IBM ®

*@*server
xSeries 343

Product Guide

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the**

> **installation and configuration procedures.**
>
> - **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	To Disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2

CAUTION

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
- **Throw or immerse into water**
- **Heat to more than 100 °C (212 °F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3

CAUTION

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the fol

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Statement 4

≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

CAUTION

Use safe practices when lifting.

Statement 14

CAUTION

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

Statement 15

CAUTION

Make sure that the rack is secured properly to avoid tipping when the server unit is extended

Part I: User's Guide

This document provides an overview of the IBM® @server xSeries® 343 server. This manual consists of two parts:

- *User's Guide*: Describes procedures that **DO NOT REQUIRE** removing and replacing boards. You do not need to be a qualified service technician to perform procedures listed in the *User's Guide*.
- *Service Technician's Guide*: Describes procedures that **REQUIRE** removing and replacing boards. You must be a qualified service technician to perform procedures listed in the *Service Technician's Guide*.

⚠ 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 the rack on slides. You must also consider the weight of any other device installed in the rack. A crush hazard exists should the rack tilt forward which could cause serious injury.

If AC power supplies are installed:

Main AC power disconnect: The AC power cord(s) is considered the main disconnect for the server and must be readily accessible when installed. If the individual server power cord(s) will not be readily accessible for disconnection then 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 labeled as controlling power to the entire rack, not just to the server(s). To remove all power, two AC cords must be removed.

Grounding the rack installation: To avoid the potential for an electrical shock hazard, you must include a third wire safety ground conductor with the rack installation. If the 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 the server power cord is plugged into a wall AC outlet, the safety ground conductor in the power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: The server is designed for an AC line voltage source with up to 20 amperes of overcurrent protection per cord feed. If the power system for the equipment rack is installed on a branch circuit with more than 20 amperes of protection, you must provide supplemental protection for the server. The overall current rating of a server configured with two power supplies is less than 4 amperes.

If DC power supplies are installed:

Connection with a DC source should only be performed by trained service personnel. The server with DC input is to be installed in a Restricted Access Location in accordance with articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70. The DC source must be electrically isolated by double or reinforced insulation from any hazardous AC source. The DC source must be capable of providing up to 650 Watts of continuous power per feed pair.

Main DC power disconnect: You are responsible for installing a properly rated DC power disconnect for the server system. This mains disconnect must be readily accessible, and it must be labeled as controlling power to the server. The circuit breaker of a centralized DC power system may be used as a disconnect device when easily accessible and should be rated no more than 10 amps.

Grounding the server: To avoid the potential for an electrical shock hazard, you must reliably connect an earth grounding conductor to the server. The earth grounding conductor must be a minimum 14AWG connected to the earth ground stud(s) on the rear of the server. The safety ground conductor should be connected to the chassis stud with a Listed closed two-hole crimp terminal with a maximum width of 0.25 inch. The nuts on the chassis earth ground studs should be installed with a 10 in/lbs torque. The safety ground conductor provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: Overcurrent protection circuit breakers must be provided as part of each host equipment rack and must be incorporated in the field wiring between the DC source and the server. The branch circuit protection shall be rated minimum 75Vdc, 10 A maximum per feed pair. If the DC power system for the equipment rack is installed with more than 10 amperes of protection, you must provide supplemental protection for the server. The overall current rating of a server configured with two power supplies is 8 amperes.

Safety

⚠ WARNING

Do not attempt to modify or use an AC power cord set that is not the exact type required. You must use a power cord set that meets the following criteria:

1. **Rating: For U.S./Canada cords must be UL Listed/CSA Certified type SJT, 18-3 AWG. For outside U.S./Canada cords must be flexible harmonized (<HAR>) or VDE certified cord with 3 x 0.75 mm conductors rated 250 VAC.**

2. **Connector, wall outlet end: Cords must be terminated in grounding-type male plug designed for use in your region. The connector must have certification marks showing certification by an agency acceptable in your region and for U.S. must be Listed and rated 125% of overall current rating of the server.**

3. **Connector, server end: The connectors that plug into the AC receptacle on the server must be an approved IEC 320, sheet C13, type female connector.**

4. **Cord length and flexibility: Cords must be less than 4.5 meters (14.76 feet) long.**

⚠ CAUTION

Temperature: The temperature, in which the server operates when installed in an equipment rack, must not go below 5 °C (41 °F) or rise above 40 °C (104 °F). 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. The rack must also include ventilation sufficient to exhaust a maximum of 1023 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.

Statement 14

CAUTION

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

Statement 15

CAUTION

Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Notes

Only use a screwdriver tip to push in the lock tabs on the rack slides. A pinch hazard exists if fingers are used for this purpose.

DC Power supplies are installed: The DC source must be electrically isolated by double or reinforced insulation from any hazardous DC source. The DC source must be capable of providing up to 350 W of continuous power per feed pair. Connection with a DC source should only be performed by trained service personnel.

Mains DC power disconnect: You are responsible for installing a DC power disconnect for the entire rack unit. This mains disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the servers(s).

Grounding the rack installation: To avoid the potential for an electrical shock hazard, you must include a third wire safety ground conductor with the rack installation. The safety grounding conductor must be a minimum 14AWG connected to the earth ground stud on the rear of the server. The safety ground conductor should be connected to the chassis stud with a two hole crimp terminal with a maximum width of 0.25 inch. The nuts on the chassis studs should be installed with a 10 in/lbs torque. The safety ground conductor provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: Overcurrent protection circuit breakers must be provided as part of each host equipment rack and must be installed between the DC source and the server. The server is designed for a DC line voltage power source with up to 10 amperes of overcurrent protection per feed pair. If the DC power system for the equipment rack is installed with more than 10 amperes of protection, you must provide supplemental protection for the server. The overall current rating of a server configured with two power supplies is less than 7 amperes.

Temperature: The temperature in which the server operates when installed in an equipment rack, must not go below 5 °C (41 °F) or rise above 40 °C (104 °F). 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. The rack must also include ventilation sufficient to exhaust a maximum of 1023 BTUs 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.

Statement 4
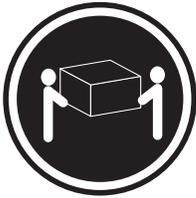
≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

CAUTION
Use safe practices when lifting.

1 Chassis Description

The IBM® @server xSeries 343 server is a compact, high-density, rack mount server system with support for 1 or 2 Intel® Xeon™ processors with 512 KB L2 cache and 12 GB DDR266 SDRAM DIMM memory. The IBM® @server xSeries 343 server supports high availability features such as hot swap disk drives and hot swap and redundant power supply modules. The scalable architecture of the xSeries 343 server supports symmetric multiprocessing (SMP) and a variety of operating systems (OS).

Physical Specifications

Table 1 lists the server's physical specifications while Figure 1 presents a view of the xSeries 343 server chassis.

Table 1.   Server Physical Specifications

Specification	Value
Height	3.45 inches (87.6 mm)
Width	17.11 inches (434.6 mm)
Depth	20 inches (508 mm)
Front clearance	2 inches (76 mm)
Side clearance	1 inches (25 mm)
Rear clearance	3.6 inches (92 mm)

TP108
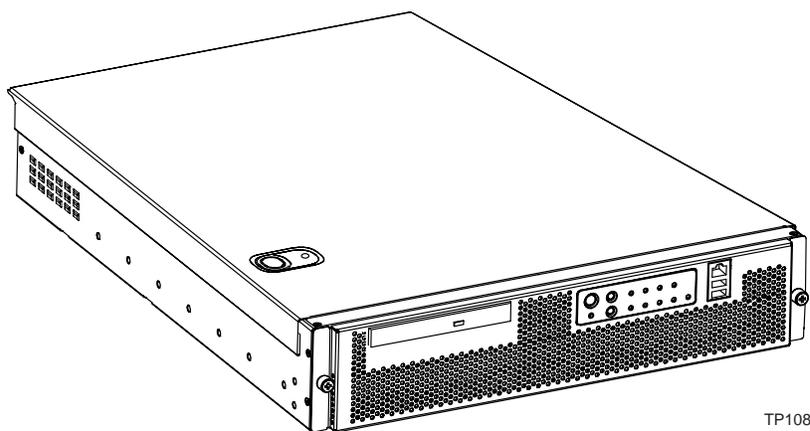
Figure 1. IBM® @server xSeries 343 Server Chassis

Environmental Specifications

The IBM® @server xSeries 343 server has been tested to the environmental specifications listed in Table 2. All testing has been performed per procedures defined in Bellcore GR-63-CORE NEBS Physical Protection, Bellcore GR-3580 NEBS Criteria Levels, and Bellcore GR-1089-CORE EMC and Electrical Safety – Generic Criteria for Network Telecommunications Equipment.

Table 2.   Environmental Specifications Summary

Environment	Specification
Temperature operating	5 °C to 40 °C (41 °F to 104 °F)
Temperature non-operating	-40 °C to 70 °C (-104 °F to 158 °F)
Altitude	0 to 3,962 m (0 to 13,000 ft)
Humidity non-operating	95%, non-condensing at temperatures of 23 °C (73 °F) to 40 °C (104 °F)
Vibration operating	Swept sine survey at an acceleration amplitude of 0.1 g from 5 to 100 Hz and back to 5 Hz at a rate of 0.1 octave/minute, 90 minutes per axis on all three axes as per Bellcore GR-63-CORE standards.
Vibration non-operating	Swept sine survey at an acceleration amplitude of 0.5 g from 5 to 50 Hz at a rate of 0.1 octaves/minute, and an acceleration amplitude of 3.0g from 50 to 500 Hz at a rate of 0.25 octaves/minute, on all three axes as per Bellcore GR-63-CORE standard.
	2.2 Grms, 10 minutes per axis on all three axes
Safety	UL 60950, CSA 60950, IEC 950, TUV/GS EN60950
Emissions	Verified to FCC Class A; tested to CISPR 22 Class A, EN 55022 Class A, VCCI Class A ITE, AS/NZS 3548 Class A, CNS13438
Immunity	Verified to comply with EN 55024
Shock operating	Half-sine 2 G, 11 ms pulse, 100 pulses in each direction, on each of the three axes.
Shock non-operating	Trapezoidal, 25 G, 170 inches/sec delta V, three drops in each direction, on each of the three axes.
Electrostatic discharge (ESD)	Tested to ESD levels up to 15 kilovolts (kV) air discharge and up to 8 kV contact discharge without physical damage.
Acoustic	Sound pressure: < 55 dBA at ambient temperatures < 28 °C measured at bystander positions in operating mode

Chassis Feature Location

Front Panel

Figure 2 shows the front view of the system including the front panel. The front panel contains system control switches, alarm indicators and relays, and status indicators. Front panel controls and LEDs are summarized in Table 3.
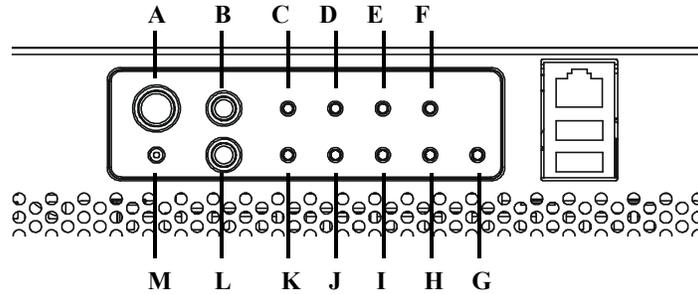
A	Power switch	H	Disk 2 Activity/Fault LED (green/amber)
B	Reset Switch	I	Main power LED (green)
C	Alarm: CRT	J	NIC0/NIC1 activity LED (green)
D	Alarm: MJR	K	System ID LED (white)
E	Alarm: MNR	L	ID switch
F	Alarm: PWR	M	NMI switch
G	Disk 1 Activity/Fault LED (green/amber)		

Figure 2. Front Panel

Table 3. Front Panel Features

Item	Feature	Description
Front Panel Switches		
A	Power switch	Toggles the system power
B	Reset switch	Resets the system
L	ID switch	Toggles system ID LED
M	NMI switch	Assert NMI to baseboard
Front Panel Alarm LEDs and Relays		
C	Critical (amber or red)	When continuously lit, indicates the presence of a Critical System Fault. A critical system fault is an error or event that is detected by the system with a fatal impact to the system. In this case, the system cannot continue to operate. An example could be the loss of a large section of memory, or other corruption, that renders the system not operational. The front panel critical alarm relay will be engaged.
D	Major (amber or red)	When continuously lit, indicates the presence of a Major System Fault. A major system fault is an error or event that is detected by the system that has discernable impact to system operation. In this case, the system can continue to operate but in a "degraded" fashion (reduced performance or loss of non-fatal feature reduction). An example could be the loss of one of two mirrored disks. The front panel major alarm relay will be engaged.
E	Minor (amber)	When continuously lit, indicates the presence of a Minor System Fault. A minor system fault is an error or event that is detected by the system but has little impact to actual system operation. An example would be a correctable ECC error. The front panel minor alarm relay will be engaged.
F	Power (amber)	When continuously lit, indicates the presence of a Power System Fault. The front panel power alarm relay will be engaged.
Front Panel Status LEDs		
G	Disk 1 Activity/Fault LED (green/amber or red)	Indicates disk 1 SCSI hard drive activity when green, or a disk 1 SCSI hard drive fault when amber or red.
H	Disk 2 Activity/Fault LED (green/amber or red)	Indicates disk 2 SCSI hard drive activity when green, or a disk 2 SCSI hard drive fault when amber or red.
I	Main power LED (green)	When continuously lit, indicates the presence of DC power in the server. The LED goes out when the power is turned off or the power source is disrupted.
J	NIC0/NIC1 activity LED (green)	Indicates activity on either NIC0 or NIC1.
K	System ID LED (white)	Indicates any system SCSI hard drive activity.

Figure 3 shows the front view of the system with the bezel removed.
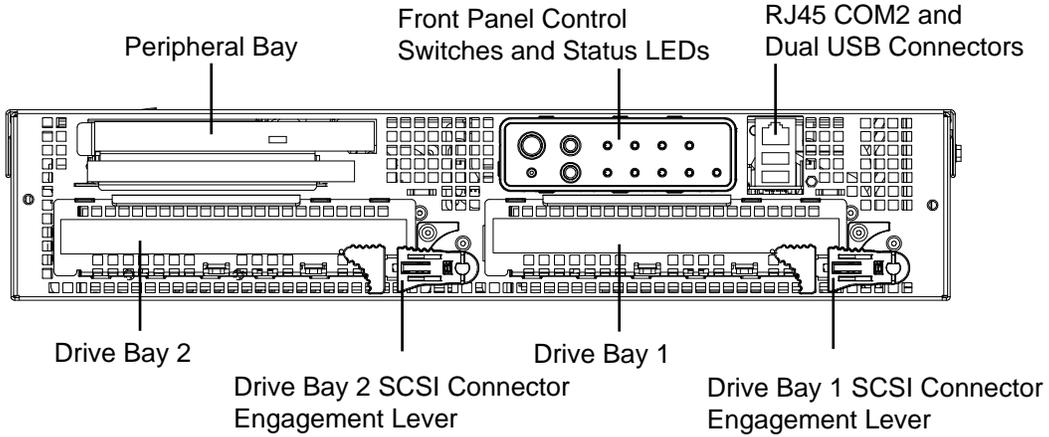
Figure 3. Front View with Bezel Removed

Back Panel

Figure 4 shows the back panel view of the system and Table 4 lists the features of the back panel.
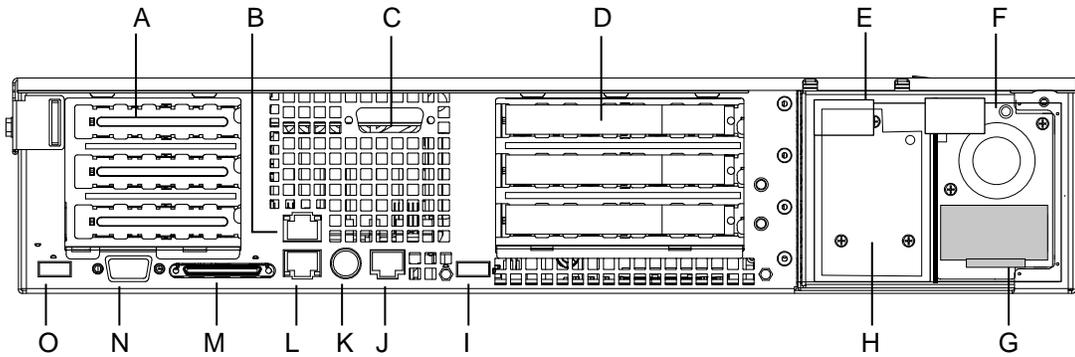
Figure 4. Back Panel DC Version

Table 4.   Back Panel Features

Item	Description
A	PCI card bracket (low profile)
B	RJ-45 NIC 2 connector - Green Status LED / Yellow Status LED
C	DB15 Alarm Connector
D	PCI card bracket (full-height)
E	DC power input (primary)
F	DC power input (redundant)
G	Power supply module, redundant (system accessory)
H	Power supply module, primary
I	USB connector 0
J	RJ-45 serial 2 port
K	PS/2 mouse/keyboard connector – requires dongle ("Y" cable) to connect both keyboard and mouse
L	RJ-45 NIC 1 connector
M	U-320 SCSI connector
N	Video connector
O	USB connector 1

Internal Chassis Features

Figure 5 shows the location of the connectors and components on the IBM® @server xSeries 343 server board.
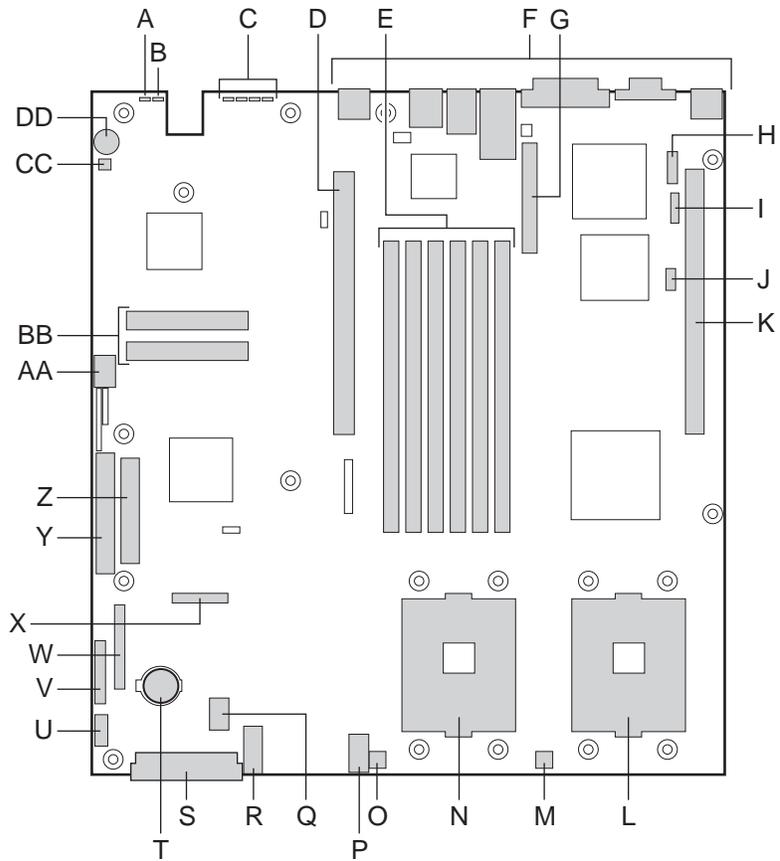
OM14124

A.   System status LED
B.   ID LED
C.   Diagnostic LEDs (POST code)
D.   64-bit PCI riser slot for PCI-X bus B (full height)
E.   DIMM slots
F.   I/O ports
G.   SCSI channel B connector (SCSI version only)
H.   COM 1 serial header
I.   ICMB connector
J.   IPMB connector
K.   64-bit PCI riser slot for PCI-X bus C (low profile) RADIOS enabled. Modular ROM-B card support is provided via the riser card (SCSI only)
L.   Secondary processor socket
M.   Secondary processor fan connector
N.   Primary processor socket
O.   Primary processor fan connector

P.   Auxiliary signal connector
Q.   Sys fan 1 connector
R.   Sys fan 2 connector
S.   Main power connector
T.   Battery
U.   Power supply signal connector
V.   ATX front panel connector
W.   SSI front panel connector
X.   Floppy/FP/IDE connector
Y.   ATA/IDE connector
Z.   Floppy drive connector

AA. USB 2 & 3 connector
BB. N/A
CC. Hard Disk Drive LED header
DD. Speaker

Figure 5. Server Board Connector and Component Locations

Processor

The server board accommodates one or two Intel® Xeon™ 2.4 GHz/512KB L2 cache processors in the INT3/FCPGA Socket 604 package operating at 533MHz. This processor uses the 0.13 micron technology.

Memory

The system board has six 168-pin DIMM slots each supporting 72-bit ECC registered DDR DIMMs (DDR266 compatible). Memory is partitioned in three banks. A minimum of 256 MB (128 MB x 2) and as much as 12 GB may be installed. Memory must be installed in pairs, starting with bank 1 (slots 1B and 1A).

The controller automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs, and reports memory size and allocation to the server via configuration registers.

➡ NOTE

Use DIMMs that have been tested for compatibility with the server board. Contact your sales representative or dealer for a current list of approved memory modules.

PCI Riser Slots

The server board has two PCI riser slots. The Segment B PCI adapter subsystem provides the following features:

- 184-pin, 5-volt keyed, 64-bit expansion slot connector
- Support for a 3-slot PCI riser card
- Support for both 5-volt and 3.3-volt PCI riser cards

The Segment C PCI adapter subsystem provides the following features:

- 184-pin, 5-volt keyed, 64-bit expansion slot connector
- Support for a 3-slot PCI riser card
- Support for only low-profile 3.3-volt PCI riser cards
- RADIOS enabled for use with zero channel RAID cards (SCSI version only)

Video

The server board uses an ATI* RAGE XL PCI graphics accelerator with 8 MB of video SDRAM. The embedded SVGA video subsystem supports:

- Resolutions up to 1600 x 1200 under 2D and 1024 x 768 under 3D
- CRT and LCD monitors up to 100-Hz vertical refresh rate

The server board supports disabling of the onboard video through the BIOS setup menu or when a plug-in video card is installed in any of the PCI slots.

SCSI Controller

The SCSI version of the server board includes an embedded Adaptec* AIC-7902W controller providing dual Ultra-320 Low Voltage Differential (LVD) SCSI channels.

The SCSI bus is terminated on the server board with active terminators that cannot be disabled. The onboard device must always be at one end of the bus. The device at the other end of the cable must also be terminated. LVD devices generally do not have termination built-in and need to have a termination source provided. Non-LVD devices generally are terminated through a jumper or resistor pack on the device itself.

Network Controller

> To ensure EMC product regulation compliance for intra-building lighting surges, the system must only be used with shielded LAN cables that are grounded at both ends.

The server board uses the Intel® Fast Ethernet Controller 82546EB and supports two 10Base-T/100Base-T/1000Base-TX network subsystems.
The 82546EB controller supports the following features:

- 32-bit PCI master interface
- Integrated IEEE 802.3 10Base-T, 100Base-TX and 1000Base-TX compatible PHY
- IEEE 820.3u auto-negotiation support
- Full-duplex support at 10 Mbps, 100 Mbps, and 1000 Mbps operation
- Low power +3.3 V device

On the server board, NIC 1 can be used as both a network interface and server management interface.

NIC Connector and Status LEDs

The E82546EB controller drives LEDs on the network interface connector that indicate link/activity on the LAN and speed of operation. The green LED indicates network connection when on and TX/RX activity when blinking. The speed LED indicates 1000 Mbps when amber, 100 Mbps when green, and 10 Mbps when off.

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible. If specified through the System Setup Utility, the server may be locked automatically if there is no keyboard or mouse activity for a predefined length of time. Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered. A Y-cable can be used if both a PS/2 mouse and keyboard are required at the same time.

RJ-45 Serial Port

The rear RJ-45 serial port is a fully functional serial port that supports any standard serial device and provides support for serial concentrators. For server applications that use a serial concentrator to access the server management features of the baseboard, a standard 8-pin CAT-5 cable from the serial concentrator is plugged directly into the rear RJ-45 serial port. The 8 pins of the RJ-45 connector can be configured to match either of two pin-out standards used by serial port devices. To accommodate either standard, the J5A2 jumper block located directly behind the rear RJ-45 serial port must be jumpered appropriately according to the desired standard.

> By default, the RJ-45 serial port is configured to support a DSR signal.

ACPI

The server board supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 2.0 specification. 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 IBM® @server xSeries 343 server 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 or Save to Disk. The memory and machine state are saved to disk. Pressing the power button or other wakeup event will restore the system state from the disk and resume normal operation. This assumes that no hardware changes have been made to the system while it was off.
- s5: Soft off. Only the RTC section of the CSB and the BMC are running in this state. No context is saved by the OS or hardware.

