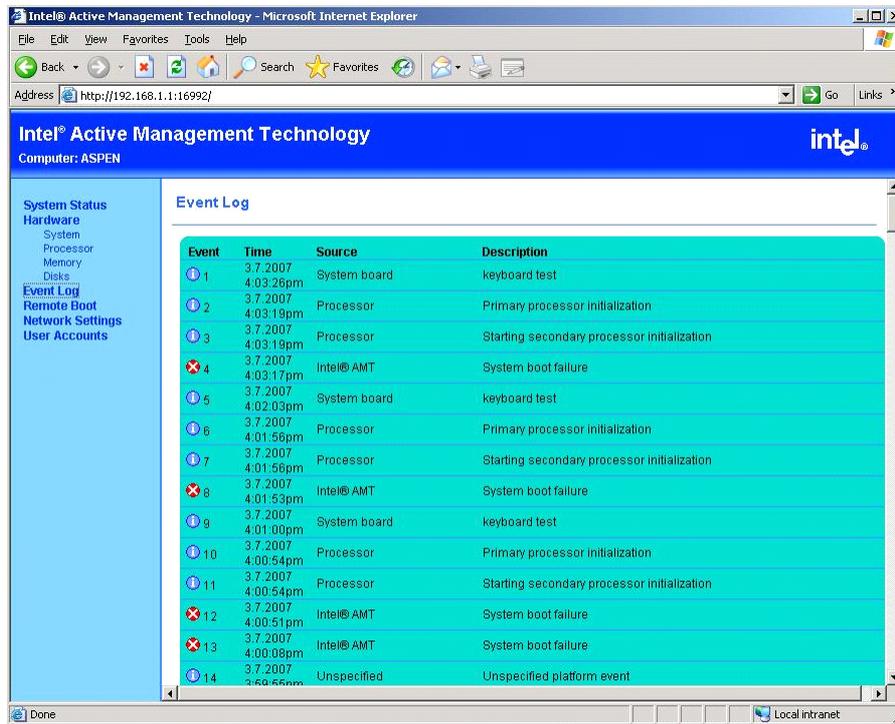
Figure 59: Event Log screen

Power management

Select **Remote Boot** to power on and off the computer.
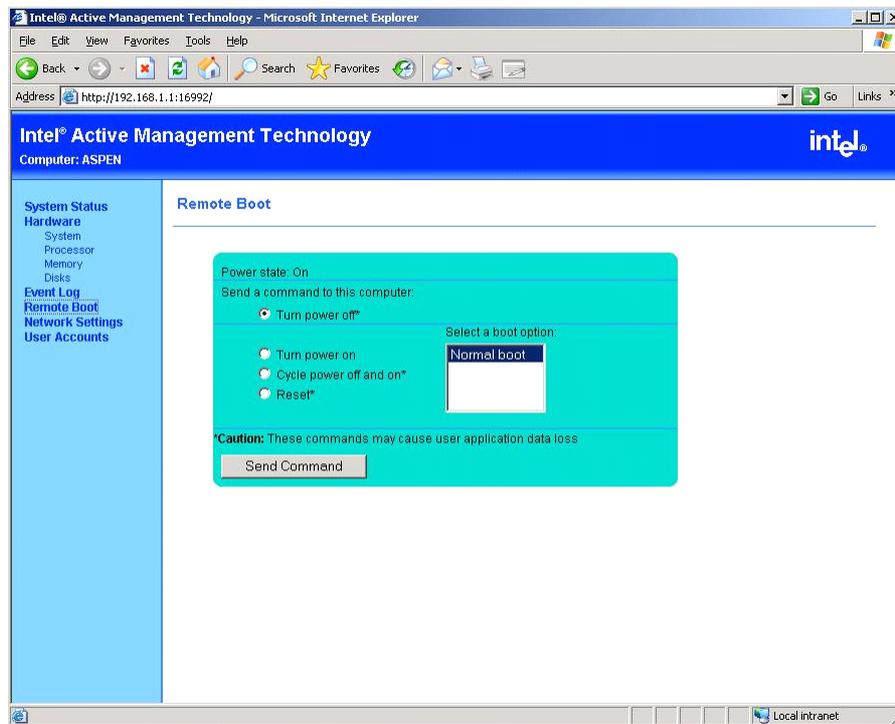
Figure 60: Power Management screen

Power management works independently of any operating system that may be running on the computer at the time. If you select to power off the system, the operating system will not be shut down gracefully. Effectively, this will be like removing the power plug.