⚠ CAUTION

The system is off only when the AC power cord is disconnected.

Security

Software Locks

The BIOS Setup and the System Setup Utility provide a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, you can access the system only after you enter the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time out period—1 to 120 minutes.
- Set and enable an administrator password.
- Set and enable a user password.
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
- Activate a hot key combination to enter secure mode quickly.
- Disable writing to the diskette drive when secure mode is set.
- Disable access to the boot sector of the operating system hard disk drive.

Using Passwords

You can set the user password, the supervisor password, or both passwords.

If only the user password is set, you:

- Must enter the user password to enter BIOS Setup or the System Setup Utility.
- Must enter the user password to boot the server if "Password on Boot" is enabled in either the BIOS Setup or System Setup Utility.
- Must enter the user password to exit secure mode.

If only the supervisor password is set, you:

- Must enter the administrator password to enter BIOS Setup or the System Setup Utility.
- Must enter the administrator password to boot the server if "Password on Boot" is enabled in either the BIOS Setup or System Setup Utility.

- Must enter the administrator password to exit secure mode.

If both passwords are set, you:

- May enter the user password to enter BIOS Setup or the System Setup Utility. However, you will not be able to change many of the options.
- Must enter the administrator password if you want to enter BIOS Setup or the System Setup Utility and have access to all of the options.
- May enter either password to boot the server if "Password on Boot" is enabled in either the BIOS Setup or System Setup Utility.
- May enter either password to exit secure mode.

Secure Mode

Configure and enable the secure boot mode by using the System Setup Utility. When secure mode is in effect:

- You can boot the server and the operating system will run, but you must enter the user password to use the keyboard or mouse.
- You cannot turn off system power or reset the server from the front panel switches.
- Secure mode has no effect on functions enabled via remote server management or power control via the watchdog timer.

Taking the server out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system will not be powered off when secure mode is later removed. However, if the front panel power switch remains depressed when secure mode is removed, the server will be powered off.

Summary of Software Security Features

Table 5 lists the software security features and describes what protection each offers. In general, to enable or set the features listed, you must run the System Setup Utility and select "Security" from the "Available Tasks" window. Table 5 also refers to other System Setup Utility menus and to the Setup utility.

Table 5.   Software Security Features

Feature	Description
Secure mode	**How to enter secure mode:**
	Setting and enabling passwords automatically places the system in secure mode.
	If you set a hot-key combination (through Setup), you can secure the system simply by pressing the key combination. This means you do not have to wait for the inactivity time-out period.
	When the system is in secure mode:
	The server can boot and run the operating system, but mouse and keyboard input are not accepted until the user password is entered.
	At boot time, if a CD is detected in the CD-ROM drive, the system prompts for a password. When the password is entered, the server boots from CD and disables the secure mode.
	If there is no CD in the CD-ROM drive, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time.
	To leave secure mode: Enter the correct password(s).
Set a time-out period so that keyboard and mouse input are not accepted. Also, screen can be	Specify and enable an inactivity time-out period of from 1 to 120 minutes.
	If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted.
	The monitor display will go blank.

blanked.	To resume activity: Enter the correct password(s).
Control access to using the System Setup Utility: set administrator password	To control access to setting or changing the system configuration, set an administrator password and enable it through Setup.

If both the administrator and user passwords are enabled, either can be used to boot the server or enable the keyboard and/or mouse, but only the administrator password will allow Setup to be changed.

To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the Administrator Password Option menu found in the Security subsystem group.

To clear the password if you cannot access Setup, change the Clear Password jumper (see Table 20). |
| Control access to the system other than System Setup Utility: set user password | To control access to using the system, set a user password and enable it through Setup.

To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the User Password Option menu found in the Security Subsystem Group.

To clear the password if you cannot access Setup, change the Clear Password jumper (see Table 20). |
| Boot without keyboard | The system can boot with or without a keyboard. During POST, before the system completes the boot sequence, the BIOS automatically detects and tests the keyboard if it is present and displays a message. |
| Specify the boot sequence | The sequence that you specify in Setup will determine the boot order. If secure mode is enabled (a user password is set), you will be prompted for a password before the server fully boots. If secure mode is enabled and the "Secure Boot Mode" option is also enabled, the server will fully boot but will require a password before accepting any keyboard or mouse input. |

2 System Description

This chapter describes the basic subsystems of the IBM® @server xSeries 343 server.

Front Panel IO (FPIO) System Board

Features

The IBM® @server xSeries 343 server has the following FPIO features:
- Four switches to control power-on, reset, NMI, and the system ID LED
- One system ID LED that can be controlled remotely or by the system ID switch
- Two system activity LEDs that indicate power-on and NIC activity
- Two hard drive activity/fault LEDS that indicate activity/fault status for drives 1 and 2
- Four system fault LEDs that indicate critical, major, minor, and power system fault status
- Four system fault relays for external critical, major, minor, and power fault indicators
- One SCSI bus with hot-swap circuitry for controlling hot-swap SCSI disk drives 1 and 2
- IDE Bus from IDE Connector to blind mate connector
- Floppy Bus from Floppy Connector to blind mate connector
- One blind mate connector for interfacing to CDROM or floppy drive carrier assembly
- Connectors for interfacing to the power supply, server baseboard, drive carrier assemblies, and hot plug disk drives 1 and 2

FPIO SCSI Subsystem Status LEDs

The status LEDs give the user a visual indication of the drives' condition. There is a single LED for each drive. The LEDs are bi-colored and use a combination of color and blinking frequency to indicate multiple conditions. The LEDs are mounted on the FPIO board, and the light is directed to the front panel through the use of a light pipe assembly. See Table 6 for LED activity definitions. See the Firmware EPS for definitions of the different blink rates.

Table 6.   LED Activity Definitions

LED State	Drive Active	Fault Condition
Solid Green		
Blinking Green	X	
Blinking Yellow/Green		X
Blinking Yellow/Blank		X
Blank		

Riser Boards

The server board supports two riser boards, a 3.3V/5V Segment B full-length riser board, and a 3.3V Segment C low-profile riser board. Features of the Segment B riser board include:
- Support for three 33-MHz 5-Volt 64-bit PCI add-in cards

- Provides 5-Volt to 3.3-Volt signal level translation
- Support for a Zero Channel RAID (ZCR) card

The 3.3V/5V Segment B riser board contains voltage level translation converting the 5-Volt PCI add-in card signals to conform to the server board, which has 3.3 Volt-signaling levels. The board supports a limit of 25 Watts per slot. Figure 6 illustrates the Segment B riser board.

TP00475

Figure 6. 3.3-Volt/5-Volt Segment B Full-Length Riser Board

The 3.3-Volt Segment C low-profile riser board supports three 3.3-Volt 64-bit slots. The bus speed varies from 33MHz to 100MHz depending on the type of PCI adapters configured in the 3.3-Volt riser card.   Figure 7 illustrates the 3.3-Volt Segment C low-profile riser board.
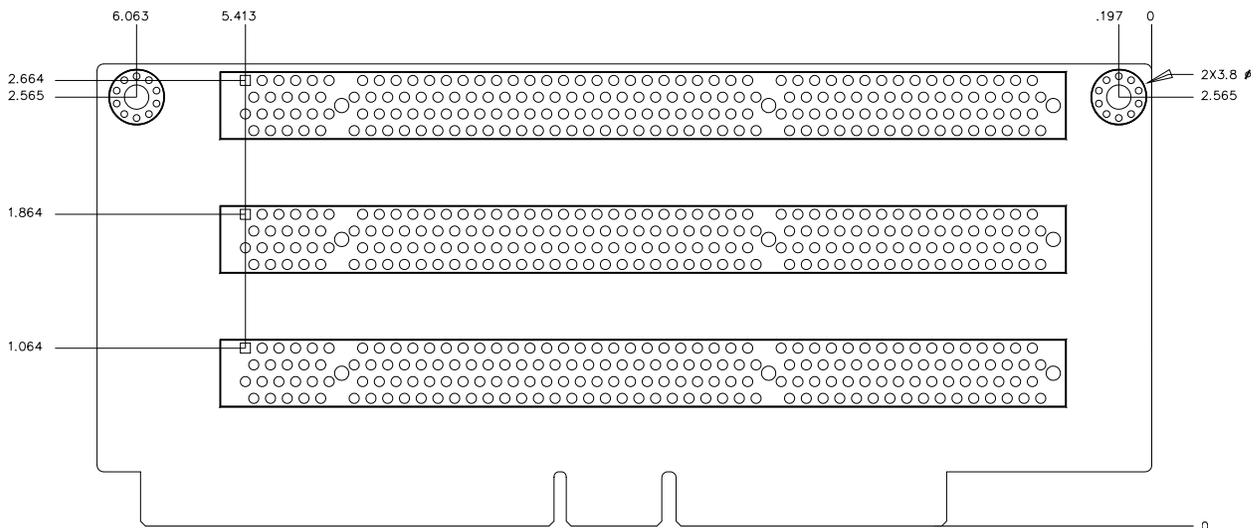
Figure 7. 3.3-Volt Segment C Low-Profile PCI Adapter Subsystem

The 3.3-Volt Segment C low-profile riser board supports ZCR cards. To operate correctly, insert the ZCR card into the lower slot of the Segment C riser board, and then insert the Segment C riser board into the low-profile riser board slot on the server board. For the location of the low-profile riser board slot, see callout K on Figure 5.

Power Supplies

The power supply cage shown in Figure 8 is accessed from the rear of the chassis. The power supply cage supports up to two hot-swap power supplies (either AC input or DC input) in a (1+1) redundant configuration. A power supply filler module (shown at left in Figure 8) for the empty power supply site is supplied for systems without redundancy.
Only the DC input version is NEBS certified.
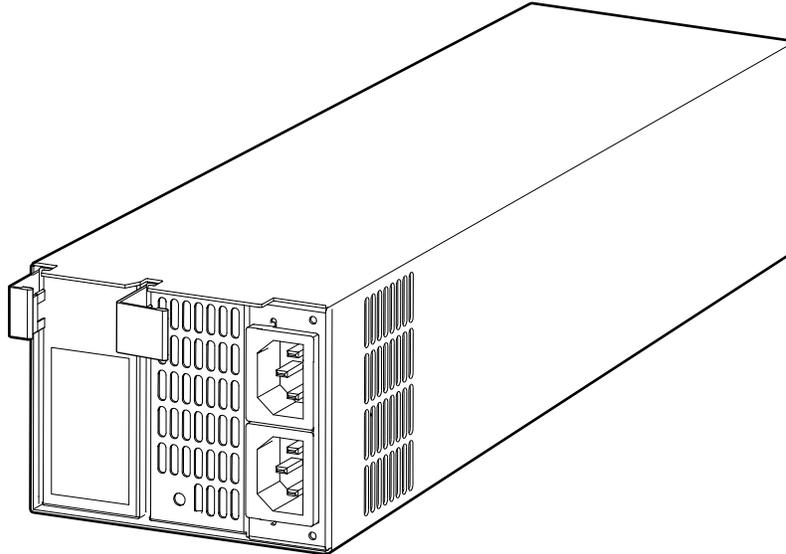
TP109

Figure 8. Non-redundant AC-Power Supply Subsystem (Filler Module Shown at Left)

DC Power Subsystem

This section defines the features of the DC input switching power subsystem.

Features
- 470-Watt output capability in full DC input voltage range
- "Power Good" indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability
- Remote sense of 3.3-Volt, 5-Volt, and 12-Volt DC outputs
- "DC_OK" circuitry for brown-out protection and recovery
- Built-in load sharing capability
- Built-in overloading protection capability
- Onboard field replaceable unit (FRU) information
- I^2C interface for server management functions
- Integral handle for insertion/extraction

Introduction

The DC version of the IBM® @server xSeries 343 server uses a -48 to -60 VDC input switching power subsystem, which provides up to 470 Watts with -48 to -60 VDC input and with current and remote sense regulation. The power subsystem consists of one or two 470-Watt power supply modules. A system with two modules forms a redundant, hot-swappable (1+1) power subsystem.

Interface Requirements

DC Input

The DC power source may produce hazardous voltage levels exceeding -60 VDC and high energy levels above 240VA that may cause electric shock or burns. All DC input connections should be made only by a qualified service person to prevent injury. All wiring terminals connected to the DC input terminal block must be fully insulated with no exposed bare metal.

DC Output Connectors

The power subsystem DC power and control signals are interfaced to the server system via wire harnesses when the power supply modules are inserted into the power subsystem enclosure. The safety ground pin of the power supply module is the first pin to connect and the last to disconnect when the module is being inserted or removed from the power subsystem housing. In addition to the 5-V Standby, -12 V, +3.3 V, +5 V and +12 VDC outputs, the following signals and output pins are included:

- +3.3 VDC remote sense
- +5 VDC remote sense
- +12 VDC remote sense
- Remote sense return
- Power Subsystem On (DC PWR enable)
- Power Good
- I^2C interface chip[1]

Power Supply Module LED Indicators

There is a single bi-color LED to indicate power supply status that is visible on the back of the system. Table 7 shows the conditions confirmed by the LED indicators.

Table 7.   LED Indicators

Power Supply Condition	Power Supply LED
No DC power to all PSUs	OFF
No DC power to this PSU only	AMBER
DC present/Only Standby Outputs On	BLINK GREEN
Power supply DC outputs ON and OK	GREEN
Current limit	AMBER
Power supply failure (OTP, OCP, OVP, UV)	AMBER

---

[1] PS Failure, PS Presence, PS Predictive Fail, +12 V Mon, +5 V Mon, and the 5 V Standby rails failure are being monitored via an I^2C interface chip.

DC Input Voltage Specification

The power supply will operate within all specified limits over the input voltage range outlined in Table 8. The power supply will power-off if the DC input is less than -34 VDC.

Table 8. **DC Input Rating**

Parameter	Minimum Tolerance	Nominal Rating	Maximum Tolerance	Maximum Input Current
Voltage	-38VDC	-48 to -60VDC	-75VDC	17.0 Amps

DC Output Current Specifications

The combined output power of all outputs will not exceed 450 W. Each output has a maximum and minimum current rating, as shown in Table 9. The power supply meets both static and dynamic voltage regulation requirements for the minimum dynamic loading conditions. The power supply meets only the static load voltage regulation requirements for the minimum static load conditions.

Table 9. **DC Power Supply Input/Output Summary**

Voltage	Current Rating
+3.3 VDC Output	20 Amp Max[1]
+5 VDC Output	26 Amp Max[1]
+12 V1DC Output	16 Amp Max[2]
+12 V2DC Output	12.0 Amp Max[2]
+12 V3DC Output	12.0 Amp Max[2]
-12 VDC Output	0.5 Amp Max
+5 VDC Standby	2.0 Amp Max
Output balancing	Total combined output power of all output shall not exceed 450 W.
DC Line Voltage	-48VDC to –60VDC
DC Input Current	17.0 Amp maximum

1. Combined 3.3V/5V shall not exceed 150W.

2. Maximum continuous load on the combined 12V output shall not exceed 25A. Peak load on the combined 12V output shall not exceed 30A for greater than 10 seconds.

AC Power Subsystem

This section defines the AC input switching power subsystem.

Features

- 500-Watt output capability
- "Power Good" indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability
- Remote sense of 3.3 Volt, 5 Volt, and 12 VDC outputs
- "AC_OK" circuitry for brown-out protection and recovery
- Built-in load sharing capability
- Built-in overloading protection capability
- Onboard field replaceable unit (FRU) information
- I^{2}C interface for server management functions
- Integral handle for insertion/extraction

Introduction

The AC version of the IBM® @server xSeries 343 server uses an AC input switching power subsystem that provides up to 500-Watt DC with 100–240 VAC input with current and remote sense regulation. The power subsystem consists of one or two 500-Watt power supply modules. A system with two modules forms a redundant, hot-swappable (1+1) power subsystem. There is a single bi-color LED to indicate power supply status. Refer to Table 10 for conditions of the power supply LEDs.

Table 10.   LED Indicators

Power Supply Condition	Power Supply LED
No AC power to all PSUs	OFF
No AC power to this PSU only	AMBER
DC present/Only Standby Outputs On	BLINK GREEN
Power supply DC outputs ON and OK	GREEN
Power Supply in Alert Condition	BLINK AMBER
Power supply failure (OTP, OCP, OVP, UV)	AMBER

AC Input Voltage Specification

The power supply operates within all specified limits over the voltage ranges outlined in Table 11.

Table 11.   AC Power Supply Input/Output Summary

Voltage	Current Rating
+3.3 VDC Output	20 Amp Max [1]
+5 VDC Output	20 Amp Max [1]
+12 V1DC Output	18 Amp Max [2]
+12 V2DC Output	18.0 Amp Max [2]
-12 VDC Output	0.5 Amp Max
+5 VDC Standby	2.0 Amp Max
Output balancing	Total combined output power of all output shall not exceed 500 W.
AC Line Voltage	Auto-ranging for either 100-127 VAC or 200-240 VAC
AC Line Frequency	50/60 Hz
AC Input Current	4 Amp at 100-127 VAC 2 Amp at 200-240 VAC

1.   Combined 3.3/5V shall not exceed 120W.

2.   Maximum continuous load on the combined 12V output shall not exceed 25A. Peak load on the combined 12V output shall not exceed 30A for greater than 10 seconds.

Peripheral Bay

One peripheral drive (either a slim-line floppy drive or a slim-line CD-ROM drive) can be mounted in the system using a blind-mate peripheral drive carrier inserted into the peripheral drive bay. The peripheral drive bay is located above the hard drive tray and to the left. The blind-mate peripheral drive carrier for the floppy drive is different from the blind-mate peripheral drive carrier for the CD-ROM drive.
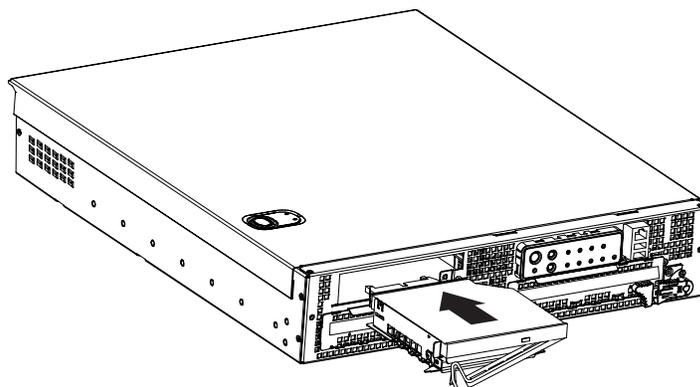
TP127

Figure 9. Peripheral Drive Bay

Hard Drive Tray

Hard Drive Bays

Up to two 1.0-inch Ultra-320* SCSI technology hard drives can be mounted in the hot swap drive bays, which are located in the bottom front of the chassis. The front bezel must be removed to access the hot swap drive bays.

Installed hard drives are auto assigned addresses 0 and 1. Do not jumper the SCSI ID Selector Block on the hard drives. Refer to the following figure for SCSI ID assignment details.
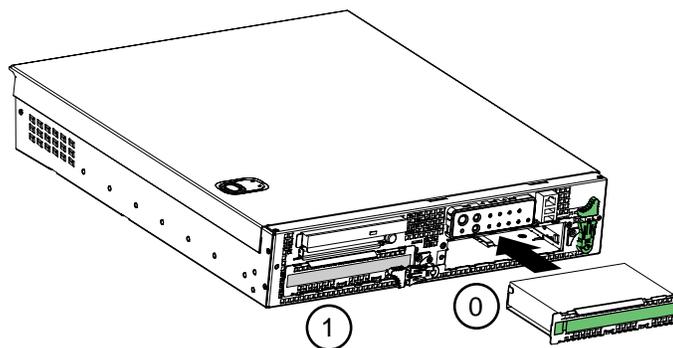
TP00474

Figure 10. Hard Drive Bays

Cooling Subsystem

All system components except the power supply cage are cooled by a set of fans mounted near the middle of the chassis and behind the hard drive bays. This is shown in Figure 11.

Fan Array Assembly
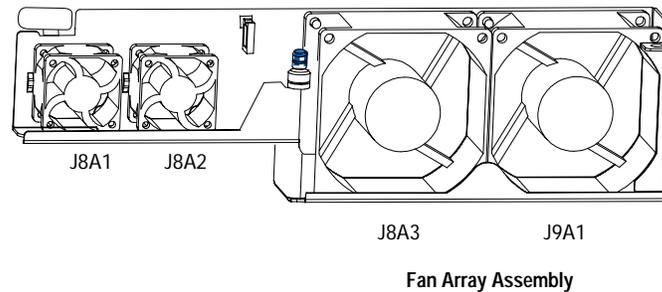
TP00473

Figure 11. Fan Array with Four System Fans Installed

The IBM® @server xSeries 343 server comes in a non-redundant, four-fan configuration that consists of two 80mm x 38mm fans and two 40mm x 28mm fans.

Air flows in through the front bezel over the peripheral bay and the hard drive bays, passes through the fans and over the baseboard, and exhausts through the rear of the chassis. Each fan provides tachometer signal output to the server baseboard to indicate a fan failure.

The cooling subsystem contains a fan array (as shown in Figure 11) consisting of two 80 x 38 mm fans and two 40 x 28 mm fans to cool the server board and other components. A fan failure is indicated by one of the fault LEDs located on the front panel.

Ambient Temperature Control

The server baseboard contains a pulse-width-modulation (PWM) circuit, which cycles the 12 VDC fan voltage to provide quiet operation when system ambient temperature is low and no fan failures exist. There are 16 fan speed settings between 20 °C and 35 °C, with the lowest fan speed setting at 20 °C or below. When the room ambient temperature exceeds 35 °C, the fan control circuit ceases cycling and delivers 12 VDC. Following a room temperature excursion above 35°C the fan voltage does not reenter PWM mode until the room temperature drops below 35 °C and all fans are operational.

Server Management Summary

The IBM® @server xSeries 343 server baseboard server management architecture features a Baseboard Management Controller (BMC), which autonomously monitors server status and provides the interface to server management control functions. This controller is responsible for controlling system power, resets, monitoring voltages, temperatures, fans, and communicating with secondary controllers on its Intelligent Platform Management Bus (IPMB).

Server Board Management Controller

The BMC on the system baseboard provides server management monitoring capabilities. A flash memory is associated with the BMC that holds the operational code, sensor data records (SDRs), and system event log (SEL). There is also a serial EEPROM that holds the BMC configuration defaults and FRU information. The various server management functions provided by the BMC are listed as follows:

- Baseboard voltage monitoring
- Fan failure detection
- Fan speed control
- Processor voltage monitoring
- Processor presence detection
- Processor internal error (IERR) monitoring
- Fault resilient booting (FRB)
- Processor disable control
- Watchdog timer
- Periodic system management interrupt (SMI) timer
- I^2C master controller for the IPMB
- Two private I^2C management bus interfaces
- Server management software (SMS) and server management mode (SMM) IPMB message receiver
- Event message receiver
- SEL management and access
- SDR repository management and access
- Processor non-maskable interrupt (NMI) monitoring
- Processor SMI monitoring
- Time-stamp clock
- Secure mode, video blank, and floppy write protect
- Software front panel NMI generation

3 Regulatory Specifications and Disclaimers

Declaration of the Manufacturer or Importer

This product is in compliance with European Union EMC Directive 89/336/EEC, using standards EN55022 (Class A) and EN55024 and Low Voltage Directive 73/23/EEC, Standard EN60950.

Safety Compliance

USA:	UL 60950 – 3rd Edition/CSA 22.2. No. 950-M93
Canada:	cUL Certified – CAN/CSA 22.2. No. 60950-00 for Canada (product bears the single UL mark for U.S. and Canada)
Europe:	Low Voltage Directive, 73/23/EECTUV/GS to EN60950 2nd Edition with Amendments, A1 = A2 + A3 + A4
International:	TUV/CB to IEC 60950 3rd Edition, EN60 950 2nd Edition + Amd 1-4, EMKO-TSE (74-SEC) 207/94 plus International deviations
Australian / New Zealand:	CB Report to IEC 60950, 3rd Edition plus International deviations

Electromagnetic Compatibility (EMC)

USA:	FCC CFR 47 Part 2 and 15, Verified Class A Limit
Canada:	IC ICES-003 Class A Limit
Europe:	EMC Directive, 89/336/EEC • EN55022, Class A Limit, Radiated & Conducted Emissions • EN55024, ITE Specific Immunity Standard • EN61000-4-2, ESD Immunity (Level 2 Contact Discharge, Level 3 Air Discharge) • EN61000-4-3, Radiated Immunity (Level 2) • EN61000-4-4, Electrical Fast Transient (Level 2) • EN61000-4-5, AC Surge • EN61000-4-6, Conducted RF • EN61000-4-8, Power Frequency Magnetic Fields • EN61000-4-11, Voltage Dips and Interrupts • EN61000-3-2, Limit for Harmonic Current Emissions • EN61000-3-3, Voltage Flicker
Japan:	VCCI Class A ITE (CISPR 22, Class A Limit) IEC 1000-3-2 Limit for Harmonic Current Emissions
Australia/New Zealand:	AS/NZS 3548, Class A
Taiwan:	BSMI Approval, Class A
Korea:	RRL Approval, Class A
China:	CCC Approval, Class A
Russia:	GOST Approved
International:	CISPR 22, Class A Limit

FCC Electromagnetic Compatibility Notice (USA)

This equipment has been tested and found to comply with the limits for a Class A 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 operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. In this case, the user is required to correct the interference at his or her expense. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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

FCC Declaration of Conformity

Product Type: IBM® @server xSeries 343 server

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

> Intel Corporation
> 250 Berry Hill Rd., Suite 100
> Columbia, SC 29210

Electromagnetic Compatibility Notices (International)

Europe (CE Declaration of Conformity)

This product has been tested in accordance to, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

Japan EMC Compatibility

この装置は、情報処理装置等電波障害白主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation of the notice above:

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) by Information Technology Equipment. If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

ICES-003 (Canada)

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

English translation of the above notice:

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

BSMI (Taiwan)

The BSMI Certification number and the following warning are located on the product safety label that is located visibly on the external chassis.

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

4 POST and BIOS Setup Utilities

This chapter describes the POST and BIOS setup utilities provided with the IBM® @server xSeries 343 server. It also includes information about the Adaptec* SCSI Utility. For information about server management utilities, see Chapter 5.

Table 12.   POST and BIOS Setup Utilities

Utility	Description and brief procedure	Page
Changing boot priority through POST	Change the boot device for the current boot.	35
Adaptec SCSI Utility	Use to view/configure the settings for the Adaptec AIC-7902 SCSI host adapter.	35
BIOS Setup	Use to configure system options.	36
BIOS Update Utility	Use to update the BIOS or recover from a corrupted BIOS update.	39

Hot Keys

Use the numeric pad of the keyboard to enter numbers and symbols.

Table 13.   Hot Keys

To Do This:	Press These Keys
Secure your system immediately.	<Ctrl+Alt> + hot key (Set your hot key combination with the System Setup Utility or BIOS Setup)
Enter the Adaptec SCSI Utility during POST.	<Ctrl+A> (SCSI version only)
Enter BIOS Setup during POST.	<F2>
Abort memory test during POST.	<ESC> (Press while BIOS is updating memory size on screen)
Display a menu for selecting the boot device.	<ESC> (Press anytime after memory check)
To remove the splash screen.	<ESC>
To perform a network boot.	<F12>

Power-On Self-Test (POST)

Each time the system is turned on, the BIOS begins executing the Power-On Self-Test (POST), which is stored in flash memory. POST discovers, configures, and tests the processors, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory that it is able to access and test. The time needed to test memory depends on the amount of memory installed.

1. Turn on your server and monitor. After a few seconds, POST begins to run and displays a splash screen.
2. While the splash screen is displayed, make one of the following selections:
   - Press <F2> to enter the BIOS Setup.
   - Press <Ctrl-A> to enter the Adaptec SCSI*Select** Utility. See page 35 for information about the Adaptec SCSI*Select* Utility.

- Press <Esc> to view POST diagnostic messages and change the boot device priority for this boot only.
- Press <F12> to perform a network boot.

3. If you do NOT make one of the above selections and do NOT have a device with an operating system loaded, the boot process continues and the system beeps once. The following message is displayed:

```
Operating System not found
```

What appears on the screen after this depends on whether you have an operating system loaded and if so, which one.

If the system halts before POST completes running, it emits a beep code indicating a fatal system error that requires immediate attention. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

Write down both the screen display and the beep code you hear; this information is useful for your service representative. For a listing of common beep codes and error messages that POST can generate, see Chapter 7, "Technical Reference," in this manual.

Temporarily Changing the Boot Device Priority

During POST, you can change the boot device priority for the current boot process. The changes are not saved for the next boot process.

1. Boot the server.
2. At any time during POST, press <Esc>. When POST completes, a popup Boot menu displays.
3. Use the arrow keys to highlight the device you want the server system to boot from first. For example, if you want the server system to boot from the CD-ROM first, then select "ATAPI CD-ROM Drive."

⟹ **NOTE**

   If you boot to a CD-ROM, make sure the CD is in the CD drive before selecting. One of the options on the popup Boot menu is "Enter Setup." Selecting this option brings you into the BIOS Setup.

4. Press <Enter> and the boot process continues.

The Adaptec SCSI*Select* Utility

Each host adapter includes an onboard SCSI*Select* configuration utility that allows you to configure/view the settings of the host adapter and devices in the server.

The system finds the Adaptec* AIC-7902 SCSI host adapter and displays the message Adaptec* AIC-7902 SCSI BIOS V x.xxx where x.xxx is the version number of the SCSI*Select* utility. Pressing <Ctrl+A> at this time allows you to configure the Adaptec* AIC-7902 SCSI host adapter.

When to Run the Adaptec SCSISelect Utility

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 server
- Do a low-level format on SCSI devices installed in the server

Running the SCSI*Select* Utility

1. When this message appears on the video monitor:

   ```
   <<<Press <Ctrl><A> for SCSISelect(TM) Utility!>>>
   ```

2. Press <Ctrl+A> to run the utility. When the main menu for the host adapter appears, choose the device that you want to configure; each SCSI bus accepts up to 15 devices.

Use the following keys to navigate through the menus and submenus:

Table 14.   SCSI*Select* Navigation Keys

Press	To
ESC	Exit the utility
Enter	Select an option
↑	Return to a previous option
↓	Move to the next option
F5	Switch between color and monochrome
F6	Reset to host adapter defaults

Configuring the Adaptec AIC-7902 SCSI Adapter

The Adaptec AIC-7902 SCSI adapter has two buses. Select the bus from the following menu.

Table 15.   Adaptec Main Menu

Menu Item	Options
You have an AIC-7902 adapter in your system. Move the cursor to the bus:device:channel of the one for configuration and press <Enter>.	Bus:Device:Channel 01:06:A 01:06:B
<F5> - Toggle color/monochrome.	

After selecting the bus, the following menu displays.

Table 16.   Menu for each SCSI Channel

Host Adapter	Option	Comment
AIC-7902 at Bus:Device:Channel 01:06:A (or 01:06:B)	Configure/View Host Adapter Settings	Press <Enter> to view the Configuration Menu.
	SCSI Disk Utilities	Press <Enter> to view the SCSI Disk Utilities Menu. This menu allows you to format hard disks and/or verify disk media.

When you are finished, press <Esc> and make your selection from the following menu.

Table 17.   Exit Menu

Feature	Option	Comment

BIOS Setup

You can run BIOS Setup with or without an operating system being present. BIOS Setup stores most of the configuration values in battery-backed CMOS; the rest of the values are stored in flash

memory. The values take effect when the system is booted. POST uses these values to configure the hardware. If the values and the actual hardware do not agree, POST generates an error message.

Record your BIOS Setup settings. If default values ever need restoring (after a CMOS clear, for example), you must run BIOS Setup again. Your record will make this much easier.

If BIOS Setup Is Inaccessible

If you are not able to access BIOS Setup, you might need to clear the CMOS memory. To clear CMOS, either of two methods can be used:

- Press the reset button and hold it down for four seconds or more, and then, while holding the reset button down, press the power button. Release both buttons at the same time
  OR
- Move the Clear CMOS jumper found on the configuration jumper block on the baseboard (see Table 20).

Starting BIOS Setup

You can enter and start BIOS Setup under several conditions:

- When you turn on the server, after POST completes the memory test
- When you have moved the CMOS jumper on the server board to the "Clear CMOS" position (enabled). For instructions on moving the jumper, see Table 20.

Under either of these two conditions, after rebooting, you will see this prompt:

```
Press <F2> to enter SETUP
```

- Under a third condition, when CMOS/NVRAM has been corrupted, you will see other messages but not the <F2> prompt:

```
Warning:  CMOS checksum invalid
Warning:  CMOS time and date not set
```

In this condition, the BIOS will load default values for CMOS and attempt to boot.

BIOS Setup Menus

Each BIOS Setup menu page contains a number of features. Except those used for information purposes, each feature is associated with a value field that contains user-selectable parameters. Parameters may be changed depending upon the security option chosen. If a value is not changeable due to insufficient security privileges (or other reasons), the feature's value field becomes inaccessible.

The bottom portion of the BIOS Setup screen provides a list of commands that are used for navigating the Setup utility.

Table 18. Keyboard Commands

Press	Description
← →	The left and right arrow keys are used to move between the major menu pages. The keys have no affect if a submenu or pick list is displayed.
↑	Select Item up - The up arrow is used to select the previous value in a menu item's option list, or a value field pick list. Pressing the Enter key activates the selected item.
↓	Select Item down - The down arrow is used to select the next value in a menu item's option list, or a value field pick list. Pressing the Enter key activates the selected item.

-	Change Value - The minus key or the F5 function key 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.
+	Change Value - The plus key or the F6 function key 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. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboard, but it has the same effect.
<Enter>	Execute Command - The Enter key is used to activate submenus when the selected feature is a submenu, or to display a pick list if a selected feature 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 undo the pick list, and allow another selection in the parent menu.
<Esc>	Exit - 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 submenu, 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.
<F9>	Setup Defaults - Pressing F9 causes the following to appear: Load Setup Defaults? [Yes] [No] If "Yes" is selected and the Enter key is pressed, all Setup fields are set to their default values. If "No" is selected and the Enter key is pressed, or if the ESC key is pressed, the user is returned to where they were before F9 was pressed without affecting any existing field values.
<F10>	Save and Exit - Pressing F10 causes the following message to appear: Save Configuration changes and exit now? [Yes] [No] If "Yes" is selected and the Enter key is pressed, all changes are saved and Setup is exited. If "No" is selected and the Enter key is pressed, or the ESC key is pressed, the user is returned to where they were before F10 was pressed without affecting any existing values.

Table 19.   On-Screen Options

When you see this:	What it means:
On screen, an option is shown but you cannot select it or move to that field.	You cannot change or configure the option in that menu screen. Either the option is auto-configured or auto-detected, or you must use a different BIOS Setup screen.
On screen, the phrase "Press Enter" appears next to the option.	Press <Enter> to display a sub-menu that is either a separate full screen menu or a popup menu with one or more choices.

Upgrading the BIOS

Preparing for the BIOS Upgrade

Before you upgrade the BIOS, prepare for the upgrade by recording the current BIOS settings and obtaining the upgrade utility.

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:

    ```
    Press <F2> to enter 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 Upgrade Utility

You can upgrade to a new version of the BIOS using the new BIOS files and the BIOS upgrade utility, iFLASH.EXE. You can obtain the BIOS upgrade file and the iFLASH.EXE utility through your computer supplier or from IBM Customer Support.

⟹ **NOTE**

> Review the instructions distributed with the upgrade utility before attempting a BIOS upgrade.

This upgrade utility allows you to upgrade the BIOS in flash memory. The following steps explain how to upgrade the BIOS.

Creating a Bootable Diskette

1. Use a DOS system to create the diskette.
2. Insert a diskette in diskette drive A.
3. At the C:\ prompt, for an unformatted diskette, type:

    ```
    format a: /s
    ```

    or, for a formatted diskette, type:

    ```
    sys a:
    ```

4. Press <Enter>.

Creating the BIOS Upgrade Diskette/CD

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS. If your IBM® @server xSeries 343 server does not have a diskette drive, then extract the BIOS files on a system with a diskette drive and transfer the extracted files to a bootable CD-ROM.

On a system with a diskette drive:
1. Insert the bootable diskette into the diskette drive.
2. Extract the contents of the BIOS.EXE file onto the bootable diskette. To do this, type
    `BIOS.EXE A:`
3. The BIOS upgrade image files are extracted directly onto the floppy disk.

If your IBM® @server xSeries 343 server has a CD drive and no diskette drive (standard or USB), then perform the following steps to create a bootable BIOS update CD:
1. Insert the bootable diskette into a system with a CD-R (CD writer) drive and "Easy CD Creator" or "Nero" CD writing software.
2. Start the CD writer application and choose "Bootable CD" or "CD-ROM (Boot)".
3. Set the source of the bootable image to the floppy drive (A:\) and choose "Floppy Emulation 1.44MB".
4. Set the "Load Segment" to 0x7C0 or 07C0.
5. Set the "Sector Count" or "Number of loaded sectors" to 1.
6. Start the CD burn.

Performing the BIOS Upgrade

1. Place the bootable diskette (or CD) containing the BIOS update files into the diskette (or CD) drive of your system. Boot the system with the diskette in the drive (or the BIOS update CD in the CD drive).
2. At this point you have a choice of two options. Press 1 and <Enter> to automatically update the system BIOS. This will update the system BIOS and reset the system. Press 2 and <Enter> to update the User Binary and reset the system.
3. Wait while the BIOS files are updated. Do **not** power down the system during the BIOS update process! The system will reset automatically when the BIOS update process is completed. Remove the diskette from the diskette drive (or the BIOS upgrade CD from the CD drive).
4. Verify that the BIOS version displayed during POST is the new version as the system reboots.
5. Enter BIOS Setup by pressing the <F2> key during boot. Once in BIOS Setup, press <F9> and <Enter> to set the parameters back to default values.
6. Re-enter the values you wrote down at the beginning of this process. Press <F10> and <Enter> to exit BIOS Setup and Save Changes.
7. If you do not set the CMOS values back to defaults using the <F9> key, the system may function erratically.

⇒ **NOTE**

> You may encounter a CMOS Checksum error or other problem after reboot.
> Try shutting down the system and booting up again. CMOS checksum errors
> require that you enter BIOS Setup, check your settings, save your settings, and
> exit Setup.

It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, the
BIOS could be damaged.

Changing the BIOS Language

You can use the BIOS upgrade utility to change the language that the BIOS uses for messages and
for the Setup program. Use a bootable diskette (or bootable CD) containing the Intel® Flash Utility
and language files. Please refer to the "Creating the BIOS Upgrade Diskette/CD" section on Page
40 for instructions on creating a bootable BIOS upgrade diskette or CD.

To change the BIOS language, do the following:
1. Boot the computer with the bootable diskette in drive A. The BIOS upgrade utility screen
   appears.
2. Select "Update Flash Memory From a File".
3. Select "Update Language Set". Press <Enter>.
4. Select drive A and use the arrow keys to select the correct `.lng` file. Press `<Enter>`.
5. When the utility asks for confirmation that you want to flash the new language into memory,
   select "Continue with Programming". Press <Enter>.
6. When the utility displays the message `upgrade is complete`, remove the diskette. Press
   <Enter>.
7. The computer will reboot and the changes will take effect.

5 Configuration Software and Utilities

System Software Update Sequence

When updating the system software, you should do it in the following order:
1. Update firmware (BMC and Hot Swap Controller)
2. Update FRU/SDR
3. Unplug system for 30 seconds
4. Update BIOS
5. Clear CMOS

Note: The IBM System Update Package (SUP) CD-ROM must be used to update the system software. The system should be booted to the SUP CD and the user can choose which components to upgrade. The System Resource CD does not include the FRU/SDR, BIOS, or BMC software.

Server Configuration Wizard

The Server Configuration Wizard is a utility that is provided to help you configure your server. The Server Configuration Wizard is located on the System Resource CD-ROM shipped with the server and runs automatically when you boot your server to this CD-ROM. The Server Configuration Wizard includes a help system that can be accessed by clicking the Help button. Run the Server Configuration Wizard to:

- Create or update a Service Partition and install service partition files, including files that are necessary to run the System Setup Utility
- Set Server Management settings, including an IP address, emergency management port (EMP) settings, platform event paging (PEP) settings, and LAN/Alert settings
- Execute utility applications that can be used to manually configure the server

When first executed, the Server Configuration Wizard probes the server for installed devices, firmware, chassis information, hard disks, and other relevant data. This information is used to determine what questions the application needs to ask you to complete the configuration.
When you select the option Server Configuration Wizard > Run Wizard, you will be shown a selection window allowing you to choose the items you want to configure. You can select one or more options to configure at the same time. Some options have dependencies that make you select multiple options. These are:

- If you select "Configure this server for LAN Alerting", the option for "Configure this server for remote Server Management over a LAN connection" will automatically be selected.
- If you select"Configure this server for Serial/Modem alerting", the option for "Configure this server for remote Server Management over a Serial/Modem connection" will automatically be selected.

If you select multiple options, the Server Configuration Wizard will run each option to completion.

To use the Server Configuration utility to	Description of procedure	Page
Configure the server for remote LAN	Enable a connection to the server from a workstation on the LAN to allow remote management functions, such as powering the server on or	49

management	off, or running diagnostic utilities.	
Configure for Remote Serial/Modem management	Enable a connection to the server from a serial or Modem connection to allow remote management functions, such as powering the server on or off, or running diagnostic utilities.	51
Configure for Serial/Modem alerting	Configure the server to send a telephone page in the event that a hardware or firmware error occurs at the server.	52
Configure for LAN alerting	Configure the server to send a notification message to a workstation segment of the network in the event that a hardware or firmware error occurs at the server.	54
Create/modify the service partition	If a service partition does not already exist, create one. If a service partition has been created earlier, update it.	56
Save/load configuration data	Save the configuration data to a file. Use this saved file to configure other servers identically.	58

Using the System Setup Utility

The System Setup Utility is located on the System Resource CD-ROM that is shipped with the server.

Run the System Setup Utility to:

- Set boot device priority
- Set passwords and security options
- View the System Event Log
- View SDRs
- View FRU information
- Save and restore the system configuration (available from Expert mode only)
- Update system firmware and BIOS (available from Expert mode only)
- Access the Platform Event Manager to configure the PEP, LAN or EMP

Using either the System Setup Utility or BIOS Setup, you can specify the boot device sequence and set up system passwords and security options. Both utilities access the same stored configuration data for these items, and the result of making a change to these settings using either utility is identical.

The System Setup Utility consists of a collection of task-oriented modules plugged into a common framework called the Application Framework. The Application Framework provides a launching point for individual tasks and a location for setting customization information.

Running the System Setup Utility

You can run the System Setup Utility from the Server Configuration Utilities menu of the Server Configuration Wizard, or from the service partition of the hard disk.

When the System Setup Utility starts in the default local execution mode, it accepts input from the keyboard or mouse. The System Setup Utility presents a VGA-based GUI on the primary monitor. If you run the System Setup Utility from read-only media, you cannot save user preference settings (such as screen colors).

The System Setup Utility supports ROM-DOS version 6.22. The System Setup Utility will not operate from a "DOS box" running under an operating system such as Windows.

Start the System Setup Utility using one of the following methods:

- From the System Resource CD-ROM: Boot the server to the Server Configuration Wizard and start the System Setup Utility from the Server Configuration Utilities menu.
- From the Service Partition: Boot the server to the Service Partition and execute the following DOS commands:

```
C:\>  cd SSU
C:\SSU>  SSU.bat
```

  The mouse driver loads if it is available; press <Enter> to continue.

When the System Setup Utility title appears on the screen, press any key to continue.

Working with the System Setup Utility Interface

You can access features of the System Setup Utility interface using the mouse or keyboard:

- **Mouse:** Click once to choose menu items and buttons or to select items in a list, such as the Available Tasks list. To run a list item, such as one from the Available Tasks list, select the item and click OK or double-click the item.
- **Keyboard:** Use the tab and arrow keys to highlight buttons and press the spacebar or <Enter> to execute. You can also execute a menu or button by using the <Alt> key in combination with the underlined letter in the name of the menu or button.

You can have more than one task open at the same time, although some tasks might require complete control to avoid possible conflicts. The tasks achieve complete control by keeping the task as the center of operation until you close the task window.

The System Setup Utility has a built-in help system, which you access by clicking a Help button or choosing the Help menu.

Customizing the System Setup Utility Interface

The System Setup Utility lets you customize your interface using the Preferences section of the main window. The Application Framework sets these preferences and saves them in the AF.INI file so that they take effect the next time you start the System Setup Utility. There are four user-customizable settings:

- **Color:** Lets you change the default colors associated with different items on the screen using predefined color combinations. The color changes take effect immediately.
- **Mode:** Lets you set the desired expertise level: novice, intermediate, or expert. The expertise level determines which tasks are visible in the Available Tasks section and which actions each task performs. For a new mode setting to take effect, you must exit the System Setup Utility and restart it.
- **Language:** Lets you change the text in the System Setup Utility to the appropriate language. For a new language setting to take effect, you must exit the System Setup Utility and restart it.
- **Other:** Lets you show or hide the status bar at the bottom of the System Setup Utility main window. The change takes effect immediately.

⇒ **NOTE**

> If you run the System Setup Utility from read-only media (CD-ROM, for example), these preferences are lost when you exit the System Setup Utility.

Exiting the System Setup Utility

Exiting the System Setup Utility closes all System Setup Utility windows.

Setting Boot Device Priority

To change the boot priority of a device:
1. From the System Setup Utility "Available Tasks" window, choose Boot Devices.
2. In the "Boot Device Priority" window, select a device.
3. Click the "Move Up" button to move up the list. Click the "Move Down" button to move down the list.

Setting Passwords and Security Options

You can set a user password and an administrator password for the server. You must set an administrator password before you can set a user password. (You can set the same passwords and security options by using BIOS Setup.)

Setting the Administrator Password

The "Admin Password" button lets you set or change the administrator password used by both the System Setup Utility and the system BIOS. This option is not available if both an administrator and a user password are set and you entered only the user password when you started the System Setup Utility. All changes to the administrator password take effect immediately.

To change or clear the administrator password:
1. From the System Setup Utility "Available Tasks" window, choose Security.
2. Click the "Admin Password" button.
3. If you are changing passwords, enter the old password.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click OK to save the password and return to the Security window.

Setting the User Password

The "User Password" button lets you set or change the user password used by both the System Setup Utility and the system BIOS. You must set an administrator password before you can set a user password. All changes to the user password take effect immediately.

To change or clear the user password:
1. From the System Setup Utility "Available Tasks" window, choose Security.
2. Click the "User Password" button.
3. If you are changing passwords, enter the old password in the first box.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click OK to save the password and return to the Security window.

Setting Security Options

To set the security options:
1. From the System Setup Utility "Available Tasks" window, choose Security.
2. Click the Options button.
3. For each option, select the desired setting from the list. The options are:
   - **Security Hot Key:** The key combination that can be used to put the server into secure mode.
   - **Secure Mode Timer:** If no keyboard or mouse activity occurs during the chosen time interval, the server enters secure mode.
   - **Secure Mode Boot:** Enable forces the server to boot directly into secure mode.
   - **Video Blanking:** Enable turns off the video when the server is in secure mode.
   - **Power Switch Inhibit:** Enable prevents the power and reset buttons from functioning when the server is in secure mode. Disable allows the power and reset buttons to function normally when the server is in secure mode.
4. Click "Save" to save the settings and return to the Security window.

Viewing the System Event Log (SEL)

To view the SEL:
1. From the System Setup Utility "Available Tasks" window, choose SEL Manager.

When you start the SEL Manager, it automatically loads the current list of events from non-volatile memory.

2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the <tab> key to move from field to field.
4. Use the File and SEL menu items to work with the SEL information:

- **Open:** Views data from a previously saved SEL file.
- **Save As:** Saves the currently loaded SEL data to a file.
- **Properties:** Displays information about the SEL.
- **Clear SEL:** Clears the SEL data from the non-volatile storage area.
- **Reload:** Refreshes the display by reading the current SEL entries from the server.
- **Sort By:** Sorts the displayed events by event number, time stamp, sensor type and number, event description, or event generator ID.

Viewing Sensor Data Records (SDRs)

To view the SDRs:

1. From the System Setup Utility "Available Tasks" window, choose SDR Manager.

    When you start the SDR Manager, it automatically loads the SDR entries from non-volatile memory.

    The SDR Manager window has a navigation pane on the left that displays, in a tree format, the SDRs. The tree has categories for each type of record. Clicking on a category expands or collapses a list of SDRs for that category. Clicking on an individual SDR displays the information for that SDR in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected SDR type.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the <tab> key to move from field to field.
4. Use the File and SDR menu items to work with the SDR information:

- **Open:** Views data from a previously saved SDR file.
- **Save As:** Saves the currently loaded SDR data to a file.
- **Properties:** Displays information about the SDR, including IPMI version, number of SDR entries, time stamps for changes to the SDR information, and free space remaining.
- **Reload:** Refreshes the display by reading the SDR data from the server.

Viewing Field Replacement Unit (FRU) Information

To view FRU information:

1. From the System Setup Utility "Available Tasks" window, choose FRU Manager.

   When you start the FRU Manager, it automatically loads the current list of FRU devices from non-volatile memory.