Network Settings

Select **Network Settings** to change the TCP/IP network settings of the AMT chipset.
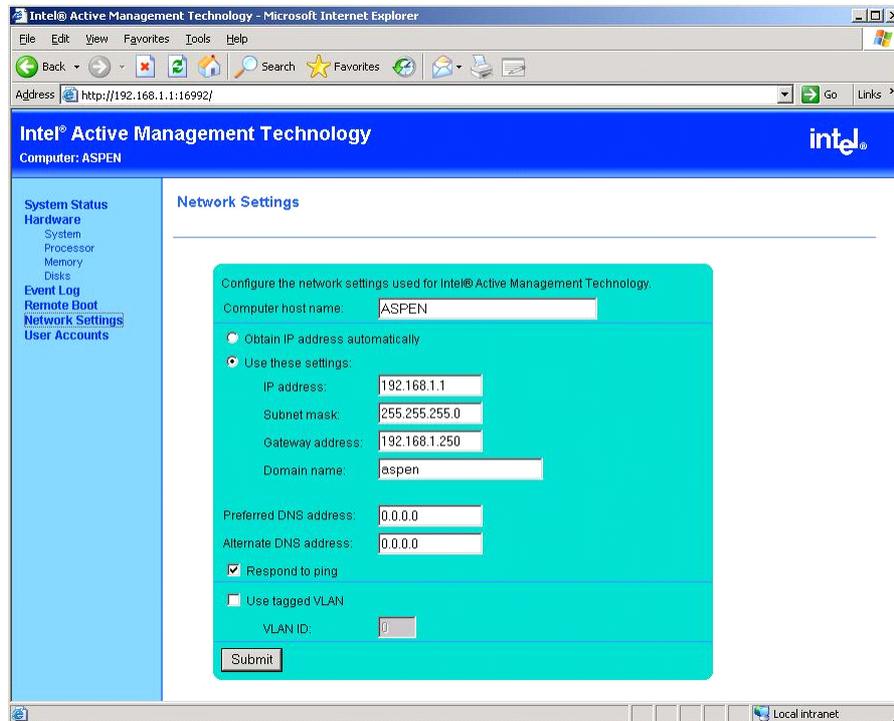
Figure 61: Network Settings screen

Any changes to these settings are likely to result in the loss of the web browser connection.

User accounts

In addition to the default *admin* account, it is possible to create other user accounts with different access controls.

To create a new account:

1. Press the **New…**button.
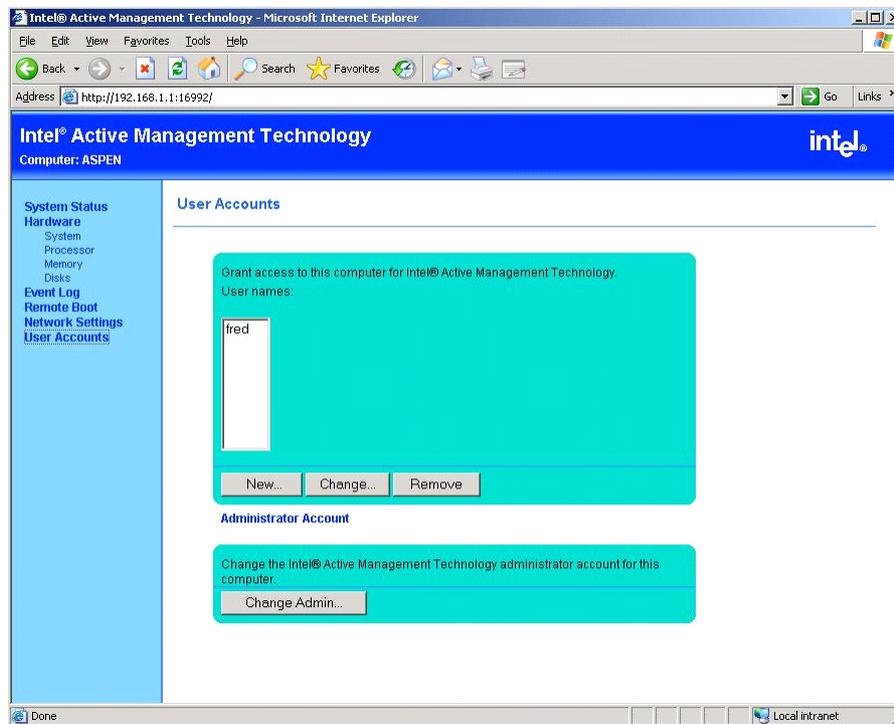
Figure 62: User Accounts screen

2. Enter the name and password, and select the permissions granted to this user.

3. Press **Submit**.
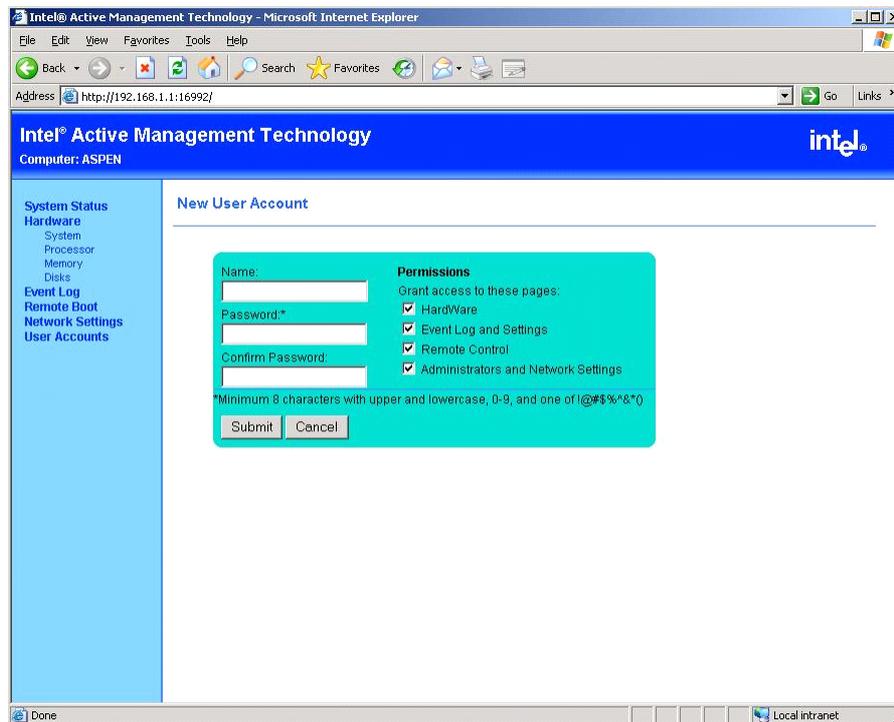
Figure 63: New User Account screen

If you create a user with restricted permissions, these will be visible when that user logs in. For example, if a user logs in with restrictions only allowing access to hardware details, the web browser will show lock icons in front of the options that cannot be selected.
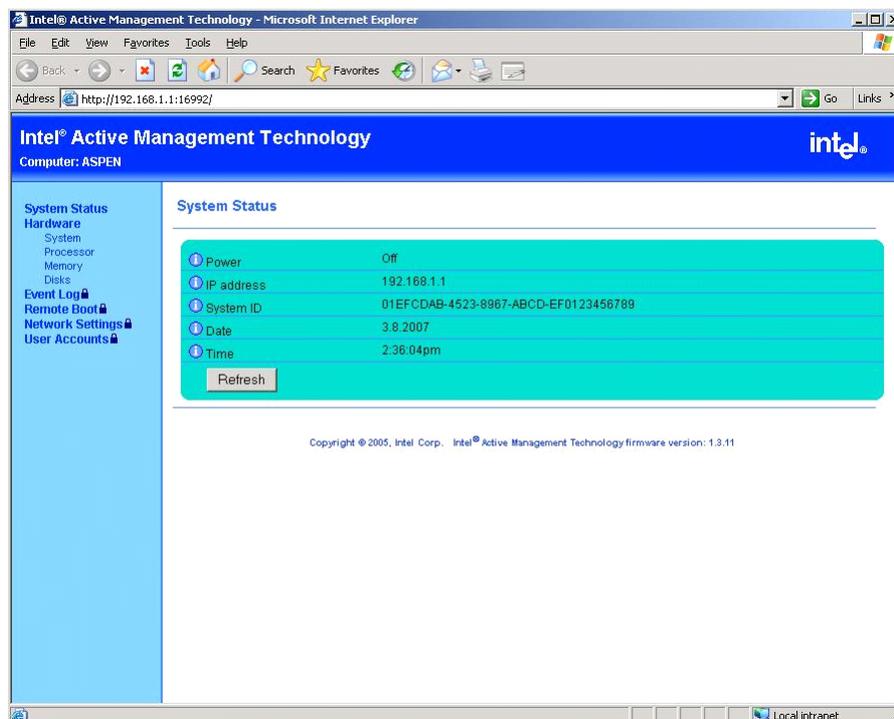
Figure 64: Accessing a restricted user account

Adaptec Storage Manager™ - Browser Edition

Adaptec Storage Manager™ - Browser Edition (hereinafter abbreviated to ASMBE) is a management utility for the HostRAID system and provides RAID functions through the SCSI interface in your server.

You can use the following functions for HostRAID by installing ASMBE in your system.

Features

■ Maintaining ZCR and HostRAID storage system.

■ Making a consistency check on redundant disk arrays.

■ Recording ZCR and HostRAID events into the event log.

■ Omitting the installation of client software into each management PC if ASMBE is installed.

Before attempting to operate ASMBE, read the *Adaptec Storage Manager^{TM} - Browser Edition User's Guide* included on the ExpressBuilder disc.

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.

Power Console Plus

Power Console Plus is a utility used to control the RAID system of the disk array controllers (SecuRAID) produced by LSI Logic.

Using Power Console Plus enables operations (e.g., monitoring and maintenance) of RAID systems that are constructed on local systems and systems connected through networks (TCP/IP). The operations can be done online on graphical screens without the system being stopped.

Major Functions

Power Console Plus provides the following features:

■ Support for the Wizard function in order to facilitate configuration

■ Makes it possible to change of RAID level

■ Compatible with SAF-TE

■ Performance monitor support

■ Supports enclosure functions such as temperature monitoring, power monitoring, and fan monitoring

■ Enables the settings of Write, Read, and Cache policies for each logical drive

■ Supports the save and restore functions for configuration

■ Enables the display of the SCSI transfer rate

Components

Power Console Plus consists of the following five components:

■ SNMP Agent (not supported)

■ MegaRAID Service Monitor

Enables NEC ESMPRO to monitor the SecuRAID controller by registering event logs. Install MegaRAID Service Monitor in the system in which the SecuRAID controller is mounted.