   The FRU Manager window has a navigation pane on the left that displays, in a tree format, the inventory of components in the server. The tree has three categories: Product, Chassis, and Board. Clicking on a category expands or collapses a list of components for that category. Clicking on an individual component displays the FRU information for that component in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected FRU area.

2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.

3. Use the <tab> key to move from field to field.

4. Use the File and FRU menu items to work with the FRU information:

   - **Open:** Views data from a previously saved FRU file.

   - **Save As:** Saves the currently loaded FRU data to a file.

   - **Properties:** Displays the number of FRU devices in the system and the number being displayed. Only FRU devices with valid FRU areas are displayed.

   - **Reload:** Refreshes the display by reading the current FRU entries from the server.

Updating System BIOS and Firmware

Using the System Setup Utility, you can update the BIOS, update the firmware, and verify the firmware. Procedures for each are given below. (You can also update the BIOS and firmware using the BIOS System program.)

Updating the BIOS

To update the BIOS:

1. Download the update from the IBM support website. Please refer to the "Creating the BIOS Upgrade Diskette/CD" section on Page 40 for instructions on creating a bootable BIOS upgrade diskette or CD.

2. From the System Setup Utility "Available Tasks" window, choose System Update. (System Update is available only in Expert mode.)

   When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.

3. From the File menu, choose Load and choose a .uif or .bio file to use for the update.

4. Click the "Update" button to update the BIOS.

Updating the Firmware

To update the system firmware:

1. Download the update from the IBM support website. Please refer to the "How to Run the Firmware Update Utility" section on Page 56 for instructions on creating a firmware upgrade diskette or CD.

2. From the System Setup Utility "Available Tasks" window, choose System Update. (System Update is available only in Expert mode.)

When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.

3. From the Firmware menu, choose Update and choose a .uif or .hex file to use for the update.
4. Click the "Update" button to perform the update.

Verifying the Firmware

To compare the system firmware in non-volatile memory with a firmware file:
1. Download the update from the IBM support website. Please refer to the "How to Run the Firmware Update Utility" section on Page 56 for instructions on creating a firmware upgrade diskette or CD.
2. From the System Setup Utility "Available Tasks" window, choose System Update. (System Update is available only in Expert mode.)

    When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the Firmware menu, choose Verify and choose a .hex file to use for the update.
4. Click the Verify button to compare the firmware code in non-volatile storage with the selected file.

Managing the Server Remotely

You can set up the server so that you can connect to it from a remote client system to perform management tasks and so that the server can contact you if a system error occurs. You can make the connection over a LAN or by using a modem or direct serial cable to the EMP. You can set up the server to notify you when various events occur. Alerts can be delivered either as telephone pages or over the LAN.

Instructions for setting up the server for remote LAN and serial/modem access and for setting up the server to proactively alert or page you are given in the following sections.

How to Set Up Remote LAN Access

To set up the server so you can access it from a remote workstation, you can use either the Server Configuration Wizard or the System Setup Utility.

To use the Server Configuration Wizard to configure remote LAN access:
1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on the "Continue" button.
4. Select the "Run Wizard" option and click on the "Continue" button.
5. Select the "Configure this server for remote Server Management over a LAN connection" option and click on the "Continue" button.
6. Review the system date and time for accuracy and click on the "Continue" button.
7. In the IP Setup screen, choose either:
    - **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
    - **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
8. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
    - **Host IP Address:** The IP address of this server.

- **Subnet Mask:** The IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
- **Gateway IP Address:** The IP address of the router for this server.
- **Backup Gateway IP Address:** (optional) The IP address of the alternate router for this server.

9. Click on "Continue". Click the LAN Password button (optional) to require that a password be entered before a user can perform server management functions on this server from a workstation on the LAN.
10. Select the LAN Access Mode to set the points at which LAN connectivity can be activated:
- **Always Available:** A remote system can initiate a LAN connection, regardless of the server's state or health.
- **Restricted:** Power control functions, such as power down, front panel NMI, and system reset cannot be performed remotely.
- **Disabled:** Remote LAN connections cannot be initiated.
11. Select the "Serial Over LAN Access Mode" to set the user access level that is required for connecting to the server using Serial over LAN.
- **Always Available:** An individual can access the server through Serial over LAN if that user knows the server's User password.
- **Restricted:** An individual can access the server through Serial over LAN if that user knows the server's Administrator password.
- **Disabled:** Serial over LAN cannot be used.
12. Select the appropriate Server Over LAN Baud Rate and click on "Continue".

To use the System Setup Utility to configure remote LAN access:
1. From the System Setup Utility "Available Tasks" window, choose Platform Event Manager (PEM).
2. In the PEM window, click "Configure LAN" and fill in the boxes described in the following steps (boxes that are not listed here are not required for remote access).
3. To require a password for remote access, enter the password in the Enter New Password box and in the Verify New Password box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by selecting the menu Options > Clear LAN Password.)
4. From the "LAN Access Mode" list, select the remote access mode:
- **Restricted:** A remote system can initiate a LAN connection, but cannot perform control operations such as power down, reset, or front panel NMI.
- **Always Available:** A remote system can initiate a LAN connection regardless of the state or health of the server.
- **Disabled:** Remote systems are not allowed to initiate LAN connections.
5. In the IP Setup box, choose either:
- **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
- **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
6. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
- **Host IP Address:** The IP address of this server.

- **Gateway IP Address:** The IP address of the router for this server.
- **Subnet Mask:** The IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.

7. Click Save to save the changes.
8. Click Close to return to the PEM window.

How to Set Up Remote Modem or Serial Access

To set up the server so you can access it through a modem or a serial connection, you can use either the Server Configuration Wizard or the System Setup Utility.

To use the Server Configuration Wizard to configure remote modem or serial access:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on the "Continue" button.
4. Select the "Run Wizard" option and click on the "Continue" button.
5. Select the "Configure this server for remote Server Management over a Serial/Modem connection" option and click on the "Continue" button.
6. Review the system date and time for accuracy and click on the "Continue" button.
7. Enter the appropriate Serial/Modem parameters and click on the "Continue" button.
8. Click the "Serial/Modem Password" button (optional) to require that a password be entered before a user can perform server management functions on this server from a serial or modem connection.
9. Select the "Access Mode" to set the points at which serial/modem connectivity can be activated:
    - **Preboot Only:** The EMP is available only when the server is powered down or is running POST during startup. Once the operating system is loaded, a connection cannot be made.
    - **Always Active:** The EMP is available at any time.
    - **Disabled:** A connection cannot be made to the server using serial/modem access.
10. Select the "Restricted Mode" to set the restrict power control operations:
    - **Enable:** Enable restrictions. A user cannot use Serial/Modem access to affect the power state of the system, such as powering the server on or off.
    - **Disable:** Disables restrictions. A user can choose to power the server on or off through a Serial/Modem connection.
11. Select the "Connection Mode":
    - **Direct Connect:** Use direct connect when a system is connected directly to the server through the serial port, without using an external modem.
    - **Modem Connect:** Use Modem Mode when the serial port is connected to an external modem.
12. Enter a "System Phone Number" (the telephone number that is being used to connect to this server).
13. Click on the "Continue" button.

To use the System Setup Utility to configure remote modem or serial access:

1. From the System Setup Utility "Available Tasks" window, choose Platform Event Manager (PEM).
2. In the PEM window, click "Configure EMP" and fill in the boxes described in the following steps (boxes that are not listed here are not required for remote access).

3. To require a password for remote access, enter the password in the "Enter New Password" box and in the "Verify New Password" box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by selecting the menu Options > Clear EMP Password.)

4. In the "Modem Ring Time" box, enter the number of 500ms intervals that the BMC should wait before taking control of the Serial 2 port and answering an incoming call. A value greater than zero gives the BIOS time to answer before the BMC takes control. A value of zero causes the BMC to answer immediately. The maximum value, 63, tells the BMC to ignore the call. Modem Ring Time applies only to Preboot access mode and is ignored for other access modes.

5. In the "System Phone Number" box, enter the number of the phone line connected to the modem on the EMP.

6. From the "Access Mode" list, choose the remote access mode:
   - **Preboot:** The EMP is available only when the server is powered down or is running POST during startup. Once the operating system is loaded, a connection cannot be made.
   - **Always Active:** The EMP is available at any time.
   - **Disabled:** Remote systems are not allowed to initiate connections.

7. From the "Restricted Mode" list, choose either:
   - **Enable:** A remote system can initiate a connection, but cannot perform control operations such as power down, reset, or front panel NMI.
   - **Disable:** The remote system has full control of the server.

8. From the "Connection Mode" list, choose either:
   - **Direct Connect:** The Serial B port on the server is connected by a serial cable to the remote system.
   - **Modem Connect:** The Serial B port on the server is connected to a modem.

9. Click "Save" to save the changes.

10. Click "Close" to return to the PEM window.

How to Set Up Paging Alerts

To set up the server so it pages you in the event of an alert, you can use either the Server Configuration Wizard or the System Setup Utility.

To use the Server Configuration Wizard to configure the server to send alerts as telephone pages:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on the "Continue" button.
4. Select the "Run Wizard" option and click on the "Continue" button.
5. Select the "Configure this server for Serial/Modem Alerting" option. The box that says "Configure this server for remote Server Management over a Serial/Modem connection" will be automatically selected as a dependency. Click on the "Continue" button.
6. Review the system date and time for accuracy and click on the "Continue" button.
7. Enter the appropriate Serial/Modem parameters and click on the "Continue" button.
8. Click the "Serial/Modem Password" button (optional) to require that a password be entered before a user can perform server management functions on this server from a serial or modem connection.
9. Select the "Access Mode" to set the points at which Serial/Modem connectivity can be activated:
   - **Preboot:** A serial or Modem connection can be made when the server is powered down or hard reset. Once the operating system is loaded, a connection cannot be made.

- **Always Active:** A connection to the server can be established at any time.
- **Disabled:** A connection cannot be made to the server using Serial/Modem access.
10. Select the "Restricted Mode" to set the restrict power control operations:
    - **Enabled:** Enable restrictions. A user cannot use Serial/Modem access to affect the power state of the system, such as powering the server on or off.
    - **Disabled:** Disables restrictions. A user can choose to power the server on or off through a Serial/Modem connection.
11. Select the "Connection Mode":
    - **Direct Connect:** Use direct connect when a system is connected directly to the server through the serial port, without using an external modem.
    - **Modem Connect:** Use modem mode when the serial port is connected to an external modem.
12. System Phone Number: Enter the telephone number that is being used to connect to this server.
13. Click Continue.
14. Select the Enable Serial/Modem Paging option.
15. In the "Alert Destination Phone Number" box, enter the telephone number that the system should send the page to if an event happens.
16. In the "Paging String" box, enter the paging string that the server should send after a phone connection is made.
17. Enter the "Blackout Period" in minutes. This is the time (in minutes) that should be allowed between pages. The valid range is [0 - 255] where 0 disables the blackout period. Setting a blackout period can save you from being flooded with repeat pages. After you receive a PEP page, no additional pages are sent by PEP for the duration of the blackout period.
18. Click the "Alert Paging Filters" button. Click the appropriate boxes to enable/disable filters. Click "OK" when you are done, and then click on "Continue".

To use the System Setup Utility to set up the server to send alerts as telephone pages:
1. Install an external modem on the EMP (Serial B port).
2. From the System Setup Utility "Available Tasks" window, choose Platform Event Manager (PEM).
3. In the PEM window, click Configure EMP.
4. In the corresponding boxes, enter the following command strings for the modem attached to the EMP port (boxes that are not listed here are not required for paging alerts):
    - **ESC Sequence:** The escape sequence. This string is sent to the modem before sending command strings. The maximum length for the string is five characters; longer strings are truncated.
    - **Hangup String:** Hang up or drop the connection. The EMP automatically sends an <ENTER> character following this string. The maximum length for the string is eight characters; longer strings are truncated.
    - **Modem Dial Command:** The command to dial a phone number. This string is sent to the modem before sending the paging string.
    - **Modem Init String:** Initialization string for the modem. This string is sent every time the EMP initializes. The maximum length for the string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.
5. Click Save to save the changes.
6. Click Close to return to the PEM window.
7. In the PEM window, click "Configure PEP".

8. Select the "Enable PEP" check box.
9. In the "Blackout Period in Minutes" box, enter the minimum time, in minutes, between successive pages. The valid range is [0 - 255] where 0 disables the blackout period. Setting a blackout period can save you from being flooded with repeat pages. After you receive a PEP page, no additional pages are sent by PEP for the duration of the blackout period.
10. In the "Paging String" box, enter the phone number to dial for the page and the message you want sent with the page. The maximum length for the paging string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.
11. From the Options menu, choose Configure Event Actions.
12. In the "Platform Event Paging Actions" window, move the events that you want to generate an alert for to the Enabled column and move all other events to the Disabled column using the following buttons:
    - \>\>: Moves all events from the enabled list to the disabled list.
    - \>: Moves the selected event from the enabled list to the disabled list.
    - <: Moves the selected event from the disabled list to the enabled list.
    - <<: Moves all events from the disabled list to the enabled list.
13. Click "Save" to save the changes.
14. Click "Close" to return to the PEP Configuration window.
15. To send a test page to verify that you have correctly configured PEP, from the Options menu, choose Send Alert.
16. Click "Save" to save the configuration.
17. Click "Close" to return to the PEM window.

How to Set Up LAN Alerts

To set up the server to send alerts over the LAN, you can use either the Server Configuration Wizard or the System Setup Utility.
To use the Server Configuration Wizard to configure the server to send alerts over the LAN:
1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on "Continue".
4. Select the "Run Wizard" option and click on the "Continue" button.
5. Select the "Configure this server for LAN Alerting" option. The box that says "Configure this server for remote Server Management over a LAN connection" will be automatically selected as a dependency. Click on the "Continue" button.
6. Review the system date and time for accuracy and click on the "Continue" button.
7. In the IP Setup screen, choose either:
    - **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
    - **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
8. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
    - **Host IP Address:** The IP address of this server.
    - **Gateway IP Address:** The IP address of the router for this server.

- **Subnet Mask:** The IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
- **Backup Gateway IP Address:** (optional). The IP address of the alternate router for this server.

9. Click "Continue". Click the LAN Password button (optional) to require that a password be entered before a user can perform server management functions on this server from a workstation on the LAN.

10. Select the LAN Access Mode to set the points at which LAN connectivity can be activated:
- **Always Available:** A remote system can initiate a LAN connection, regardless of the server's state or health.
- **Restricted:** Power control functions, such as power down, front panel NMI, and system reset cannot be performed remotely.
- **Disabled:** Remote LAN connections cannot be initiated.

11. Select the SOL Access Mode to set the user access level that is required for connecting to the server using Serial over LAN.
- **Always Available:** An individual can access the server through Serial over LAN if that user knows the server's User password.
- **Restricted:** An individual can access the server through Serial over LAN if that user knows the server's Administrator password.
- **Disabled:** Serial over LAN cannot be used.

12. Select the baud rate and then click on "Continue".

13. Select the "Enable LAN Alerting" option.

14. Enter the IP address for the system that should receive notifications if an event happens.

15. Enter the SNMP Community String. The default is public.

16. Check the box to resolve the Gateway MAC address (optional).

17. Click on the "LAN Alert Filters" button. Click the boxes to enable/disable filters. Click "OK" when you are done, and then click on "Continue".

To use the System Setup Utility to configure the server to send alerts over the LAN:
1. From the System Setup Utility "Available Tasks" window, choose Platform Event Manager (PEM).
2. In the PEM window, click Configure LAN and fill in the boxes described in the following steps (boxes that are not listed here are not required for LAN alerts).
3. Select the Enable LAN Alerts check box.
4. (Optional) In the SNMP Community String box, enter a string for the community field in the Header section of the SNMP trap sent for an alert. The string must be from 5 to 16 characters. The default string is public.
5. In the IP Setup box, choose either:
- **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
- **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
6. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
- **Host IP Address:** The IP address of this server.
- **Gateway IP Address:** The IP address of the router for this server.

- **Subnet Mask:** The IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
7. Fill in the Alert IP Address1 and Alert IP Address2 boxes. Enter the IP address of the system you want the server to send alerts to. If you want the alert to be broadcast to an entire subnet, enter the IP address for the subnet.
8. From the Options menu, choose Configure Event Actions.
9. In the BMC-LAN Alerting Actions window, move the events that you want to generate an alert for to the Enabled column and move all other events to the Disabled column using the following buttons:
   - >>: Moves all events from the enabled list to the disabled list.
   - >: Moves the selected event from the enabled list to the disabled list.
   - <: Moves the selected event from the disabled list to the enabled list.
   - <<: Moves all events from the disabled list to the enabled list.
10. Click "Save" to save the changes.
11. Click "Close" to return to the BMC LAN Configuration window.
12. Click "Save" to save the changes.
13. Click "Close" to return to the PEM window.

System Software Update (BIOS, BMC, and FRU/SDR)

The IBM System Update Package (SUP) CD-ROM should be used to update the system software. The SUP contains the BIOS, BMC, and FRU/SDR software and load utilities. The SUP can install all of these components with just a single reboot. The system should be booted to the SUP CD and the user can choose which components to upgrade. The System Resource CD does not include the FRU/SDR, BIOS, or BMC software.

Installing a Service Partition

When you are setting up your server system, you can optionally install a service partition onto your hard drive. The service partition includes utilities and other software that can be run locally or remotely to assist in server management. The service partition uses approximately 40 MB of hard disk space.
The service partition can be installed with the Server Configuration Wizard on the System Resource CD.

⟹ **NOTE**

It is highly recommended that you install the service partition **before** installing an operating system.

To install the service partition using the Server Configuration Wizard:
1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on the "Continue" button.
4. Select the "Run Wizard" option and click on the "Continue" button.
5. Select the "Install/Update a Service Partition" option and click on the "Continue" button.

6. Review the system date and time for accuracy and click on the "Continue" button.
7. If a service partition does not exist, you will see a screen listing the drives that the Server Configuration Wizard has identified. The fields are as follows:

- Drive#: The order in which the drives were reported by the BIOS. Drive 1 is always the CD-ROM Drive and cannot have a service partition installed on it.

- Size: The size of the drive in megabytes.

- Formatted?: Whether or not the drive has already been formatted for data storage.

- Unused Space: The amount of space on the drive that has not been used.

- SP Capable: Whether or not a service partition can be created on the drive. The drive must be a minimum of 32 MB. Drives over 8 gigabytes must be empty, and the service partition can only be created on one of the first 8 drives reported. If you do not see a screen listing the available drives, it means a service partition has already been created. When you click "Continue", the existing service partition will be updated.

8. Click "Continue". The service partition will be created or updated.

⟹ **NOTE**

> After the service partition is installed, you can boot to it by pressing <F4> during POST. The service partition operating system is ROM-DOS. Once you have booted to the service partition, you will be at a DOS prompt. From the prompt, you can access the System Setup Utility and perform server management functions by running batch files and executables.

Saving and Restoring the System Configuration

Using the System Setup Utility, you can save the following configuration information to a file:
- Platform type, BIOS revision, and firmware revision
- CMOS settings
- Extended system configuration data (ESCD)
- Settings for the EMP, PEP, and BMC LAN alerts

Data is saved from all sources. You cannot choose only certain pieces of configuration data to save. You can also restore the information from a saved configuration file.

➡ **NOTE**

> BIOS passwords are stored in the file. Restoring a configuration can change passwords on a server. EMP and LAN passwords are not stored in the file.

Using the Server Configuration Wizard, you can save the following configuration information to a file:
- Serial/Modem data
- Paging data
- LAN configuration data
- LAN alert data
- Service partition configuration
- System asset tag

➡ **NOTE**

> LAN passwords are not stored in the file. Passwords cannot be saved or restored.

Saving a Configuration

To save the system configuration from the System Setup Utility:
1. From the System Setup Utility "Available Tasks" window, choose Config Save/Restore. (Config Save/Restore is available only in Expert mode.)
2. Click "Save To File" and specify a filename and location.

To save the system configuration from the Server Configuration Wizard:
1. Follow the configuration prompts until you see "Save Server Configuration to Disk."
2. Select the "Save Server Configuration to Disk" checkbox and click on the "Continue" button.
3. Specify a filename and location as prompted.
4. You will receive the following warning message: "If passwords are set for Serial Mode or LAN access, they will be viewable in the saved configuration file should someone view it with a text editor." Click on "OK" to continue.

Loading a Saved Configuration

To load a previously saved system configuration from a file using the System Setup Utility:

1. From the System Setup Utility "Available Tasks" window, choose Config Save/Restore. (Config Save/Restore is available only in Expert mode.)
2. Click "Restore from File" and specify a filename and location.

⟹ **NOTE**

> You can only load a configuration that has been previously saved with the System Setup Utility.

To restore the system configuration from a file using the Server Configuration Utility:
1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on the "Continue" button.
4. Select the "Load from Diskette" option and click on the "Continue" button.

⟹ **NOTE**

> You can only load a configuration that has been previously saved with the Server Configuration Wizard.

The utility reads the platform type, BIOS revision, and firmware revision from the file and compares that information with the same information retrieved from the server. If the two do not match, an error message is displayed and the load operation aborts. If they do match, the utility saves the configuration data to the server. You will need to reboot your server for the changes to take effect.

6 Solving Problems

This chapter helps you identify and solve problems that might occur while you are using the system.

Resetting the System

To do this:	Press:
Soft boot reset, which clears system memory and reloads the operating system.	<Ctrl+Alt+Del>
Clear system memory, restart POST, and reload the operating system.	Reset button
Cold boot reset. Turn the system power off and then on. This clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals.	Power off/on

Initial System Startup

Problems that occur at initial system startup are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause. Check the following:
- Are all cables correctly connected and secured?
- Are the processors fully seated in their sockets on the server board?
- Are all add-in PCI boards fully seated in their slots on the server board?
- Are all jumper settings on the server board correct?
- Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. If applicable, ensure that there are no conflicts—for example, two add-in boards sharing the same interrupt.
- Are all DIMMs installed correctly?
- Are all peripheral devices installed correctly?
- If the system has a hard disk drive, is it properly formatted or configured?
- Are all device drivers properly installed?
- Are the configuration settings made in BIOS Setup correct?
- Is the operating system properly loaded? Refer to the operating system documentation.
- Did you press the system power on/off switch on the front panel to turn the server on (power on light should be lit)?
- Is the system power cord properly connected to the system and plugged into a NEMA 5-15R outlet for 100-120 Volt (or a NEMA 6-15R outlet for 200-240 Volt)?
- Is AC power available at the wall outlet?
- Are all integrated components from the tested components lists? Check the tested memory and chassis lists, as well as the supported hardware and operating system list on the IBM Customer Support website.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. Check the following:

- Does the system meet the minimum hardware requirements for the software? See the software documentation.
- Is the software an authorized copy? If not, get one; unauthorized copies often do not work.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a CD-ROM disk, is the disk scratched or dirty?
- If you are running the software from a hard disk drive, 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?

If the problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. Many situations that are easy to correct, however, can also cause such problems. Check the following:

- If you are running the software from a diskette, try a new copy of the software.
- If you are running the software from a CD-ROM disk, try a different CD-ROM disk to see if the problem occurs on all disks.
- If you are running the software from a hard disk drive, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk drive. Reinstall the software on the hard disk, and try running it again. Make sure all necessary files are installed.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. (Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.)

⟹ **NOTE**

>   Random errors in data files: If you are getting random errors in your data files, voltage spikes on your power line may be corrupting them. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the system power cord.

More Problem Solving Procedures

This section provides a more detailed approach to identifying a problem and locating its source.

Preparing the System for Diagnostic Testing

⚠ **CAUTION**

Turn off devices before disconnecting cables: Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

Check the following:

- Turn off the system and all external peripheral devices. Disconnect all of them from the system, except the keyboard and video monitor.
- Make sure the system power cord is plugged into a properly grounded AC outlet.
- Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two thirds of their maximum ranges (see the documentation supplied with your video display monitor).
- If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
- Turn on the system. If the power LED does not light, see "Power Light Does Not Light" on page 63.
- If errors are encountered, power off the system and remove all add-in cards.

Monitoring POST

See "Power-On Self-Test (POST)," on page 34.

Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity light should turn on briefly. Check the following:

- Does the diskette drive activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 64.
- If a second diskette drive is installed, does its activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 64.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, see "Initial System Setup" on page 60.

Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not light.
- There is no beep or an incorrect beep pattern.
- No characters appear on screen.
- Characters on the screen appear distorted or incorrect.
- System cooling fans do not rotate.
- Diskette drive activity light does not light.
- CD-ROM drive activity light does not light.
- There are problems with the application software.
- The bootable CD-ROM is not detected.

Try the solutions in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for help.

Power Light Does Not Light

Check the following:

- Is the system operating normally? If so, the power LED is probably defective or the cable from the front panel to the server board is loose.
- Are there other problems with the system? If so, check the items listed under "System Cooling Fans Do Not Rotate Properly."