■ MegaRAID Client

Controls the RAID system on graphical screens. Install MegaRAID Client in the system in which the SecuRAID controller mounted or in the management PC that is connected through the system and network.

■ MegaRAID Server

Enables control of the SecuRAID controller via the network. Install MegaRAID Server in the system in which the SecuRAID controller mounted.

■ MegaRAID Registration Server

Enables control of the SecuRAID controller via the network. Install in one of systems and management PCs that are connected through network. The above components must be installed correctly for establishing the environment to use Power Console Plus.

Power Console Plus components to be installed are different between the target systems and management PC.

■   Server (system in which the SecuRAID controller is mounted):

Install the following three components in this system:

- MegaRAID Service Monitor

- MegaRAID Server

- MegaRAID Client

Start Power Console Plus of management PC, after the Power On machine that installed "Server" and "Management Server".

Install the following component in this PC:

- MegaRAID Client

■   Management server (Machine that manages all systems that are monitored and controlled by management PCs):

Install the following component in one of the systems or management PCs:

- MegaRAID Registration Server

System Setup

This section explains the Power Console Plus setup in the system in which the MegaRAID controller is mounted.

Operating Environment

■   Hardware

- Machine: server connected with the AMI disk array controller (A)

- Memory: Size large enough for OS operation + 8MB or more

- Free space of the hard disk: 5MB or more

- Display unit: Screen size 1024×768 or larger

- Required peripheral equipment: Network Interface card, CD-ROM unit, Pointing device such as a mouse

■   Software

- Microsoft Windows XP

- Microsoft Windows 2003

Management PC Setup

This section explains Power Console Plus setup in a computer that manages systems via the network (TCP/IP).

Operating Environment

■ Hardware

- Machine: PC/AT-compatible machine (which contains Intel Pentium or a CPU at least equivalent to it)

- Memory: Size large enough for OS operation + 8MB or more

- Free space of the hard disk: 5 MB or more

- Display unit: Screen size 1024 × 768 or larger

- Required peripheral equipment: Network Interface card, CD-ROM unit, Pointing device such as a mouse

■ Software

- Microsoft Windows XP

- Microsoft Windows 2003

SCSISelect Utility

The SCSI*Select* Utility detects and configures the SCSI controller located on the system board or an optional SCSI controller board installed in your system. This utility may be started with a simple key operation while POST is in progress and requires no specific start-up disk.

The SCSI*Select* Utility is used mainly to set the transfer rate of connected SCSI device. Use the SCSI*Select* Utility to:

■   Change default values

■   Check and/or change SCSI device settings that may conflict with those of other devices in the system.

Running the SCSISelect Utility

You access the SCSI*Select* Utility when you turn on or reboot your system.

To run the utility, perform the following procedure:

1.   Power-on or reboot the system.
2.   When the "*Press Ctrl-A to run SCSI Utility...*"message appears, press **Ctrl**+**A**.

     The SCSI utility starts. When the Adaptec SCSI Utility detects more than one host adapters, it displays a selection menu listing the slot number of each adapter. Select the adapter you wish to configure.
3.   The following screen is displayed:

Table 11: SCSISelect Utility Selection Menu

Menu	Description
Configure/View Controller Settings	Configure host adapter and device settings.
SCSI Disk Utilities	The utility scans the SCSI bus for SCSI devices, reports a description of each device. Run these utilities *before* configuring SCSI devices.

4.   If you wish to format a disk, verify disk media, or display a list of devices and their SCSI IDs, select **SCSI Disk Utilities**.

     If you wish to configure the adapter or a device, select **Configure/View Controller Settings**.

Adaptec SCSI Utility Configuration Settings

The following keys are active for all Adaptec SCSI Utility screens:

Table 12: Active Keys

Key	Action
Arrows	Up and down arrows move from one parameter to another within a screen.
ENTER	Displays options for a configurable parameter. Selects an option.
ESC	Moves back to previous screen or parameter or EXIT if at the Main menu.
F5	Switches between color and monochrome.
F6	Resets to host adapter defaults.

The following table shows the normal settings for the Adaptec SCSI Utility and provides a place for you to record any changes you make to these settings.

Table 13: SCSISelect Utility Setup Configurations

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
SCSI Bus Interface Definitions		
SCSI Controller ID	7	
SCSI Controller Parity	Enabled	
SCSI Controller Termination	Enabled	
Additional Options		
Boot Device Configuration	Press ENTER for menu	
Master SCSI Controller	29320ALP slot 01 03:01:00	
Boot SCSI Controller	29320ALP slot 01 03:01:00	
SCSI Device Configuration	Press ENTER for menu	
Sync Transfer Rate (MB/Sec)	320	
Packetized	Yes	
QAS	Yes	
Initiate Wide Negotiation	Yes	
Enable Disconnection	Yes	
Send Start Unit Command	Yes	
BIOS Multiple LUN Support	No [1]	
Include in BIOS Scan	Yes [1]	
Advanced Configuration	Press ENTER for menu.	
Reset SCSI Bus at IC Initialization	Enabled	
Display <Ctrl-A> Messages During BIOS Initialization	Enabled	
Extended Int13 Translation for DOS Drives >1 GByte	Enabled	
POST Display Mode	Verbose	
SCSI Controller Int13 Support	Enabled[1]	
Domain Validation	Enabled[1]	
Support Removable Disks Under Int13 as Fixed Disks	Disabled[1, 2]	
BIOS Support for Bootable CDROM	Enabled[1]	

[1] No effect if BIOS is disabled.

[2] Do not remove media from a removable media drive if it is under BIOS control.

SCSI Disk Utilities

This utility scans the SCSI bus for SCSI devices, and reports a description of each device. Run this utility before configuring SCSI devices.

To enter the utility, select **SCSI Disk Utilities** on the *Options* menu.

The SCSI ID scan begins displaying the message as shown below.

```
Scanning SCSI ID : 0      LUN Number : 0
```

When the SCSI ID scan completes, the screen listing SCSI IDs and associated devices appears.

```
───── Select SCSI Disk and press <Enter> ─────

    SCSI ID #0   :  No device
    SCSI ID #1   :  No device
    SCSI ID #2   :  No device
    SCSI ID #3   :  No device
    SCSI ID #4   :  No device
    SCSI ID #5   :  No device
    SCSI ID #6   :  No device
    SCSI ID #7   : Adaptec 29320ALP
    SCSI ID #8   :  No device
    SCSI ID #9   :  No device
    SCSI ID #10  :  No device
    SCSI ID #11  :  No device
    SCSI ID #12  :  No device
    SCSI ID #13  :  No device
    SCSI ID #14  :  No device
    SCSI ID #15  :  No device
```

With this screen you can determine the SCSI IDs of the installed options. You can also view the device information by selecting a device and pressing **Enter**.

The following submenu appears.

```
SCSI ID#4: xxxxxxxxx

Firmware: xxxx xxx

Capacity: xxGB

          ┌──────────────────┐
          │  Format          │
          │  Verify Disk Me- │
          │  dia             │
          └──────────────────┘
```

The following table lists submenu items and descriptions.:

Table 14: Submenu Items

Submenu item	Description
Format	Formats the selected device.
Verify Disk Media	Verifies all the sectors in the selected device. If one or more bad sectors are found, the sectors are remapped.

Exiting Adaptec SCSI Utility

To exit the Adaptec SCSI Utility, press ESC until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).

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®

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 disc 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 disc and set the Windows disc, 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 203.*

Restrictions

⚠ Caution

■ Before starting the installation, complete all the process of adding the optional device and the setup of system main-frame (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.

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 disks.

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 ExpressBuilder will 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 disks.
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:
    <OpticalDriveLetter>:\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 disc drive.

2. Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer]

3. Run "SETUP.EXE" in the following directory.

<OpticalDrive 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.)

<OpticalDrive Letter>:\N8115-02\VIDEO\RADEON7000\SETUP.EXE

4. Follow the message to continue the installation.

5. Remove the ExpressBuilder disc from the 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 - Aritcle 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.

System Security

To help prevent unauthorized entry or use of the system, the system may include several security features, both hardware and software.

Security with Mechanical Locks and Monitoring

To unlock the bezel, insert the key in the lock and turn the lock counterclockwise until it stops (about a quarter turn).
The bezel is unlocked and can be opened again.

To lock the bezel, insert the key in the lock. Turn the lock clockwise until it stops (about a quarter turn).
The bezel is locked and cannot be opened.

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.

Also make a backup copy of the disk array configuration data if your system is in the array configuration. When your hard disks have been auto-rebuilt due to a failure, it is recommended to make a backup copy of the configuration data. 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.

⚠ Caution

■ Avoid installation in extreme temperature conditions.

■ Make sure to complete board installation.

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 off-powered (the POWER/SLEEP lamp goes off).

2. Unplug the power cord of the system from a power outlet.

3. Wipe off dust from the power cord plug with a dry cloth.

4. Soak a soft cloth in neutral detergent that is diluted with cold or lukewarm water, and squeeze it firmly.

5. Rub off stains on the system with the cloth prepared in Step 4.

6. Soak a soft cloth in water, squeeze it firmly, wipe the system with it once again.

7. Wipe the system with a dry cloth.

8. Wipe off dust from the fan exhaust opening on the rear of the system with a dry cloth.

Cleaning the Interior of the system

One important item in a good maintenance program is regular and thorough cleaning of the interior of the system, especially around the motherboard.

Dust buildup inside the system 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 system components. Also, dust may contain conductive or corrosive materials that can cause short circuits or corrosion of electrical contacts.