If all items are correct and problems persist, contact your service representative or authorized dealer for help.

No Characters Appear on Screen

Check the following:

- Is the keyboard functioning? Check to see that the "Num Lock" light is functioning.
- Is the video monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?
- Is the onboard video controller enabled?

If you are using an add-in video controller board, check the following:

- Verify that the video controller board is fully seated in the server board connector.
- Reboot the system for changes to take effect.
- If there are still no characters on the screen after you reboot the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative.
- If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your service representative or authorized dealer for help.

Characters Are Distorted Or Incorrect

Check the following:
- Are the brightness and contrast controls properly adjusted on the video monitor? See the manufacturer's documentation.
- Are the video monitor signal and power cables properly installed?

If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative or authorized dealer for help.

System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, system components could be damaged. Check the following:
- Is AC power available at the wall outlet?
- Is the system power cord properly connected to the system and the wall outlet?
- Did you press the power button?
- Is the power on light lit?
- Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- Are the fan power connectors properly connected to the server board?
- Is the cable from the front panel board connected to the server board?
- Are the power supply cables properly connected to the server board?
- Are there any shorted wires caused by pinched cables or power connector plugs forced into power connector sockets the wrong way?

If the switches and connections are correct and AC power is available at the wall outlet, contact your service representative or authorized dealer for help.

Diskette Drive Activity Light Does Not Light

Check the following:
- Are the diskette drive power and signal cables properly installed?
- Are all relevant switches and jumpers on the diskette drive set correctly?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.
- If you are using the onboard diskette controller, use the BIOS Setup Utility to make sure that "Onboard Floppy" is set to "Enabled." If you are using an add-in diskette controller, make sure that "Onboard Floppy" is set to "Disabled."

If the problem persists, there may be a problem with the diskette drive, server board, or drive signal cable. Contact your service representative or authorized dealer for help.

CD-ROM Drive Activity Light Does Not Light

Check the following:
- Are the power and signal cables to the CD-ROM drive properly installed?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

Problems With Application Software

If you have problems with application software, check the following:
- Verify that the software is properly configured for the system. See the software installation and operation documentation for instructions on setting up and using the software.
- Try a different copy of the software to see if the problem is with the copy you are using.
- Make sure all cables are installed correctly.
- Verify that the server board jumpers are set correctly. See Chapter 7.
- If other software runs correctly on the system, contact your vendor about the failing software.
- If the problem persists, contact the software vendor's customer service representative for help.

Bootable CD-ROM Is Not Detected

Check the following:
- Is the BIOS set to allow the CD-ROM to be the first bootable device?
- Check cable connections.
- Verify CD is bootable in another known good CD-ROM drive (especially if the CD is a copy).

Problems with Network

Server Hangs When Drivers Are Loaded
- Change the PCI BIOS interrupt settings.

Diagnostics Pass, But Connection Fails
- Make sure the network cable is securely attached.
- Make sure you specify the correct frame type in your NET.CFG file.

Activity LED Does Not Light
- Make sure the network hub has power.

Controller Stopped Working When An Add-in Adapter Was Installed
- Make sure the cable is connected to the port from the onboard network controller.
- Make sure your PCI BIOS is current.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts.
- Try re-seating the add-in adapter.

Add-in Adapter Stopped Working Without Apparent Cause

- Try re-seating the adapter first; then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

Cannot Connect to a Server

- Make sure you are using the drivers that are shipped on the System Resource CD for the onboard network controller.
- Make sure the driver is loaded and the protocols are bound.
- Make sure the network cable is securely attached to the connector at the system back panel. If the cable is attached but the problem persists, try a different cable.
- Make sure the hub port is configured for the same duplex mode as the network controller.
- Check with your LAN administrator about the correct networking software that needs to be installed.
- If you are directly connecting two servers (no hub), you will need a crossover cable (see your hub documentation for more information on crossover cables).
    Check the network controller LEDs that are visible through an opening on the system's back panel.

7 Technical Reference

Server Board Jumpers
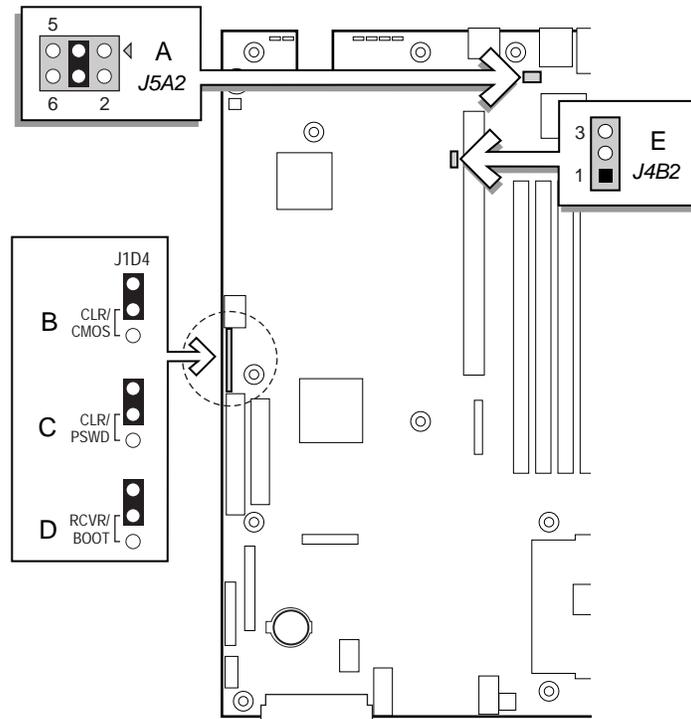
Figure 12. Jumper Locations

Table 20.   Configuration Jumper

	Jumper Name	What it does at system reset
A	RJ-45 Serial Port Config	Configures either a DSR or a DCD signal to the connector.
B	CMOS CLR	If these pins are jumpered, the CMOS settings are cleared. These pins should not be jumpered for normal operation.
C	PSWD CLR	If these pins are jumpered, the password is cleared. These pins should not be jumpered for normal operation.
D	RCVRY BOOT	If these pins are jumpered, the system will attempt BIOS recovery. These pins should not be jumpered for normal operation.
E	BMC Boot Block Write Enable	If these pins are jumpered, the BMC boot block is erasable and programmable at next reset. These pins should not be jumpered for normal operation.

Diagnostic LEDs

To help diagnose POST failures, a set of four bi-color diagnostic LEDs is located on the back edge of the baseboard. Each of the four LEDs can have one of four states: Off, Green, Red, or Amber. The LED diagnostics feature consists of a hardware decoder and four dual color LEDs. During POST, the LEDs will display all normal Port-80 codes representing the progress of the BIOS POST. Each POST code will be represented by a combination of colors from the four LEDs. The LEDs are in pairs of green and red. The post codes are broken into two nibbles, an upper and a lower nibble. Each bit in the upper nibble is represented by a red LED and each bit in the lower nibble is represented by a green LED. If both bits are set in the upper and lower nibble then both red and green LEDs are lit, resulting in an amber color. Likewise, if both bits are clear then the red and green LEDs are off.

During the POST process, each light sequence represents a specific Port-80 POST code. If a system should hang during POST, the diagnostic LEDs will present the last test executed before the hang. When reading the lights, the LEDs should be observed from the back of the system. The most significant bit (MSB) is the first LED on the left, and the least significant bit (LSB) is the last LED on the right.

⟹ **NOTE**

> When comparing a diagnostic LED color string from the baseboard to those listed in the diagnostic LED decoder in the following tables, the LEDs on the baseboard should be referenced when viewed by looking into the system from the back. Reading the LEDs from left to right, the Hi bit is located on the left.

Table 21.   POST Codes

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
07h	Off	G	G	G	Uncompress various BIOS Modules.
08h	G	Off	Off	Off	Verify password Checksum.
08h	G	Off	Off	Off	Verify CMOS Checksum.
07h	Off	G	G	G	Read Microcode updates from BIOS ROM.
07h	Off	G	G	G	Initializing the processors. Set up processor registers. Select least featured processor as the boot strap processor (BSP).
0Bh	G	Off	G	G	Hook before the keyboard BAT command is issued.
0Ch	G	G	Off	Off	Keyboard Controller Test: The keyboard controller input buffer is free. Next, issuing the BAT command to the keyboard controller.
0Eh	G	G	G	Off	Init after Keyboard Test: The keyboard controller BAT command result has been verified. Next, performing any necessary initialization after the keyboard controller BAT command test.

Table 22. POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
0Fh	G	G	G	G	Write Command Byte 8042: The initialization after the keyboard controller BAT command test is done. The keyboard command byte will be written next.
10h	Off	Off	Off	R	Keyboard Init: The keyboard controller command byte is written. Next, issuing the pin 23 and 24 blocking and unblocking commands.
10h	Off	Off	Off	R	Disable and initialize 8259.
11h	Off	Off	Off	A	Detect Configuration Mode, such as CMOS clear.
13h	Off	Off	G	A	Chipset Initialization before CMOS initialization.
19h	G	Off	Off	A	Init System Timer: The 8254 timer test is over. Starting the memory refresh test next.
1Ah	G	Off	G	R	Check Refresh Toggle: The memory refresh line is toggling. Checking the 15 second on/off time next.
23h	Off	Off	A	G	Setup Interrupt Vectors: Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24h	Off	G	R	Off	Before Vector: Configuration is required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin.
25h	Off	G	R	G	Init interrupt Vectors: Interrupt vector initialization is done.
F2h	R	R	A	R	Initialize SMM handler. Initialize USB emulation.
F5h	R	A	R	A	Validate NVRAM areas. Restore from backup if corrupted.
12h	Off	Off	G	R	Load defaults in CMOS RAM if bad checksum or CMOS clear jumper is detected.
12h	Off	Off	G	R	Initializing APP CMOS RAM for appliance servers only.
12h	Off	Off	G	R	Check point After CMOS Initialized.
27h	Off	G	A	G	Validate date and time in RTC.
F4h	R	A	R	R	Load Micro Code To All CPUs.
F6h	R	A	A	R	Scan SMBIOS GPNV areas.
15h	Off	G	Off	A	8254 Timer Test on Channel 2.
15h	Off	G	Off	A	Enable 8042.
15h	Off	G	Off	A	Keyboard Reset.
26h	Off	G	A	Off	Initialize LCD, if supported.
28h	G	Off	R	Off	Set Video Mode: Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.
29h	G	Off	R	G	Debugger Hook.
2Ah	G	Off	A	Off	Init PCI devices and motherboard devices. Pass control to video BIOS. Start serial console redirection.

Table 22.   POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
2Bh	G	Off	A	G	Platform hook.
2Dh	G	G	R	G	Initialize AMI display manager Module. Initialize support code for headless system if no video controller is detected.
2Dh	G	G	R	G	Scan flash for logos and Initialize logo data areas.
30h	Off	Off	R	R	Detect PS/2 Mouse.
30h	Off	Off	R	R	Hook after c000 ROM control.
2Eh	R	R	A	Off	Set up video parameters in BIOS data area.
37h	Off	G	A	A	Activate ADM: The display mode is set. Displaying the power-on message next.
37h	Off	G	A	A	Initialize language module. Display splash logo.
37h	Off	G	A	A	Display Sign on message, BIOS ID and processor information.
38h	G	Off	R	R	Detect USB Mouse: Initializing the bus input, and general devices next, if present.
34h	Off	G	R	R	Reset IDE Controllers.
39h	G	Off	R	A	Displaying bus initialization error messages.
3Ah	G	Off	A	R	Display Setup Message: The new cursor position has been read and saved. Displaying the Hit Setup message next.
40h	Off	R	Off	Off	Ensure Timer Keyboard Interrupts are on.
4Bh	G	R	G	G	Memory Test: The amount of memory above 8 MB has been found and verified. Checking for a soft reset and clearing the memory below 8 MB for the soft reset next. If this is a power-on situation, going to checkpoint 4Eh next.
57h	Off	A	G	A	Chipset hook after memory size.
53h	Off	R	A	A	Display processor cache size.
54h	Off	A	Off	R	Disable parity and NMI reporting.
60h	Off	R	R	Off	Test 8237 DMA Controller: The DMA page register test passed. Performing the DMA Controller 1 base register test next.
65h	Off	A	R	G	Init 8237 DMA Controller: The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
7Fh	G	A	A	A	Extended NMI enable: Extended NMI source enabling is in progress.
80h	R	Off	Off	Off	Enable Mouse and Keyboard: The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next.
81h	R	Off	Off	G	Keyboard Interface Test: A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.

continued

Table 22.   POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
82h	R	Off	G	Off	Check Stuck Key Enable Keyboard: The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next.
83h	R	Off	G	G	Disable parity NMI: The command byte was written and global data initialization has completed. Checking for a locked key next.
84h	R	G	Off	Off	Verify RAM Size: Checking for a memory size mismatch with CMOS RAM data next.
84h	R	G	Off	Off	Check ATA Cable Type presence of ATAPI devices.
84h	R	G	Off	Off	Display Keyboard Message.
16h	Off	G	G	R	Display IDE mass storage devices.
17h	Off	G	G	A	Display USB mass storage devices.
85h	R	G	Off	G	Report the first set of POST Errors to Error Manager.
86h	R	G	G	Off	Boot Password Check: The password was checked. Performing any required programming before Setup next.
8Dh	A	G	Off	G	OEM Patch 9.
8Dh	A	G	Off	G	Set Printer RS-232 Timeout.
8Dh	A	G	Off	G	Init FDD Devices: Resetting the hard disk controller next.
95h	R	G	Off	A	Lock out PS/2 keyboard/mouse if unattended start is enabled.
92h	R	Off	G	R	Option ROM Scan.
98h	A	Off	Off	R	Init Boot Devices: The adapter ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control.
9Bh	A	Off	G	A	Float Processor Initialize: Performing any required initialization before the coprocessor test next.
9Eh	A	G	G	R	Enable Interrupts 0,1,2: Checking the extended keyboard, keyboard ID, and NUM Lock key next. Issuing the keyboard ID command next.
A2h	R	Off	A	Off	Report second set of POST errors to Error Manager.
86h	R	G	G	Off	Prepare And Run Setup: Error manager displays and logs POST errors. Waits for user input for certain errors. Execute setup.
8Bh	A	Off	G	G	Set Base Expansion Memory Size.
8Ch	A	G	Off	Off	Adjust Setup: Programming the Setup options next.
A5h	R	G	R	G	Set Display Mode.
A7h	R	G	A	G	OEM Patch 12.
A7h	R	G	A	G	Build SMBIOS table and MP tables.
A7h	R	G	A	G	Program hotkey and timeout settings in keyboard controller.
A7h	R	G	A	G	Processor initialization before boot.
A7h	R	G	A	G	Copy required language strings to shadow RAM.

Table 22.   POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			**LSB**	
Aah	A	Off	A	Off	Clear video screen.
000h	Off	Off	Off	Off	One Beep to indicate end of POST. No beep if silent boot is enabled.
000h	Off	Off	Off	Off	POST completed. Passing control to INT 19h boot loader next.

POST Error Codes and Messages

Tables 23 and 24 define the POST error codes and their associated messages. The BIOS prompts the user to press a key in case of serious errors. Some error messages are preceded by the word "Error" to highlight the fact that the system might be malfunctioning. All POST errors and warnings are logged in the SEL, unless the SEL is full.

Table 22.   Standard POST Error Messages and Codes

Error Code	Error Message	Pause on Boot
100	Timer Channel 2 Error	Yes
101	Master Interrupt Controller	Yes
102	Slave Interrupt Controller	Yes
103	CMOS Battery Failure	Yes
104	CMOS Options not Set	Yes
105	CMOS Checksum Failure	Yes
106	CMOS Display Error	Yes
107	Insert Key Pressed	Yes
108	Keyboard Locked Message	Yes
109	Keyboard Stuck Key	Yes
10A	Keyboard Interface Error	Yes
10B	System Memory Size Error	Yes
10E	External Cache Failure	Yes
110	Floppy Controller Error	Yes
111	Floppy A: Error	Yes
112	Floppy B: Error	Yes
113	Hard disk 0 Error	Yes
114	Hard disk 1 Error	Yes
115	Hard disk 2 Error	Yes
116	Hard disk 3 Error	Yes
117	CD-ROM disk 0 Error	Yes
118	CD-ROM disk 1 Error	Yes

Table 23.   Standard POST Error Messages and Codes (continued)

Error Code	Error Message	Pause on Boot
119	CD-ROM disk 2 Error	Yes
11A	CD-ROM disk 3 error	Yes
11B	Date/Time not set	Yes
11E	Cache memory bad	Yes
120	CMOS clear	Yes
121	Password clear	Yes
140	PCI Error	Yes
141	PCI Memory Allocation Error	Yes
142	PCI IO Allocation Error	Yes
143	PCI IRQ Allocation Error	Yes
144	Shadow of PCI ROM Failed	Yes
145	PCI ROM not found	Yes
146	Insufficient Memory to Shadow PCI ROM	Yes

Table 23.   Extended POST Error Messages and Codes

Error Code	Error Message	Pause on Boot
8100	Processor 1 failed BIST	No
8101	Processor 2 failed BIST	No
8110	Processor 1 Internal error (IERR)	No
8111	Processor 2 Internal error (IERR)	No
8120	Processor 1 Thermal Trip error	No
8121	Processor 2 Thermal Trip error	No
8130	Processor 1 disabled	No
8131	Processor 2 disabled	No
8140	Processor 1 failed FRB-3 timer	No
8141	Processor 2 failed FRB-3 timer	No
8150	Processor 1 failed initialization on last boot	No
8151	Processor 2 failed initialization on last boot	No
8160	Processor 01: unable to apply BIOS update	Yes
8161	Processor 02: unable to apply BIOS update	Yes
8170	Processor P1 :L2 cache Failed	Yes
8171	Processor P2 :L2 cache Failed	Yes
8180	BIOS does not support current stepping for Processor P1	Yes
8181	BIOS does not support current stepping for Processor P2	Yes
8190	Watchdog Timer failed on last boot	No
8191	4:1 Core to bus ratio: Processor Cache disabled	Yes
8192	L2 Cache size mismatch	Yes
8193	CPUID, Processor Stepping are different	Yes
8194	CPUID, Processor Family are different	Yes
8195	Front Side Bus Speed mismatch. System Halted	Yes, Halt
8196	Processor Model are different	Yes
8197	CPU Speed mismatch	Yes
8300	Baseboard Management Controller failed to function	Yes
8301	Front Panel Controller failed to Function	Yes
8305	Hotswap Controller failed to Function	Yes
8420	Intelligent System Monitoring Chassis Opened	Yes
84F1	Intelligent System Monitoring Forced Shutdown	Yes
84F2	Server Management Interface Failed	Yes
84F3	BMC in Update Mode	Yes
84F4	Sensor Data Record Empty	Yes
84FF	System Event Log Full	Yes

BIOS Recovery Beep Codes

In the case of a Bootblock update, where video is not available for text messages to be displayed, speaker beeps are necessary to inform the user of any errors. Table 24 describes the type of error beep codes that may occur during the Bootblock update.

Table 24.   BIOS Recovery Beep Codes

Beeps	Error message	POST Progress Code	Description
1	Recovery started		Start recovery process.
2	Recovery boot error	Flashing series of POST codes: E9h EEh EBh ECh EFh	Unable to boot to floppy, ATAPI, or ATAPI CD-ROM. Recovery process will retry.
Series of long low-pitched single beeps	Recovery failed	EEh	Unable to process valid BIOS recovery images. BIOS already passed control to operating system and flash utility.
2 long high-pitched beeps	Recovery complete	EFh	BIOS recovery succeeded, ready for power-down, reboot.

Bootblock Error Beep Codes

Table 25.   Bootblock Error Beep Codes

Beeps	Error message	Description
1	Refresh timer failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity error	Parity cannot be reset.
3	Base memory failure	Base memory test failure.
4	System timer	System timer is not operational.
5	Processor failure	Processor failure detected.
6	Keyboard controller Gate A20 failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor exception interrupt error	The CPU generated an exception interrupt.
8	Display memory read/write error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM checksum error	System BIOS ROM checksum error.
10	Shutdown register error	Shutdown CMOS register read/write error detected.
11	Invalid BIOS	General BIOS ROM error.

Part II: Service Technician's Guide

This section describes procedures that **REQUIRE** internal server access. You must be a qualified service technician to perform procedures listed in the *Service Technician's Guide*.

8 Upgrading the Hardware

Tools and Supplies Needed

Procedures in this section require the following tools and supplies:

- Jumper-removal tool or needle-nosed pliers
- Small flat-bladed screwdriver
- Phillips* (cross-head) screwdriver (#2)
- Heat Sink Clip Attach/Removal Tool - may be ordered/purchased from:

  > Dexter Design (United States)
  > (503) 648-7000
  > Contact: dxtrdsgn@aol.com
  > P/N: 650308-003-P6

- Anti-static wrist strap and conductive foam pad (recommended)

TP205
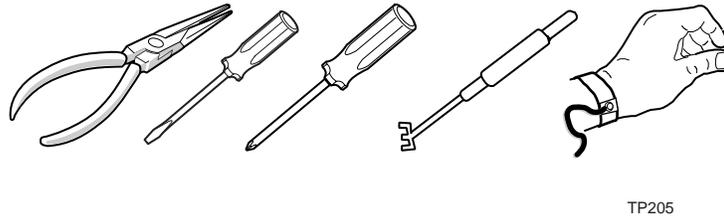
Figure 13. Tools and Supplies Needed

⇒ **NOTE**

> Blue-colored items (such as handles, buttons, and screws) represent service touch points. *Remove power from system before servicing these components.*
>
> Green-colored items (such as handles, levers, and buttons) represent hot-pluggable components.

Equipment log: As you integrate new parts into the system, add information about them to your equipment log (see Appendix A). Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system.

Cautions

These warnings and cautions apply throughout this chapter. Only a technically qualified person should configure the server hardware.

⚠ **CAUTIONS**

> **System power on/off:** The power button DOES NOT switch off system power. To remove power from the system, you must unplug/disconnect the power connections. Make sure power connections are unplugged/disconnected before you open the chassis, add, or remove any components.

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

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground (any unpainted metal surface) on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static-free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Replacing Power Supply Modules

⇒ **NOTE**

To maintain hot plug capability, ensure that an active AC or DC Power Supply Module is in the second Power Supply Module slot before replacing a Power Supply Module.

To replace an AC power supply module, follow this procedure:
1. Press in locking tab inside of green handle (A in Figure 14).
2. Pull green handle slightly downward and rearward, sliding AC Power Supply Module out of AC Power Supply Cage (B and C in Figure 14).
3. When reinserting AC Power Supply Module, make sure the green handle is in the downward position before sliding AC Power Supply Module into AC Power Supply Cage.

To replace a DC power supply module, follow this procedure:
1. Using a small flat-head screwdriver, unlatch the black connector cover from the connector base and flip connector cover up (see D in Figure 14).
2. Disconnect DC power plug from power supply module by pulling DC power plug rearward (see E in Figure 14). Flip black connector cover down and re-latch connector cover to connector base.
3. Press in green button on handle and pull handle downward. At the same time, pull DC Power Supply Module out of DC Power Supply Cage (see F, G, and H in Figure 14).
4. When reinserting DC Power Supply Module, make sure the handle is in the downward position before sliding DC Power Supply Module into DC Power Supply Cage.