How often you should clean the interior of the system depends on the environment in which it is located. For most office environments, you probably should clean the system every 12 months. For more severe environments, clean the interior every 6 months.

To clean the interior of the system, you will need a small vacuum cleaner (with plastic tipped nozzle and electrostatic protection), a 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 the brush made of chemical fabric, or the cleaning material that will generate an electrostatics.

To clean the interior of the system:

1. Turn off the system and unplug all power cables.

   2. Remove the logic cover and the drive cover.

   3. Use a small brush to loosen any dust and debris on the mother board.

   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 dust and debris from the interior of the system.

   6. Reinstall the logic cover and the drive cover.

   7. Reconnect all power cables and turn on the system.

Cleaning the Keyboard

   1. Power off the system and peripheral devices.
      The POWER/SLEEP lamp is off.

   2. Wipe the keyboard surface with a dry cloth.

Cleaning the 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.

To clean the mouse:

   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 goes off.

   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.

Cleaning an Optical Drive and Optical Disc

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 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 optical disc and take it out from the tray.

> ⊟ **Note**: *Do not touch the signal side of the disc with your hand.*

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 disc cleaner if necessary. Cleaning an optical 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.
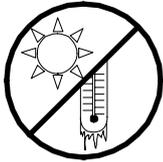
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.

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.
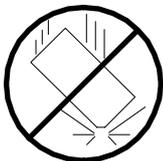
Protect the system from being bumped or dropped.

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.

Care and Handling

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.

Lamps

The system includes lamps to indicate the system states by a variety of colors and display patterns on the front panel, hard disk drive, and power supply.

Refer to *"Status Indicators" on page 19* for more information.

Lamps

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 178*.

■ 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 15: 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 DIMM board installed?

-   At least two DIMM boards are required for operation.

■   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 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 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 system. 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 16: 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 16: 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 proce-dure 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 177*.

> 📰 **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://www.nec-computers.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 17: 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 18: 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.

POST Error Pause Option

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.
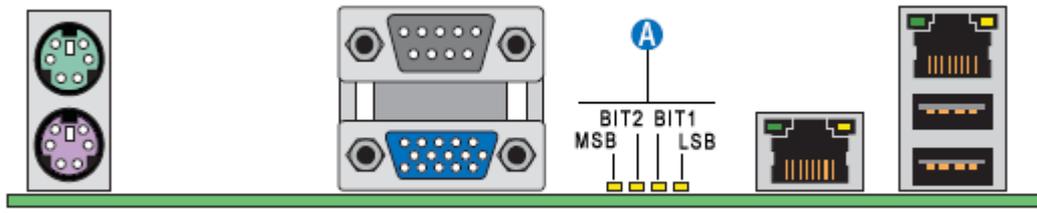
Figure 65: Diagnostic LEDs (A)

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 19: 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 20: 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
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

Table 20: Diagnostic LEDs Codes (Continued)

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			LSB	
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
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

Table 20: Diagnostic LEDs Codes (Continued)

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			**LSB**	
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					
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

Table 20: Diagnostic LEDs Codes (Continued)

Check Point	Diagnostic LED Decoder (G=green; R=red; A=amber)				Description
	MSB			**LSB**	
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 21: 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 21: 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 22: 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		Information only. Displays the BIOS build date.	
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 23: Advanced Menu

Feature	Choices or Display Only	Description	Your Setting
Processor	Press Enter	Press **Enter** to open the submenu	
Memory	Press Enter	Press **Enter** to open the submenu	
IDE Controller	Press Enter	Press **Enter** to open the submenu	
Serial Port	Press Enter	Press **Enter** to open the submenu	
USB Configuration	Press Enter	Press **Enter** to open the submenu	
PCI	Press Enter	Press **Enter** to open the submenu	
Power	Press Enter	Press **Enter** to open the submenu	
Boot configuration	Press Enter	Press **Enter** to open the submenu	
Hardware Health Configuration	Press Enter	Press **Enter** to open the submenu	

Advanced Menu

Processor Submenu

Table 24: 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 processors currently run.	
System Bus Frequency	Display only	Current frequency of the processor system bus.	
L2 Cache RAM	Display only		
CPUID Register	Display only		
Intel(R) EM64T			
Enhanced SpeedStep	**Enabled** Disabled	Enables or disables Enhanced Intel SpeedStep® Technology on the processors. Select **Enabled** to allow the OS to reduce the power consumption.	
Execute Disable Bit	**Enabled** Disabled	When disabled, forces the XD feature flag to always return 0	
Virtualization Technology	Enabled **Disabled**	When enabled, a Virtual Machine Monitor can utilize the additional hardware capabilities provided by Intel® Virtualization Technology	

Memory Submenu

Table 25: Memory Submenu

Feature	Choices or Display Only	Description	Your Setting
Total Memory	Display only	Information only. The amount of memory available in the system in the form of installed FBDIMMs, in units of MB or GB.	
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**	
Memory Channel A Slot 0 Memory Channel A Slot 1 Memory Channel B Slot 0 Memory Channel B Slot 1	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.	

IDE Controller Submenu

Table 26: IDE Controller Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard PATA Controller	**Enabled** Disabled	Enables or disables the onboard Parallel ATA controller.	
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.	
SATA Mode	**Enhanced** Legacy	In **Legacy Mode**, BIOS can enumerate only four drives. It provides four options to choose a mix of SATA and PATA drives. In **Enhanced Mode**, the BIOS is not limited to legacy PATA fourdrive limitations, and can enumerate the two PATA drives and four SATA drives (totaling six drives), and can list/boot to the remaining two SATA drives. RAID Mode is supported only when SATA Mode is selected as "Enhanced".	

Table 26: IDE Controller Submenu (Continued)

Feature	Choices or Display Only	Description	Your Setting
Configure SATA as RAID	**Enabled** Disabled	This mode can be selected only when the SATA controller is in Enhanced Mode.	
SATA RAID OPROM	LSI **Intel Matrix Storage**	Select the onboard RAID chipset of your choice. - 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. Refer to "RAID Support" on page 28 for more information.	
Primary IDE Master		Information only.	
Primary IDE Slave		Information only.	
SATA 0		Information only.	
SATA 1		Information only.	
SATA 2		Information only.	
SATA 3		Information only.	

Serial Ports Submenu

Table 27: Serial Ports Submenu

Feature	Choices or Display Only	Description	Your Setting
COM1 Enable	**Enabled** Disabled	Enables or disables COM1 port.	
Address	**3F8h** 2F8h 3E8h 2E8h	Selects the base I/O address for COM1.	
IRQ	3 **4**	Selects the Interrupt Request line for COM1.	

USB Configuration Submenu

Table 28: USB Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Module version		USB driver version.	
USB Devices Enabled <Total USB Devices in System>		Shows the number of USB devices in the system.	

Table 28: USB Configuration Submenu (Continued)

Feature	Choices or Display Only	Description	Your Setting
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.	
Port 60/64 Emulation	Enabled **Disabled**	Enables the I/O Port 60h/64h emulation support. This should be enabled for the complete USB Legacy support for non-USB aware operating systems.	
USB 2.0 Controller	**Enabled** Disabled	When **Disabled**, all the USB2.0 controllers will be turned off and inacessable by the operating system.	

PCI Submenu

Table 29: PCI Submenu

Feature	Choices or Display Only	Description	Your Setting
Intel(R) 82573V GbE	**Enabled** Disabled	Enables or disables the Intel (R) 82573V primary network controller	
Intel(R)82541PI GbE	**Enabled** Disabled	Enables or disables the Intel (R) 82541PI GbE primary network controller	

Power Submenu

Table 30: Power Submenu

Feature	Choices or Display Only	Description	Your Setting
After Power Failure	**Power Off** Last state Power On	Determines the mode of operation if a power loss occurs. **Stays off**: the system will remain off once the power is restored. **Last State**: restores the system to the same state it was on before the power failed.	
Wake on LAN from S5	Power Off **Power On**	Determines the action taken when the system power is off and a PCI Power Management wake up event occurs.	

Boot Configuration

Table 31: Boot Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
NumLock	**On** Off	Turns the keyboard numlock on or off.	

Hardware Health Configuration

Table 32: Hardware Health Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Hardware Monitor	Press Enter	Press **Enter** to open the submenu	
Auto Fan Control	**Enabled** Disabled	Enables or disables the auto fan control. When **Enabled**, the fan speed will be adjusted automatically according to the temperature. When **Disabled**, all the fans will run at full speed.	

Hardware Monitor Screen

Table 33: Hardware Monitor Screen

Feature	Choices or Display Only	Description	Your Setting
CPU Temperature			
System Temperature			
DIMM Temperature			
Fan1 Speed		CPU Fan	
Fan2 Speed		N/A	
Fan3 Speed		N/A	
Fan4 Speed		Front System Fan	
Fan5 Speed		Rear System Fan	
Fan6 Speed		N/A	
+1.5V			
+Vccp		Processor core voltage	
Vcc			
+5V			
+12V			
VTR		3.3V standby	
VBAT		Battery voltage	

Security Menu.

<div align="center">**Table 34: Security Menu**</div>

Feature	Choices or Display Only	Description	Your Setting
Administrator Password	Installed **Not Installed**	Indicates whether the administrator password is set (display only).	
User Password	Set **Not Installed**	Indicates whether the user password is set (display only).	
Admin 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.	
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.	

Security Menu.