AC Power Supply Module

DC Power Supply Module
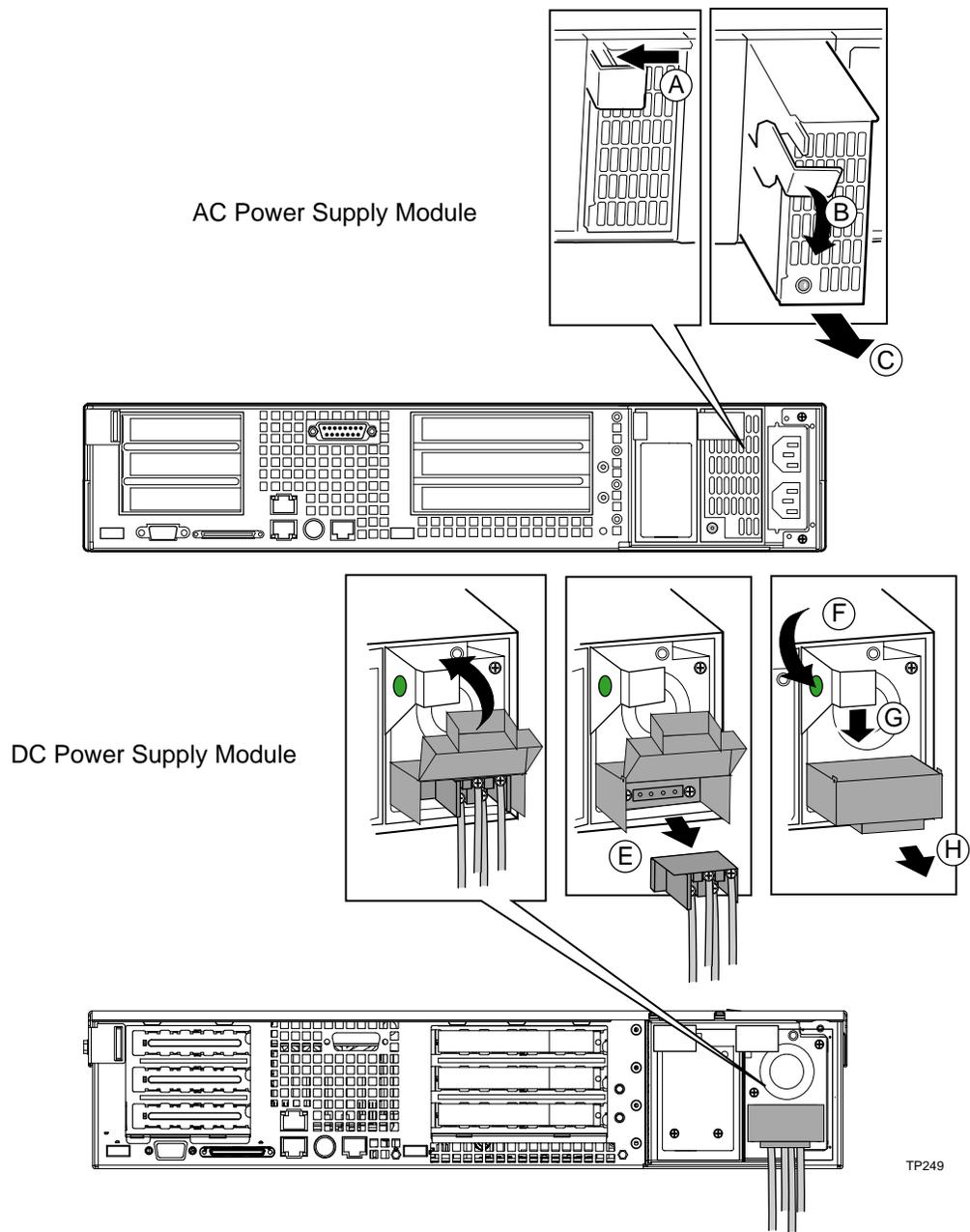
TP249

Figure 14. Removing the Power Supply Modules

Replacing Hard Disk Drives

There are two hard drive bays in the system (see (1) and (2) in Figure 15). Each hard drive bay supports a tray-mounted Ultra-320 SCSI disk drive with single connector attach (SCA) interconnect. The drive tray is installed into the front of the chassis in the hard drive bay, and then secured in place using the horizontal handle on the drive tray. A small lever on the front of the system is then rotated into the horizontal position to connect the SCA connector on the system flex circuit SCSI cable to the SCA connector on the drive. Ultra-320 SCSI technology (SCA interconnect) or slower hard disk drives can be installed in this hard drive tray. The hard drive bays are designed to accept 15,000 RPM (and below) hard drives that consume up to 18 Watts of power.
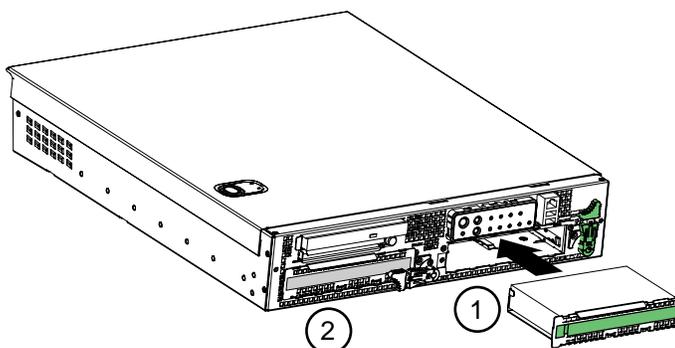
TP130

Figure 15. Hard Drive Bays

Hard Drive Tray

Each hard drive used in the system must be mounted to a drive tray using four screws inserted into the bottom of the drive as shown in Figure 16.
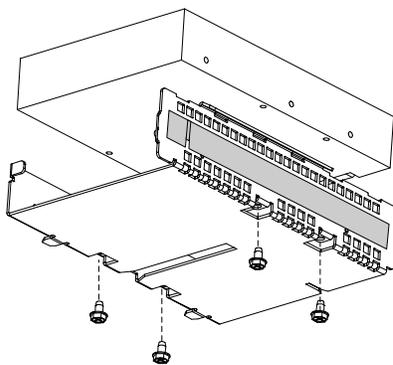
TP131

Figure 16. Hard Drive Tray

Replacing Floppy or CD-ROM Drives

The peripheral bay supports either a floppy drive carrier assembly or a CD-ROM drive carrier assembly. Both the blind-mate floppy drive carrier assembly and the blind-mate CD-ROM drive carrier assembly can be inserted or removed when the system power is off. After the drive carrier assembly is installed into the system, a horizontal handle is used to secure it to the chassis.

⇒ **NOTE**

> A floppy drive and a CD-ROM drive cannot be installed in the system at the same time.

⇒ **NOTE**

> Disconnect power from system before replacing floppy or CD-ROM drives.

The floppy drive carrier assembly utilizes a 0.5-inch (12.7mm) slim-line 3.5-inch floppy drive. The CD-ROM drive carrier assembly utilizes a 0.5-inch (12.7mm) slim-line CD-ROM or DVD drive.

TP127
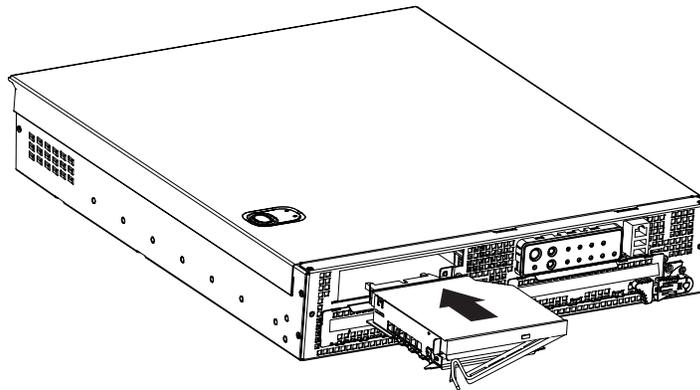
Figure 17. Peripheral Drive Bay

CD-ROM Drive Carrier Assembly

The CD-ROM drive is installed in a CD-ROM drive carrier assembly before installing it into the system. An exploded view of the CD-ROM drive carrier assembly is shown in Figure 18.
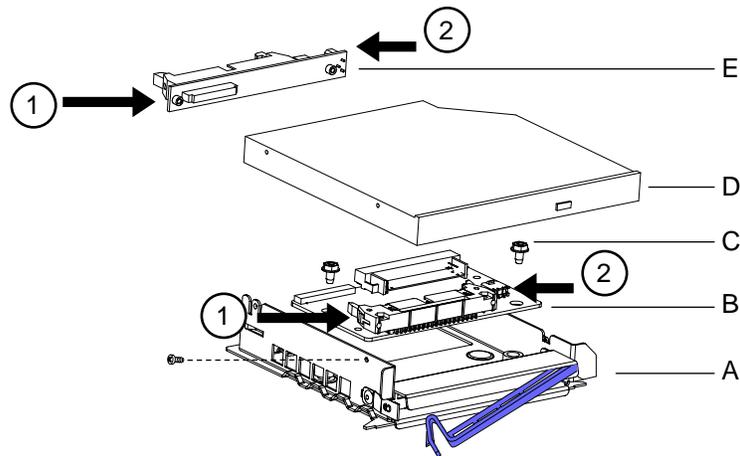
TP126

A. CD-ROM drive carrier metal housing
B. CD-ROM drive carrier interface board
C. Two screws to connect interface board to metal housing
D. CD-ROM Drive
E. CD-ROM interface board

Figure 18. CD-ROM Drive Carrier Assembly

Two cables are required to connect between the CD-ROM drive carrier interface board (B) and the CD-ROM interface board (E). An IDE cable is used to connect between the 2x20 IDE connector on both these interface boards as indicated in (1). A 1x2 power cable is used to connect between the power connector on both of these interface boards as indicated in (2).

The CD-ROM drive carrier assembly inserts into the peripheral bay on the front of the system. The mating connectors on the CD-ROM drive carrier assembly and the FPIO board are blind-mate style connectors, and will seat fully when the horizontal handle on the CD-ROM drive carrier assembly is fully secured.

Floppy Drive Carrier Assembly

The Floppy drive is installed in a Floppy drive carrier assembly before installing it into the system. An exploded view of the Floppy drive carrier assembly is shown in Figure 19.

Carrier
Sidewall
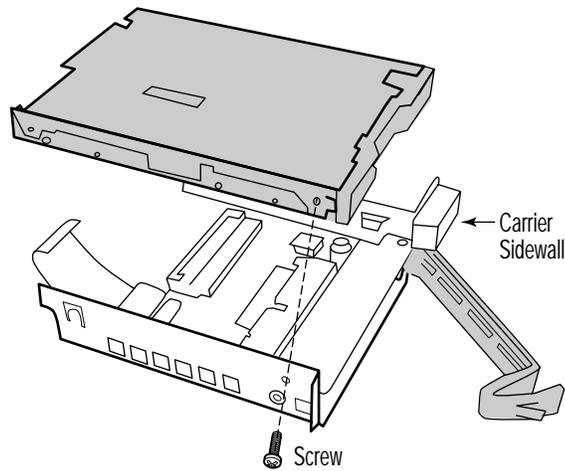
Screw

TP184

Figure 19. Floppy Driver Carrier Assembly

A. Floppy drive carrier metal housing
B. Floppy drive carrier interface board
C. Two screws to connect interface board to metal housing
D. Floppy Drive

One FFC cable is required to connect between the Floppy drive carrier interface board (B) and the Floppy drive (D). This FFC cable has a keying feature that allows it to be inserted correctly in only one orientation.

The Floppy drive carrier assembly inserts into the peripheral bay on the front of the system. The mating connectors on the Floppy drive carrier assembly and the FPIO board are blind-mate, and will seat fully when the horizontal handle on the Floppy drive carrier assembly is fully secured.

Working Inside the System

This section presents the following procedures that describe removal and installation of most components inside the system.

Safety: Before You Remove Server Covers

Before removing covers at any time to work inside the system, observe these safety guidelines:
  1. Turn off all peripheral devices connected to the system.
  2. Power down the system by pressing and holding the Power button on the front of the chassis for several seconds. After the server shuts down, unplug/disconnect the power cord to remove standby power from the server.
  3. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.

Provide ESD protection by wearing an anti-static wrist strap attached to chassis ground (any unpainted metal surface) of the server when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove covers of the system. Only a technically qualified person should integrate, configure, or service the system.

⚠ **WARNINGS**

Power Button: **Shutting down the server with the Power button on the front of the chassis DOES NOT remove all power from the system. To remove all power from system, you must also unplug/disconnect the power cord(s) from the system. Unplugging/disconnecting the power cord(s) from the system removes the +5 Volt standby power that is present when the server is powered down.**

Hazardous conditions, power supply: **Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside the power supply; technically qualified personnel should do servicing.**

Hazardous conditions, devices, and cables: **Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and unplug/disconnect the power cord(s), telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.**

Hazardous conditions, processors and power supplies: **Thermal conditions may be present in the Processor/Memory Complex. Allow all fans to continue to run until they shut down on their own after power has been turned off. After the fans stop, you can unplug/disconnect the power cord(s).**

⚠ **CAUTIONS**

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you do all procedures in this section only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground (any unpainted metal surface) on your system when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place it on a grounded surface free of static electricity. Do not slide boards over any surface.

Cooling and airflow: For proper cooling and airflow, always install the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts.

Removing and Installing the Top Cover

⚠ CAUTION

For proper cooling and airflow, do not operate the server with the cover removed. Always reinstall the cover before turning the server on.

The server comes with a removable Top Cover. Removal of this cover is necessary when installing or removing many components. You do not have to remove the Top Cover when removing or installing power supplies, peripheral drive assembly (CD-ROM or floppy), or hard drives.

⚠ WARNING

If rack mounted, make sure that the rack is anchored securely so it will not tilt forward when the server chassis is extended. A crush hazard exists should the rack tilt forward that could cause serious injury.

To remove the top cover, follow this procedure:
1. Push down on the blue locking button on the top cover while sliding the top cover rearward to release it from the chassis.
2. Lift the top cover up to remove.

TP108
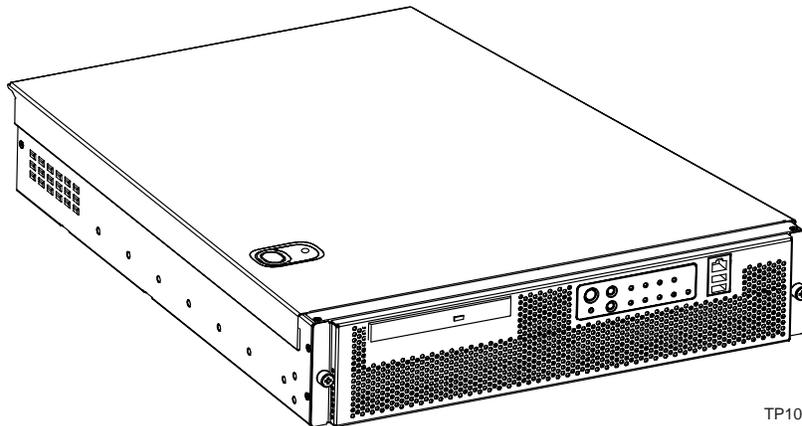
Figure 20. Removing the Top Cover

Internal Chassis Layout

The IBM® @server xSeries 343 server uses the Telco and Industrial Grade system baseboard, which contains connectors for installing up to two Intel® Xeon™ processors with 512 KB L2 cache utilizing the FCPGA sockets. The baseboard has 6 DIMM slots and supports up to 12 GB error checking and correcting (ECC) SDRAM memory. The IBM® @server xSeries 343 server baseboard also contains 6 PCI slots (implemented via riser cards), input/output (I/O) ports and various controllers.
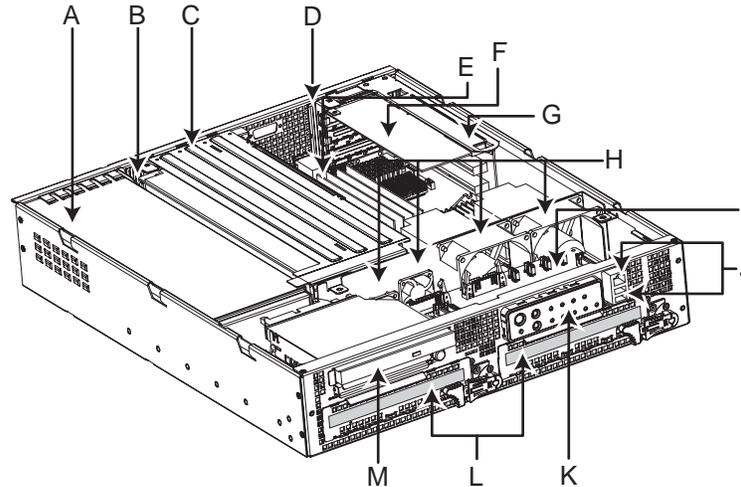
TP00485

A. Power Supply	H. System Fans
B. PCI card bracket (full-length)	I. FPIO system board
C. Riser card assembly (full-length)	J. RJ-45 COM2 and Dual USB ports
D. PCI card bracket (low-profile)	K. Control Panel
E. Server Baseboard	L. SCSI Hard Disk Drive Bays
F. PCI add-in card (accessory to system)	M. Peripheral bay (optional CD-ROM
G. Riser card assembly (low-profile)	module or FDD module available)

Figure 21. IBM® @server xSeries 343 server (shown with top cover and bezel removed)

Tools and Supplies Needed

- Jumper removal tool or needle-nosed pliers
- Small flat-headed screwdriver
- Phillips* (cross head) screwdriver (#1 bit and #2 bit)
- Anti-static wrist strap and conductive foam pad (recommended)
- Heat Sink Clip Attach/Removal Tool

Cautions

These warnings and cautions apply throughout this chapter. Only a technically qualified person should configure the server board.

⚠ **CAUTIONS**

System power on/off: The power button DOES NOT completely turn off the system AC power; 5 Volt standby is still active whenever the system is plugged

in. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

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

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground (any unpainted metal surface) on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static-free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle-nosed pliers. If your jumpers do not have such a tab, take care when using needle-nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the stake pins on the board.

Rearrange the Standoffs

If your chassis does not have board mount standoffs placed as shown in Figure 22, you must rearrange them so they match the holes in the server board. Failure to properly rearrange the metal standoffs may cause the server board to malfunction and may permanently damage it. Your chassis may be different from the illustration.
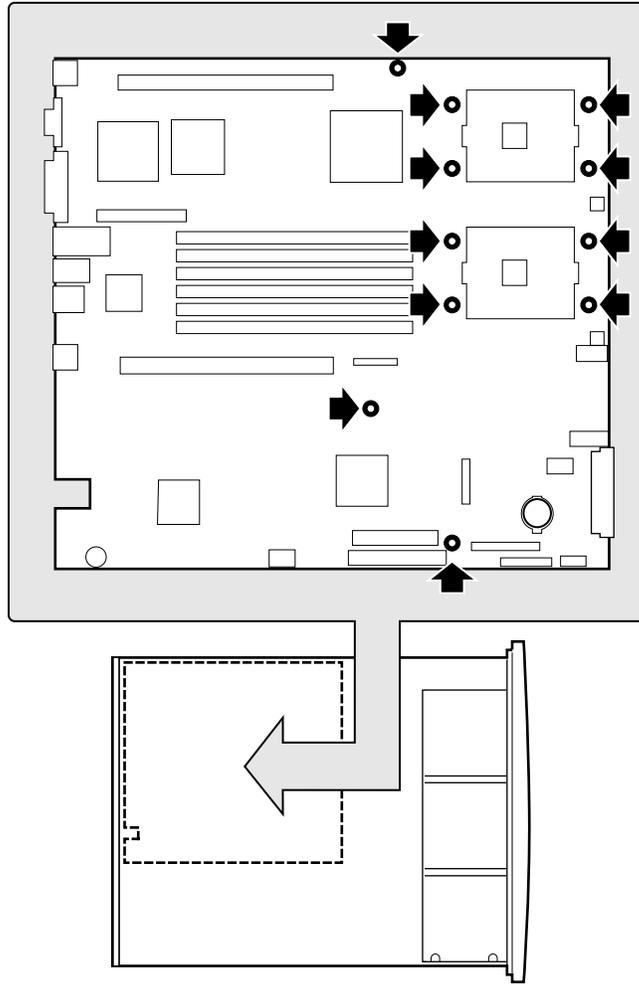
TP121

Figure 22. Rearrange the Standoffs

Install the Server Board

To ensure proper grounding and support, it is recommended that you install screws in all the required mounting holes for your chassis. You may need to move cables out of the way to properly install your server board.

1. While placing the board on the chassis standoffs, carefully position the board I/O connectors into the rear chassis I/O openings.
2. Adjust board position to align mounting holes with standoffs.
3. Using the screws that came with your chassis, mount the board to the chassis.
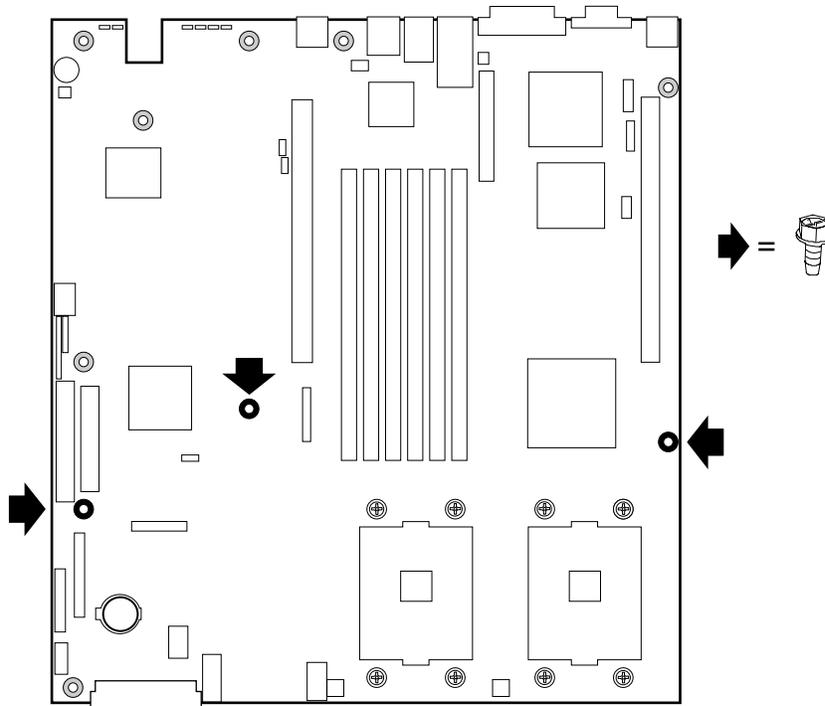
TP00476

Figure 23. Installing the Server Board

Installing or Replacing Processor(s)

⚠ **WARNING**

> **If the server 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 server board components that are located near processors.**

⚠ **CAUTION**

> **Processor must be appropriate:** You may damage the server if you install a processor that is inappropriate for your server. Make sure your server can handle a newer, faster processor (thermal and power considerations). If you are adding a second processor to your system, the second processor must be compatible with the first processor (within one stepping, same voltage, same speed). For exact information about processor interchangeability, contact your customer service representative or visit the IBM Customer Support website at http://www.ibm.com/support/.
>
> **ESD and handling processors:** Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following: (1) Touch the metal chassis before touching the processor or server board. Keep part of your body

in contact with the metal chassis to dissipate the static charge while handling the processor. (2) Avoid moving around unnecessarily.

Retention Mechanism (RM): In 2U and greater chassis, use the RM brackets that ship with the chassis, not the RM that ships with the processor kit.
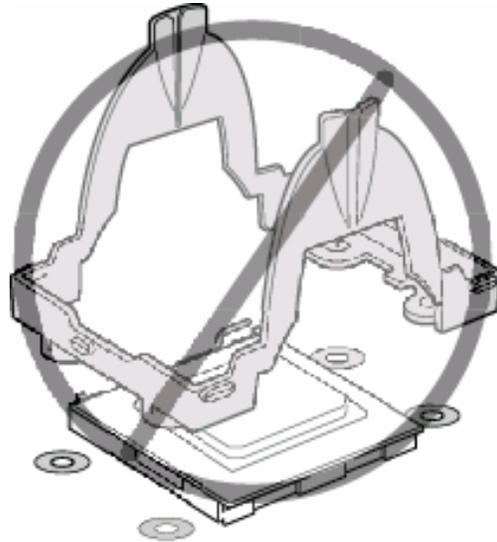
OM15078

Installing the Retention Mechanism (RM) Brackets

There are four RM brackets, two for each processor socket. For each bracket, do the following:
1. Place the bracket (A) on the server board.
2. Insert and tighten two screws (B) to secure the bracket.
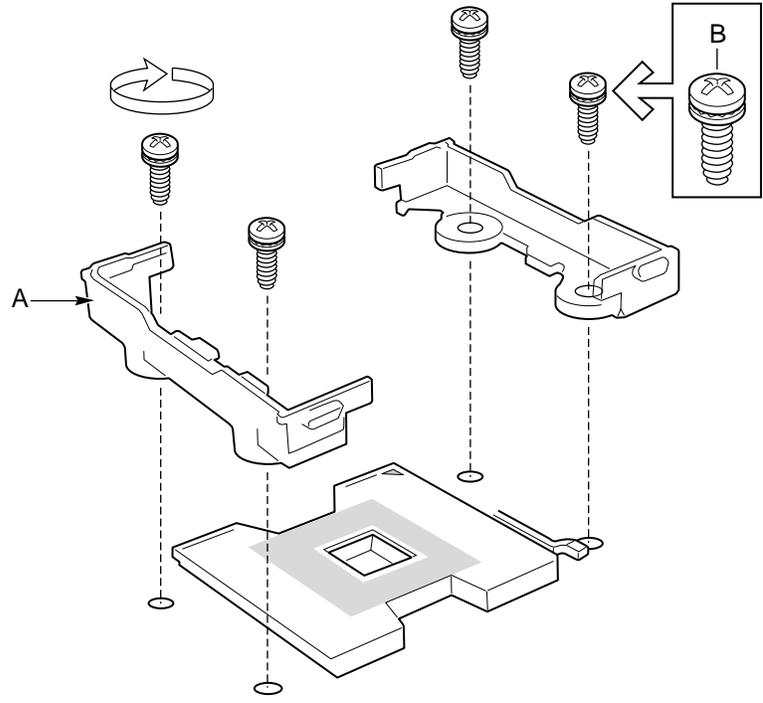
OM14144

Figure 24. Installing the Processor RM Brackets

Installing Processors

1. Raise the locking bar on the socket.
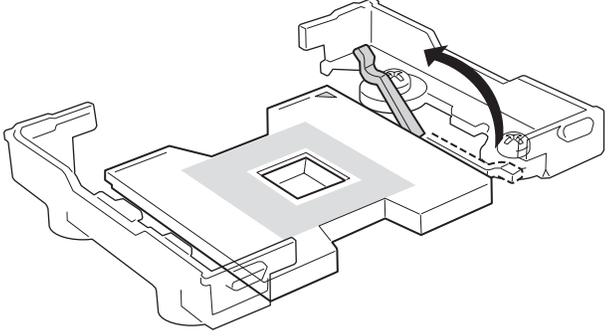
OM14132

Figure 25. Raising the Locking Bar

2. Aligning the pins of the processor with the socket, insert the processor into the socket.
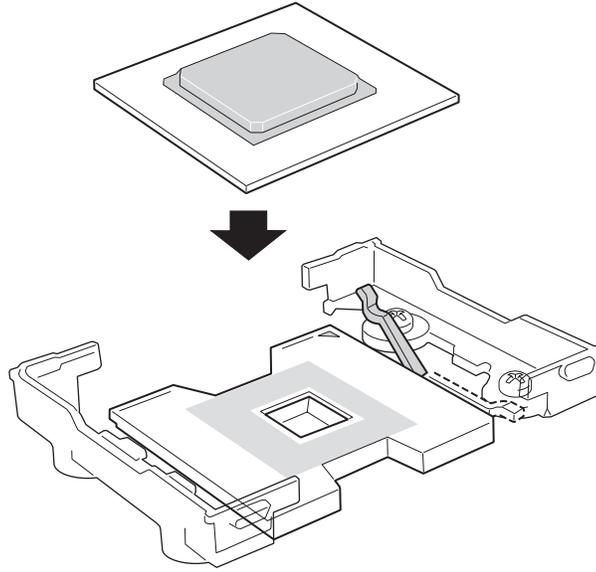
OM14133

Figure 26. Installing Processors

3. Lower the locking bar completely.
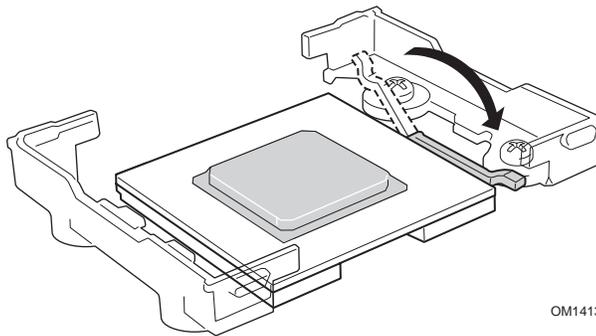
OM14135

Figure 27. Lowering the Locking Bar

4. Follow the instructions packaged with your boxed processor for preparing the heat sink and processor for installation. *It is important to ensure proper installation of the thermal interface material (TIM), either approved grease or pad.*

5. Position the heat sink above the processor.

6. Aligning the raised metal surfaces, place the heat sink on top of the processor.
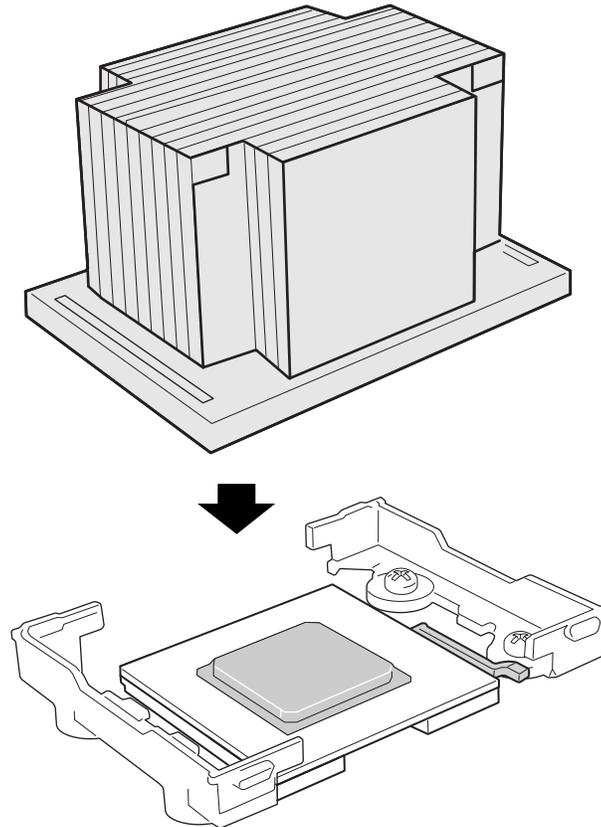
TP110

Figure 28. Installing the Heat Sink

7. Place the heat sink clip so the tab on the clip engages the slot on the heat sink and the hole opposite the tab slides over the stud on the mounting bracket (A). Refer to Figure 29.

8. When the clip is mounted in the slot on the heat sink and over the stud on the mounting bracket, move the clip to the right as far as it will travel (towards C).

9. Press down on the left end of the clip (B) until firmly engaged over the stud on the mounting bracket.

10. With the left (B) end of the clip firmly attached to the stud on the mounting bracket, press down on the other end of the clip (C) until it is firmly engaged.

11. Repeat the process for the clip on the opposite side of the heat sink.
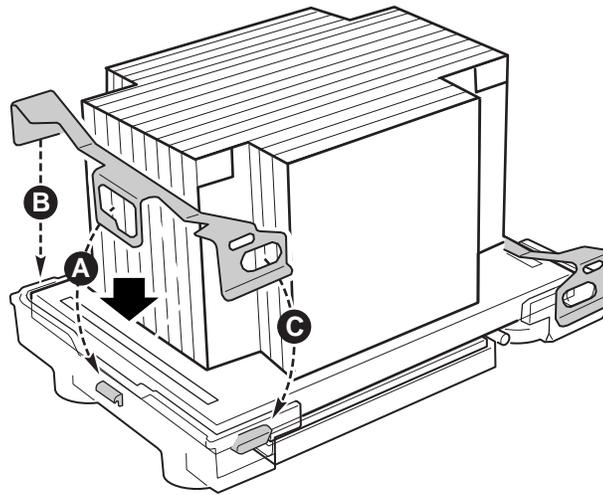
TP111

Figure 29. Installing the Heat Sink Clip

Replacing a Processor

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. Remove the fan guard (see Figure 36).
3. Using the Heat Sink Clip Attach/Removal Tool (see Figure 30), disengage the retention clip from the processor socket. Slide the Heat Sink Clip Attach/Removal Tool into the small slot on the end of the retention clip (A). While pressing down on the Heat Sink Clip Attach/Removal Tool, pull the Heat Sink Clip Attach/Removal Tool inward towards the heat sink (B). The end of the retention clip will pop off the retention mechanism bracket. Repeat process for the other end of retention clip.
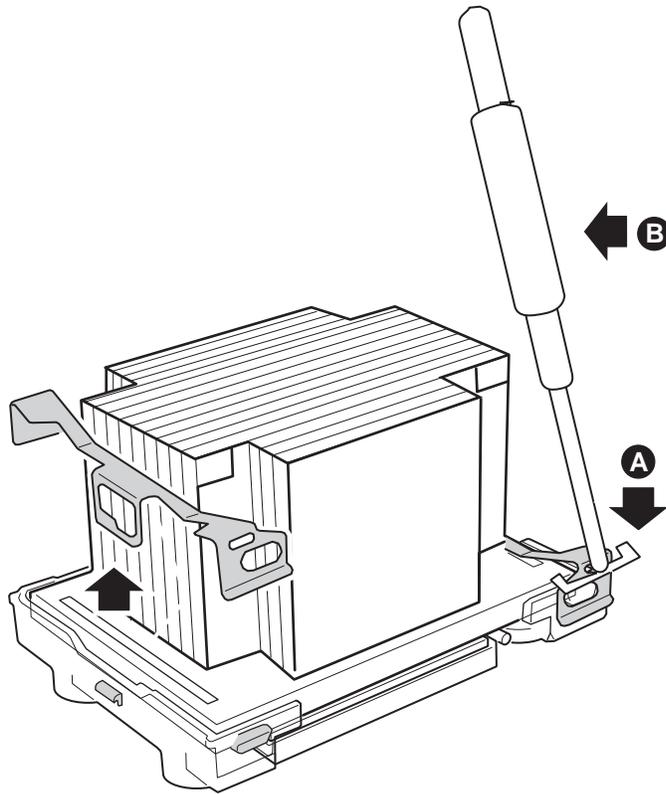
TP00486

Figure 30. Disengaging the Retention Clips from the Processor Socket

The Heat Sink Clip Attach/Removal Tool may be ordered/purchased from:

> Dexter Design (United States)
> (503) 648-7000
> Contact: dxtrdsgn@aol.com
> P/N: 650308-003-P6

4. Once the retention clips are free, lift the heat sink upward off the retention mechanism brackets.
5. Raise the locking bar on the socket. Refer to Figure 25.
6. Remove the old processor from the socket.
7. Aligning the pins of the replacement processor with the socket, insert the replacement processor into the socket. Refer to Figure 26.
8. Lower the locking bar completely. Refer to Figure 27.
9. Follow the instructions packaged with your boxed processor for preparing the heat sink and processor for installation.
10. Position the heat sink above the processor. Refer to Figure 28.
11. Aligning the raised metal surfaces, place the heat sink on top of the processor.
12. Place the heat sink clip so the tab on the clip engages the slot on the heat sink and the hole opposite the tab slides over the stud on the mounting bracket (A). Refer to Figure 29.
13. When the clip is mounted in the slot on the heat sink and over the stud on the mounting bracket, move the clip to the right as far as it will travel (towards C). Refer to Figure 29.

14. Press down on the left end of the clip (B) until firmly engaged over the stud on the mounting bracket. Refer to Figure 29.
15. With the left (B) end of the clip firmly attached to the stud on the mounting bracket, press down on the other end of the clip (C) until it is firmly engaged. Refer to Figure 29.
16. Repeat the process for the clip on the opposite side of the heat sink.

Memory

Only DDR266 compliant SDRAM is supported by the server board. Install from 256 MB to 12 GB of registered, ECC memory, using up to six DIMMs.

⇒ **NOTE**

Only DDR266 is supported with a 533 MHz Front Side Bus.

DIMMs must be installed in pairs and in the following order: 1B and 1A, 2B and 2A, 3B and 3A. Installed DIMMs must be the same speed and must all be registered. For a list of supported memory, call your service representative or visit the IBM Support website.

Memory DIMM Support

The IBM® @server xSeries 343 server board supports DDR266 compliant registered ECC DIMMs operating at 266MHz.

Only DIMMs tested and qualified by IBM or a designated memory test vendor are supported on the IBM® @server xSeries 343 server board. A list of tested DIMMs will be made available. Note that all DIMMs are supported by design, but only fully tested DIMMs will be supported.

The minimum supported DIMM size is 128 MB. Therefore, the minimum main memory configuration is 2 x 128 MB or 256 MB. The largest size DIMM supported is a 2 GB stacked registered DDR266 ECC DIMM based on 512 megabit technology.

Only registered DDR266 compliant, ECC, DDR memory DIMMs will be supported.
- ECC single-bit errors will be corrected and multiple-bit errors will be detected. The server board also supports the Intel® Single Device Data Correction (SDCC) feature.
- The maximum memory capacity is 12 GB.
- The minimum memory capacity is 256 MB.

Memory Configuration

The memory interface between the MCH and DIMMs is 144 bits wide. This requires that two DIMMs be populated per bank in order for the system to operate. At least one bank has to be populated in order for the system to boot. If additional banks have less than two DIMMs, the memory for that bank(s) will not be available to the system.

There are three banks of DIMMs, labeled 1, 2, and 3. Bank 1 contains DIMM locations 1A and 1B, Bank 2 contains 2A and 2B, and Bank 3 contains 3A and 3B. DIMM socket identifiers are marked with silkscreen next to each DIMM socket on the baseboard. Note that the sockets associated with any given bank are located next to each other.

Certain combinations of DIMM types in the same system can violate the Write Ringback measurement specification during analog validation.

- When mixing double-ranked DIMMs (x4 or x8) with single-ranked DIMMs (x4 or x8), if a single-ranked DIMM is placed in the populated slot closest to the MCH, the Write Ringback at that DIMM violates the JEDEC DRAM specification.

The baseboard's signal integrity and cooling are optimized when memory banks are populated in order. Therefore, when installing memory, DIMMs should be installed starting with Bank 1 and ending with Bank 3.

DIMM and memory configurations must adhere to the following:

- DDR266 registered ECC DIMM modules
- DIMM organization: x72 ECC
- Pin count: 184
- DIMM capacity: 128 MB, 256 MB, 512 MB, 1 GB, 2 GB
- Serial PD: JEDEC Rev 2.0
- Voltage options: 2.5 V (VDD/VDDQ)
- Interface: SSTL2
- Two DIMMs must be populated in a bank for a x144 wide memory data path.
- Any or all memory banks may be populated.
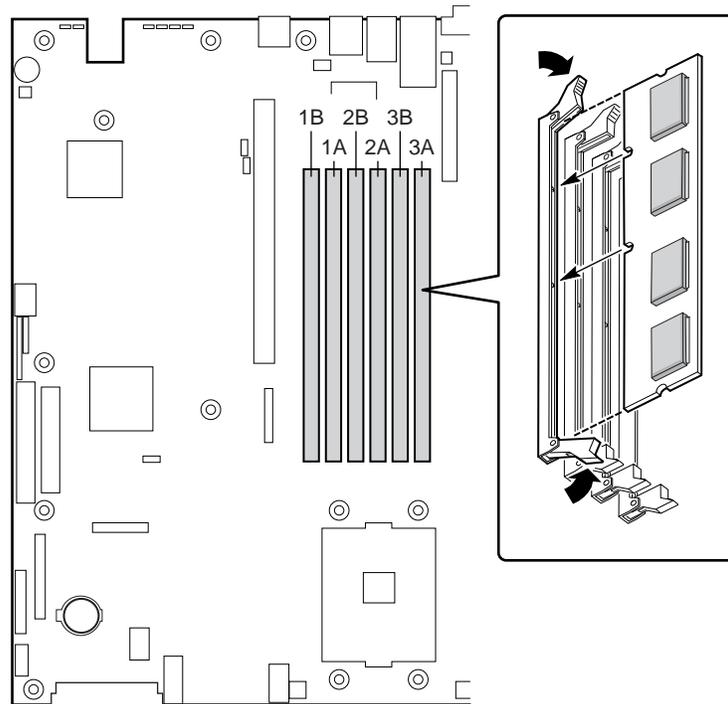
TP123

Figure 31. Installing Memory

Replacing the Back up Battery

The lithium battery on the server board powers the real time clock (RTC) in the absence of AC power. When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved devices.

⚠ **WARNING**

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

⚠ **ADVARSEL!**

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

⚠ **ADVARSEL**

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

⚠ **VARNING**

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

⚠ **VAROITUS**

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

To replace the battery

1. Before proceeding, record your custom BIOS settings.
2. Observe the safety and ESD precautions at the beginning of this chapter.
3. Open the chassis and locate the battery.
4. Push the upper end of the metal retainer away from the battery—the battery pops up.
5. Remove the battery from its socket.
6. Dispose of the battery according to local ordinance.
7. Remove the new lithium battery from its package.
8. Being careful to observe the correct polarity, lay the battery in the socket.
9. Push the battery down—the metal retainer locks the battery in the socket.
10. Close the chassis.

11. Run BIOS Setup to restore the configuration settings to the RTC.
12. Restore your custom BIOS settings.
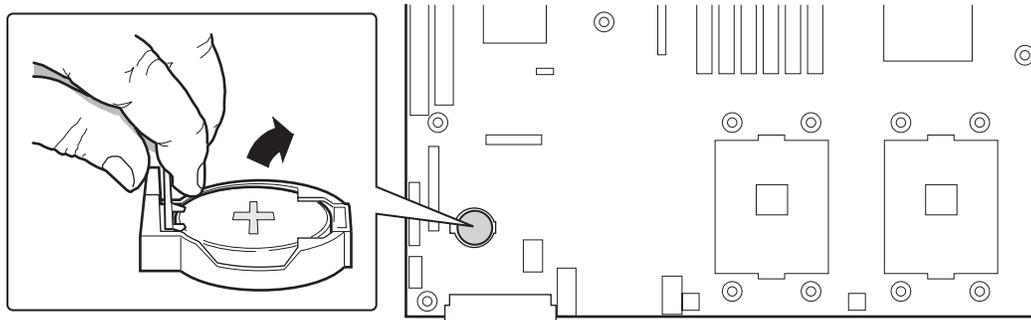
OM14141

Figure 32. Replacing the Back-up Battery

Replacing 3.3 Volt and 5 Volt PCI Add-in Cards in Full-Length PCI Adapter Subsystem

This PCI adapter assembly is configured and installed as shown in Figure 33. After the PCI adapter assembly is removed from the system, it is configured with PCI adapters by plugging the PCI adapters into the PCI connectors on the riser card (either a 3.3-Volt riser card or a 5-Volt riser card) that is part of the PCI adapter assembly. The PCI adapter assembly is then installed into the system by plugging the riser card into the riser card connector on the server baseboard. In addition, it is necessary to make sure that the interlocking metal tabs on the back of the PCI adapter assembly are correctly inserted into the slots in the back of the chassis.
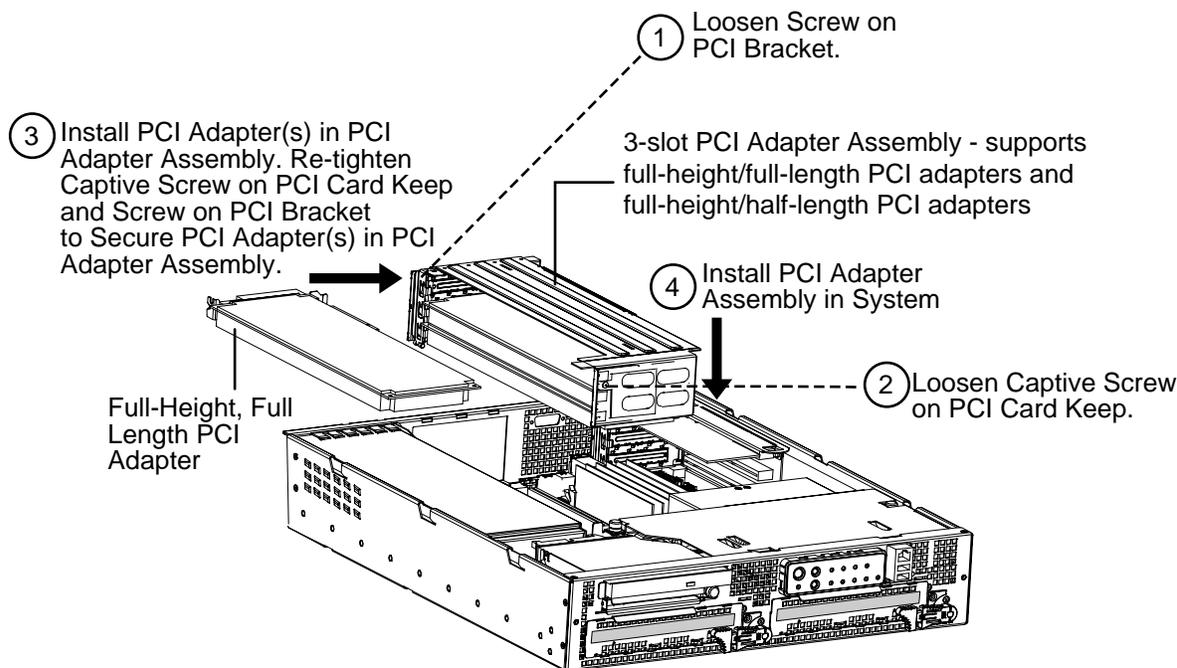
TP00469

Figure 33. Segment B Full-Height, Full-Length PCI Adapter Subsystem

Table 26 shows the maximum PCI bus speed achievable on PCI Bus Segment B. Any slower PCI adapter installed in the PCI Adapter Subsystem will gate the speed.

Table 26. Segment B Full-Height, Full-Length PCI Adapter Maximum Speed

Configuration	3.3 Volt Riser Card	5-Volt Riser Card
0 Adapter Cards installed and on-board Dual NIC device enabled	PCI-X 64 bit/100 MHz	PCI-X 32 bit/33 MHz
1 Adapter Card installed and on-board Dual NIC device enabled	PCI-X 64 bit/100 MHz	PCI-X 32 bit/33 MHz
2 Adapter Cards installed and on-board Dual NIC device enabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz
3 Adapter Cards installed and on-board Dual NIC device enabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz
1 Adapter Card installed and on-board Dual NIC device disabled	PCI-X 64 bit/100 MHz	PCI-X 32 bit/33 MHz

Configuration	3.3 Volt Riser Card	5-Volt Riser Card
2 Adapter Cards installed and on-board Dual NIC device disabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz
3 Adapter Cards installed and on-board Dual NIC device disabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz

Replacing 3.3 Volt Add-in Cards in Low Profile, Half-Length PCI Adapter Subsystem

A three-slot PCI adapter assembly that supports only low-profile, half-length PCI adapters is installed in the Segment C PCI riser slot located on the right side of the server baseboard. This PCI adapter assembly is configured and installed as shown in Figure 34. After the PCI adapter assembly is removed from the system, it is configured with PCI adapters by plugging the PCI adapters into the PCI connectors on the 3.3-Volt riser card that is part of the PCI adapter assembly. The PCI adapter assembly is then installed into the system by plugging the riser card into the riser card connector on the server baseboard. In addition, it is necessary to make sure that the interlocking metal tabs on the back of the PCI adapter assembly are correctly inserted into the slots in the back of the chassis.
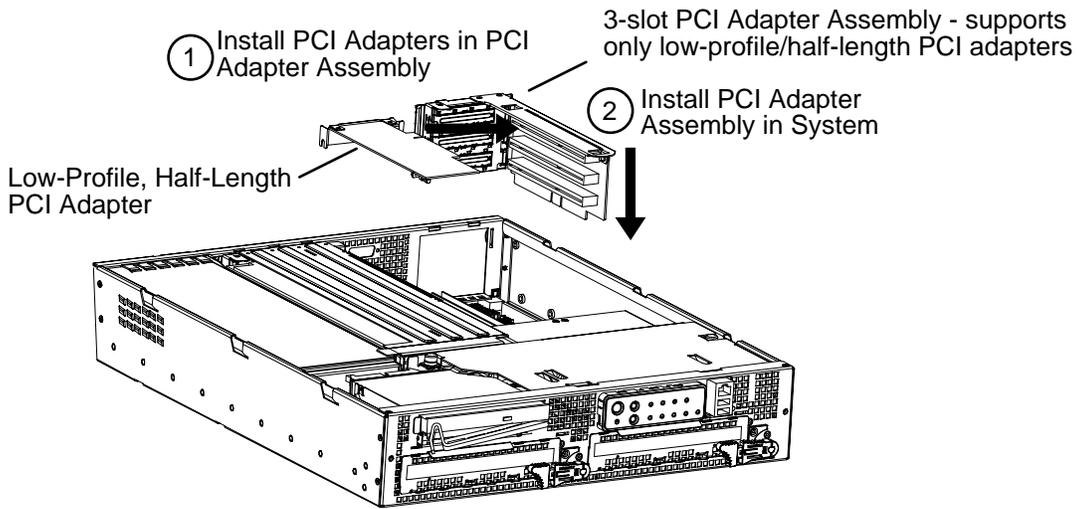
TP00470

Figure 34. Segment C Low-Profile, Half-Length PCI Adapter Subsystem

Table 27 shows the maximum PCI bus speed achievable on PCI Bus Segment C. Note that only 3.3-V PCI riser cards are supported in the Segment C PCI Adapter Subsystem. 5-V PCI riser cards are not supported.

Table 27. Segment C Low-Profile, Half-Length PCI Adapter Maximum Speed

Configuration	3.3 Volt Riser Card
0 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/100 MHz
1 Adapter Card installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/100 MHz
2 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/100 MHz
3 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/66 MHz
1 Adapter Card installed and on board Adaptec* AIC7902 SCSI device disabled	PCI-X 64 bit/100 MHz
2 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device disabled	PCI-X 64 bit/100 MHz
3 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device disabled	PCI-X 64 bit/66 MHz

Front Panel Board Connectors (FPIO Board)

Table 28 shows all the connectors on the FPIO system board, the interconnect used for each connector, and the destination for the interconnect. In addition, the first column references the location of the connector location (see Figure 35).