Server Management Menu

Table 35: Server Management Menu

Feature	Choices or Display Only	Description	Your Setting
Clear System Event Log	Enabled **Disabled**	Clear System Event Log. Will reset to Disabled after reboot	
Event Logging	**Enabled** Disabled	Enables or disables the Event Logging.	
ECC Event Logging	**Enabled** Disabled	Enables or disables the ECC Event Logging.	
Event Log Area Status		Information only.	
O/S Boot WD Timer	**Enabled** Disabled	If enabled, starts a BIOS timer (watchdog) which can only be shut off by Intel Management Software after the operating system loads. Helps determine that the operating system successfully loaded or resets the system.	
ASF Support	Enabled **Disabled**		
Boot to Network	Enabled **Disabled**	Enables or disables the Boot to Network (PXE).	
View Event Log	Press **Enter**	View the system event log	
Console Redirection	Press **Enter**		
System Information	Press **Enter**		

Console Redirection Submenu

Table 36: Console Redirection submenu

Feature	Choices or Display Only	Description	Your Setting
Console redirection	**Disabled** Serial1 Serial2	Enables and disables the ability of the system to redirect screen data across serial connection.	
Flow Control	**None** RTS/CTS	Sets the handshake protocol the BIOS should expect from the remote console redirection application	
Baud Rate	**9.6K** 19.2K 36.4K 57.6K 115.2K	Sets the communication speed for the redirection data	
Terminal Type	VT100 VT100+ VT-UTF8 **PC-ANSI**	Sets the character formatting for the console redirection screen	

System Information Submenu

Table 37: System Information submenu

Feature	Choices or Display Only	Description	Your Setting
System Information	Display only		
Manufacturer	Display only		
Product Name	Display only		
Version	Display only		
Serial Number	Display only		
UUID	Display only		
Server Board Information	Display only		
Manufacturer	Display only		
Product Name	Display only		
Version	Display only		
Serial Number	Display only		
Chassis Information	Display only		
Manufacturer	Display only		
Version	Display only		
Serial Number	Display only		
Asset Tag	Display only		

Boot Options Menu

Table 38: Boot Options Menu

Feature	Choices or Display Only	Description	Your Setting
Boot Timeout	**10** Any figure	Sets the default timeout value before system boot. The 656535 value will disable the timeout completely.	
Boot Option #N	EFI Shell List of the boot devices	Sets the system boot order.	

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 39: 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.
Restore Defaults	Load default values for all SETUP items.
	F9 key can be used for this operation.
Save 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.
Restore User Default Values	Restores previously saved user default values.

Updating 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.

Preparing for the Update

The steps below explain how to prepare to update the BIOS, including how to record the current BIOS settings and how to obtain the update utility.

Note: In the unlikely event that a BIOS error occurs during the BIOS update process, a recovery process may need to be followed to return the system to service.

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.

Obtaining the Update

Consult our Web site at the following address: **http://www.nec-computers.com** to download the required files (these files may have been zipped for your convenience). Save these files on a floppy disk (unzip them if necessary).

Note: Review the instructions and release notes that are provided in the readme file distributed with the BIOS image file before attempting a BIOS update. The release notes contain critical information regarding jumper settings, specific fixes, or other information to complete the update.

Updating the BIOS

1. Follow the instructions in the readme file that came with the BIOS update. When the update completes, remove the bootable media from which you performed the update.

⚠ **Caution**

Do not power down the system during the BIOS update process! The system will reset automatically when the BIOS update process is completed.

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2. Press F2 to enter the BIOS Setup utility.
3. In the BIOS Setup utility, press F9 to load the setup defaults.
4. Press F10 to save the changes and exit the BIOS Setup utility.

Updating the BIOS

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. Move the BIOS jumper to pins 2-3.

   The other BIOS is used to boot.
2. Update the BIOS.
3. Power off the server.
4. Remove the A/C power.
5. Move the BIOS Bank Select jumper to the Normal position.
6. Plug in AC power.
7. Wait for thirty seconds and power on.

For more information on the BIOS Recovery jumper, refer to .

Specifications

Table 40: NovaScale T810 Specifications

Item		Description	
Cabinet design		Tower or Rack (with conversion optional kit)	
Chipset		Intel® 3000	
CPU	Type	Intel® Pentium® 4, Intel® Pentium® D, or an Intel® Xeon® 3000 series	
	L2 Cache		
	HyperTransport Bus		
	Number of processors	1 (max: 1)	
	Packaging	Socket LGA775	
Memory	Minimum	512 MB	
	Maximum	8 GB (4x2GB)	
	Connectors	4 slots	
	Memory module	DDR2 533 or DDR2 667	
	Error check	ECC	
Floppy Disk Drive		3.5-inch drive × 1	
Hard Disk Drive	Technology	S-ATA	SCSI
	RPM	7,200	10,000
External accessible bays	5.25-inch bay	4 slots	
	3.5-inch bay	1 slot	
Hard Disk Drive bays	Non Hot-swap	4 slots	
	Hot-swap	3 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 x4	1 slot which operates at 1x	
LAN	On board Intel® 82573E	10/100/1000 Fast Ethernet support	
		Compliant with IEEE 802.3 (10BASE-T, 100BASE-TX, 1000BASE-T) specifications	
		IAMT support	
Video		On-board ATI ES1000 video controller with 16MB	
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 40: NovaScale T810 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)

Equipment Log

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	
Hot-swap HDD cage						
	Model name				Serial No.	
					Date installed	
Hot-swap SCSI 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					
Fixed SCSI 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			
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			
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	

3.5-inch Device #1						
	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 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				

Software

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