Table 28. FPIO Board Connections

Loc	Ref Des	Function	Interconnect	Connects to
A	J5A1	2x20 IDE Connector	IDE Cable	Baseboard IDE Connector
B	J2A1	68 Pin Blind Mate receptacle	CDFDD I/F	CDROM or Floppy Carrier
C	J7A1	2x10 System Fan Cntrl conn	Fan Cntrl Cbl	Baseboard Fan Connectors
D	J5B1	68 pin SCSI Connector	SCSI BB Cbl	Baseboard SCSI Connector
E	J6A1	2x8 Alarms Connector	Alarms Cable	System Chassis Back
F	J1A1	2x3 P/S Power Connector	P/S harness	Power Supply Assembly
G	J9A1	1x3 System Fan 1 Conn	Fan 1 harness	Fan 1
H	J8A3	1x3 System Fan 2 Conn	Fan 2 harness	Fan 2

Loc	Ref Des	Function	Interconnect	Connects to
I	J8A2	1x3 System Fan 3 Conn	Fan 3 harness	Fan 3
J	J8A1	1x3 System Fan 4 Conn	Fan 4 harness	Fan 4
K	J9D1	80 pin SCA Connector	SCSI Flex 1	SCSI Disk Drive 1
L	J5D1	80 pin SCA Connector	SCSI Flex 2	SCSI Disk Drive 2
M	J3A1	2x5 USB Connector	USB Cable	Baseboard USB Connector
N	J1C1	2x17 Floppy Conn	Floppy Cable	Baseboard Floppy Connector
O	J4A1	2x17 Front Panel conn 2mm	FP Cable	Baseboard Front Panel Connector
P	J9D2	RJ45 COM2/Dual USB conn	N/C	
Q	J9A2	I^2C Connector	IPMB Harness	Baseboard IPMB Conn
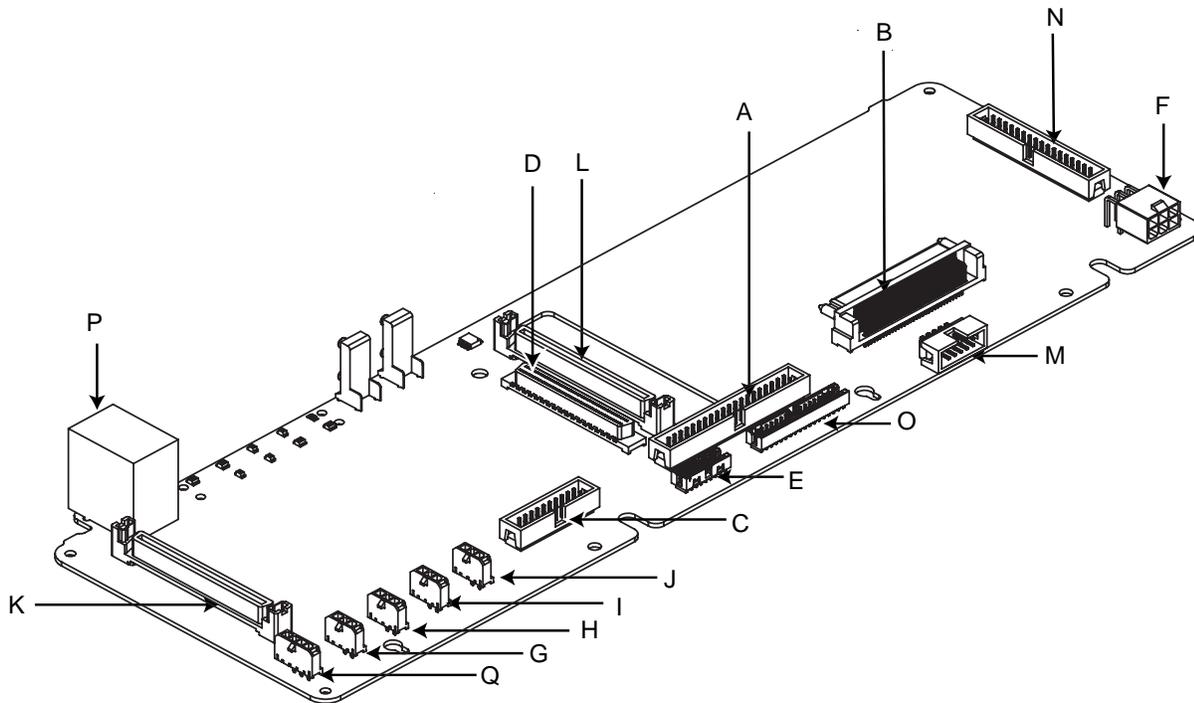
Figure 35. FPIO Connector Location

Replacing the Fan Array Assembly

To replace the fan array assembly, do the following:

1. Loosen the three captive screws that secure the fan guard and remove the fan guard.
2. Disconnect the 4 fan power cables from the FPIO board.
3. Loosen the 1 captive screw on the fan array assembly.
4. Remove the fan array assembly.
5. Insert the new fan array assembly.
6. Tighten the one captive screw on the fan array assembly.
7. Re-connect the 4 fan power cables to the connectors on the FPIO board. Take care to re-connect each fan power cable to the correct connector.
8. Replace the fan guard.
9. Tighten the three captive screws on the fan guard.

Fan Guard

Blue Captive Screw

Blue Captive Screw

Blue Captive Screw

J8A1   J8A2

J8A3   J9A1
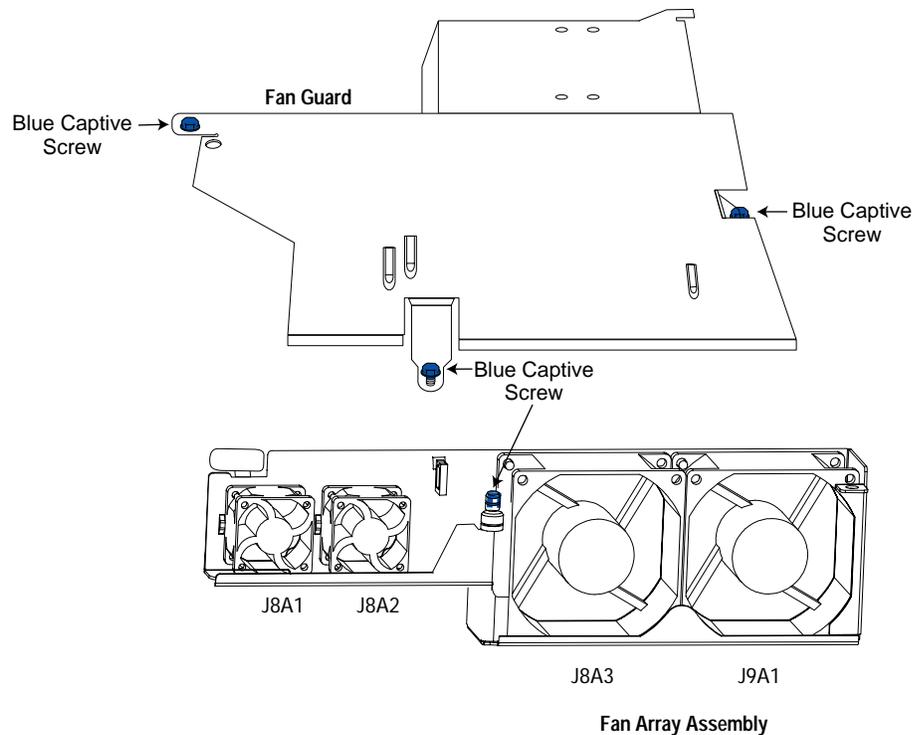
Fan Array Assembly

TP00471

Figure 36. Replacing the Fan Array Assembly

Removing the Power Supply Cage

To replace the power supply cage, follow these instructions:

1. Remove the front bezel.
2. Remove the peripheral drive tray.
3. Remove the fan guard and fan array assembly (see Figure 36).
4. Remove the full-length PCI Adapter subsystem (see Figure 33).
5. Disconnect the PS/2 power connector from the FPIO board (see "F" on Figure 35).
6. Disconnect the SSI front panel connector from the server board (see "W" on Figure 5).
7. Disconnect the ID LED connector form the server board (see "B" on Figure 5).
8. Disconnect the auxiliary signal connector from the server board (see "P" on Figure 5).
9. Disconnect the PS Signal Connector from the server board (see "U" on Figure 5).
10. Remove the power supply modules from the power supply cage (see Figure 14).
11. Loosen the 2 screws at the rear of the power supply cage, connecting the power supply cage to the chassis.
12. Loosen the one screw at the front of the power supply cage, connecting the power supply cage to the chassis.
13. Pull power supply cage forward (towards front of system) and upward. Lift cage out of chassis.
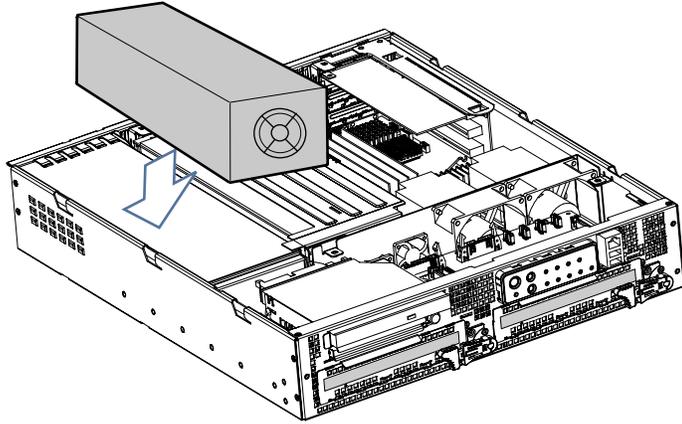
TP00472

Figure 37. Removing the Power Supply Cage

9 Technical Reference

This section includes:
- Connector pinouts
- Information on jumpers

Connector Pinouts

This section describes certain I/O interface connectors of the IBM® @server xSeries 343 server.

Alarms

The alarms port interface is a standard DB15-pin connector (see Figure 38). This connector allows remote display of alarm conditions. Each alarm (Major, Minor, Critical and Power) is the output of a STDT relay contact. A common contact with normally open and normally closed connections is included. The power alarm has just a common and normally open contact outputs. The major and minor alarms contain external reset circuits. Table 29 gives the pinout of the alarms connector.

⚠ **CAUTION**

Do not apply more than 60 Volts (maximum) to any pin or combination of pins on the alarms connector.
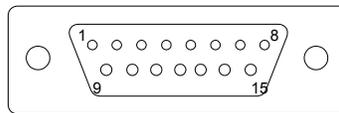
Figure 38. 15-pin Alarms Connector

Table 29.   Alarms Connector Pinout

Pin	Description	Pin	Description
1	Minor reset positive	9	Minor alarm normally closed
2	Minor reset negative	10	Minor alarm common
3	Major reset positive	11	Major alarm normally open
4	Major reset negative	12	Major alarm normally closed
5	Critical alarm normally open	13	Major alarm common
6	Critical alarm normally closed	14	Power alarm normally open
7	Critical alarm common	15	Power alarm common
8	Minor alarm normally open		

DC Power Input for DC-Input Power Supply Cage

A DC power terminal block is provided at the rear of the DC-input power supply cage.

TP136

Figure 39. DC Power Input Connector

The terminal block will accept standard terminal lugs, size Newark* stock # 81N1501 type CRS-T0-1406-HT. These lugs accept 14 AWG wire gauge. The width (W in Figure 40) of the lug can be no larger than 0.25 inches.

The DC-input connector has two sets of screw terminals. Both sets of terminals should be wired using 14AWG wire. Each terminal input should be fused with a maximum of a 10A fuse.
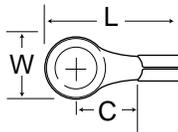
TP137

Figure 40. DC Power Terminal Lug

To connect the earth ground conductor to the chassis stud:
1. Place a #8-32 nut on the chassis stud and tighten to 10 in-lb.
2. Place the earth ground wire terminal lug on the chassis stud.
3. Place another #8-32 nut on the chassis stud so that the earth ground wire terminal is between the two nuts and tighten the second nut to 10 in-lb.

Serial Ports

The rear RJ-45 serial port is a fully functional serial port that supports any standard serial device and provides support for serial concentrators. For server applications that use a serial concentrator to access the server management features of the baseboard, a standard 8-pin CAT-5 cable from the serial concentrator is plugged directly into the rear RJ-45 serial port. The 8 pins of the RJ-45 connector can be configured to match either of two pinout standards used by serial port devices. To accommodate either standard, the J5A2 jumper block located directly behind the rear RJ-45 serial port must be jumpered appropriately according to the desired standard.

⟹ **NOTE**

By default, the RJ-45 serial port is configured to support a DSR signal.

For serial devices that require a DSR signal (default), the J5A2 jumper must be configured in position 3-4 (Figure 41, B).

For serial devices that require a DCD signal, the jumper must be in position 1-2 (Figure 41, A).
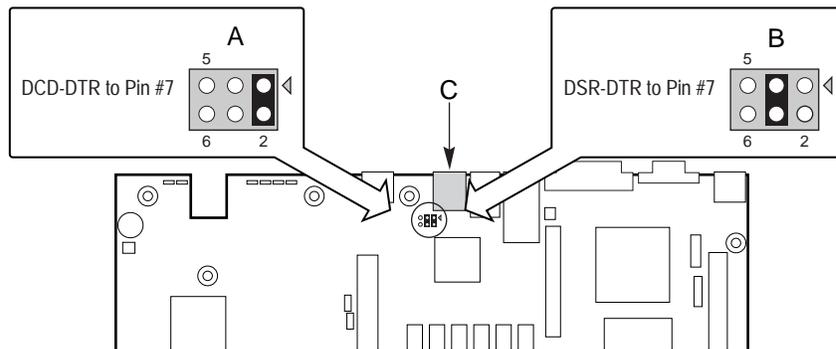
TP138

Figure 41. J5A2 Jumper Block for DSR Signal

Appendix A: IBM Statement of Limited Warranty Z125-4753-07 11/2002

Part 1 - General Terms

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms, Part 2 - Country- unique Terms, and Part 3 - Warranty Information. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. **Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract.**

What this Warranty Covers

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications") which are available on request. The warranty period for the Machine starts on the original Date of Installation and is specified in Part 3 - Warranty Information. The date on your invoice or sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part. Unless IBM specifies otherwise, these warranties apply only in the country or region in which you purchased the Machine.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

What this Warranty Does not Cover

This warranty does not cover the following:

- any software programs, whether pre-loaded or shipped with the Machine, or installed subsequently;
- failure resulting from misuse (including but not limited to use of any Machine capacity or capability, other than that authorized by IBM in writing), accident, modification, unsuitable physical or operating environment, or improper maintenance by you;
- failure caused by a product for which IBM is not responsible; and
- any non-IBM products, including those that IBM may procure and provide with or integrate into an IBM Machine at your request.

The warranty is voided by removal or alteration of identification labels on the Machine or its parts.

IBM does not warrant uninterrupted or error-free operation of a Machine.

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, is provided **WITHOUT WARRANTIES OF ANY KIND.**

How to Obtain Warranty Service

If the Machine does not function as warranted during the warranty period, contact IBM or your reseller to obtain warranty service. If you do not register the Machine with IBM, you may be required to present proof of purchase as evidence of your entitlement to warranty service.

What IBM Will Do to Correct Problems

When you call for service, you must follow the problem determination and resolution procedures that IBM specifies. A technician will attempt to make an initial diagnosis of your problem and help you resolve it over the telephone.

The type of warranty service applicable to your Machine is specified in Part 3 - Warranty Information.

You are responsible for downloading and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM Machine) and other software updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

If your problem can be resolved with a Customer Replaceable Unit ("CRU")

(e.g., keyboard, mouse, speaker, memory, hard disk drive and other easily replaceable parts), IBM will ship these parts to you for replacement by you.

If the Machine does not function as warranted during the warranty period and your problem cannot be resolved over the telephone, through your application of Machine Code or software updates, or with a CRU, IBM or your reseller, if approved by IBM to provide warranty service, will either, at its discretion, 1) repair it to make it function as warranted, or 2) replace it with one that is at least functionally equivalent. If IBM is unable to do either, you may return the Machine to your place of purchase and your money will be refunded.

IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Exchange of a Machine or Part

When the warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Your Additional Responsibilities

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to:

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;

2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and

3. where applicable, before service is provided:

    a. follow the service request procedures that IBM or your reseller provides;

    b. backup or secure all programs, data, and funds contained in the Machine;

    c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit IBM to fulfill its obligations; and

> d. inform IBM or your reseller of changes in the Machine's location.

4. ensure all information about identified or identifiable individuals (Personal Data) is deleted from the Machine (to the extent technically possible), (b) allow IBM, your reseller or an IBM supplier to process on your behalf any remaining Personal Data as IBM or your reseller considers necessary to fulfill its obligations under this Statement of Limited Warranty (which may include shipping the Machine for such processing to other IBM service locations around the world), and (c) ensure that such processing complies with any laws applicable to such Personal Data.

Limitation of Liability

IBM is responsible for loss of, or damage to, your Machine only while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller are responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM for any reason. You should remove all such information from the Machine prior to its return.

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, DATA; 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR 4) LOST PROFITS, BUSINESS

REVENUE, GOODWILL OR ANTICIPATED SAVINGS. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

Governing Law

Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Statement of Limited Warranty, without regard to conflict of law principles.

THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR JURISDICTION TO JURISDICTION.

Jurisdiction

All of our rights, duties, and obligations are subject to the courts of the country in which you acquired the Machine.

Part 2 - Country-unique Terms

AMERICAS

ARGENTINA

Governing Law: *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Ordinary Commercial Court of the city of Buenos Aires.

BRAZIL

Governing Law: *The following is added after the first sentence:*
Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the court of Rio de Janeiro, RJ.

PERU

Limitation of Liability: *The following is added at the end of this section:*

In accordance with Article 1328 of the Peruvian Civil Code the limitations and exclusions specified in this section will not apply to damages caused by IBM's willful misconduct ("dolo") or gross negligence ("culpa inexcusable").

NORTH AMERICA

How to Obtain Warranty Service: *The following is added to this Section:*
To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM- SERV (426-7378).

CANADA

Limitation of Liability: *The following replaces item 1 of this section:*

damages for bodily injury (including death) or physical harm to real property and tangible personal property caused by IBM's negligence; and

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State of New York.

ASIA PACIFIC

AUSTRALIA

What this Warranty Covers: *The following paragraph is added to this section:*
The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability: *The following is added to this section:*
Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974 or other similar legislation, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State or Territory.

IBM Statement of Limited Warranty

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State of New York, United States of America.

CAMBODIA, INDONESIA, LAOS, AND VIETNAM

Arbitration: *The following is added under this heading:*
Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Singapore in accordance with the Arbitration Rules of Singapore International Arbitration Center ("SIAC Rules") then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the SIAC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

HONG KONG S.A.R. OF CHINA AND MACAU S.A.R. OF CHINA

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of Hong Kong Special Administrative Region of China.

INDIA

Limitation of Liability: *The following replaces items 1 and 2 of this section:*

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence; and

2. as to any other actual damage arising in any situation involving

nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, the charge paid by you for the individual Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Bangalore, India in accordance with the laws of India then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Bar Council of India. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

JAPAN

Governing Law: *The following sentence is added to this section:*
Any doubts concerning this Statement of Limited Warranty will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

MALAYSIA

Limitation of Liability: *The word "**SPECIAL**" in item 3 of the fifth paragraph is deleted.*

NEW ZEALAND

What this Warranty Covers: *The following paragraph is added to this section:*
The warranties specified in this section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods

for the purposes of a business as defined in that Act.

Limitation of Liability: *The following is added to this section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York, United States of America (except when local law requires otherwise).

PHILIPPINES

Limitation of Liability: *Item 3 in the fifth paragraph is replaced by the following:*

SPECIAL (INCLUDING NOMINAL AND EXEMPLARY DAMAGES), MORAL, INCIDENTAL, OR INDIRECT DAMAGES FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Metro Manila, Philippines in accordance with the laws of the Philippines then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Philippine Dispute Resolution Center, Inc. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

SINGAPORE

Limitation of Liability: *The words* "**SPECIAL**" *and* "**ECONOMIC**" *in item 3 in the fifth paragraph are deleted.*

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:
The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

How to Obtain Warranty Service: If you purchase a Machine in Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway,

Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom or Vatican State, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM, provided the Machine has been announced and made available by IBM in the country in which you wish to obtain service. If you purchased a Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchase a Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM approved service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM approved service provider.

*Add the following paragraph in **Western Europe** (Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom, Vatican State):*

The warranty for Machines acquired in Western Europe shall be valid and applicable in all Western Europe countries provided the Machines have been announced and made available in such countries.

Governing Law:

The phrase "the laws of the country in which you acquired the Machine" is replaced by:

1) "the laws of Austria" **in Albania, Armenia, Azerbaijan, Belarus, Bosnia- Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia;** 2) "the laws of France" **in Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna;** 3) "the laws of Finland" **in Estonia, Latvia, and Lithuania;** 4) "the laws of England" **in Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, the United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe;** and 5) "the laws of South Africa" **in South Africa, Namibia, Lesotho and Swaziland.**

Jurisdiction: *The following exceptions are added to this section:*

1. **In Austria** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City); 2) **in Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates,**

West Bank/Gaza, Yemen, Zambia, and Zimbabwe all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts; 3) in **Belgium** and **Luxembourg**, all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the capital city, of the country of your registered office and/or commercial site location only are competent; 4) **in France, Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna** all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 5)

in Russia, all disputes arising out of or in relation to the interpretation, the violation, the termination, the nullity of the execution of this Statement of Limited Warranty shall be settled by Arbitration Court of Moscow; 6) **in South Africa, Namibia, Lesotho and Swaziland**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 7) **in Turkey** all disputes arising out of or in connection with this Statement of Limited Warranty shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 8) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; and 9) **in the United Kingdom**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the English courts.

Arbitration: *The following is added under this heading:*

In Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia all disputes arising out of this Statement of Limited Warranty or related to its violation, termination or nullity will be finally settled under the Rules of Arbitration and Conciliation of the International Arbitral Center of the Federal Economic Chamber in Vienna (Vienna Rules) by three arbitrators appointed in accordance with these rules. The arbitration will be held in Vienna, Austria, and the official language of the proceedings will be English. The decision of the arbitrators will be final and binding upon both parties. Therefore, pursuant to paragraph 598 (2) of the Austrian Code of Civil Procedure, the parties expressly waive the application of paragraph 595 (1) figure 7 of the Code. IBM may, however, institute proceedings in a competent court in the country of installation.

In Estonia, Latvia and Lithuania all disputes arising in connection with this Statement of Limited Warranty will be finally settled in arbitration that will be held in Helsinki, Finland in accordance with the arbitration laws of Finland then in effect. Each party will appoint one arbitrator. The arbitrators will then jointly appoint the chairman. If arbitrators cannot agree on the chairman, then the Central Chamber of Commerce in Helsinki will appoint the chairman.

EUROPEAN UNION (EU)

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

Consumers have legal rights under applicable national legislation governing the sale of consumer goods. Such rights are not affected by the warranties provided in this Statement of Limited Warranty.

How to Obtain Warranty Service: *The following is added to this section:*

To obtain warranty service from IBM in EU countries, see the telephone listing in Part 3 - Warranty Information.

You may contact IBM at the following address:

> IBM Warranty & Service Quality Dept.
> PO Box 30
> Spango Valley
> Greenock
> Scotland PA16 0AH

AUSTRIA, DENMARK, FINLAND, GREECE, ITALY, NETHERLANDS, PORTUGAL, SPAIN, SWEDEN AND SWITZERLAND

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty or due to any other cause related to this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault) or of such cause, for a maximum amount equal to the charges you paid for the Machine. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").
The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

FRANCE AND BELGIUM

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault), for a maximum amount equal to the charges you paid for the Machine that has caused the damages. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").
   The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE**

CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA

What this Warranty Covers: *The following replaces the first sentence of the first paragraph of this section:*
The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this section:

The warranty period for Machines is 12 months from the date of delivery. The limitation period for consumers in action for breach of warranty is the statutory period as a minimum. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *The following is added to this section:*

During the warranty period, transportation for delivery of the failing Machine

to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this section:*
as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this section:*
In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

GERMANY

What this Warranty Covers: *The following replaces the first sentence of the first paragraph of this section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this section:

The minimum warranty period for Machines is twelve months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *The following is added to this section:*

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

HUNGARY

Limitation of Liability: *The following is added at the end of this section:*

The limitation and exclusion specified herein shall not apply to liability for a breach of contract damaging life, physical well-being, or health that has been caused intentionally, by gross negligence, or by a criminal act.

The parties accept the limitations of liability as valid provisions and state that the Section 314.(2) of the Hungarian Civil Code applies as the acquisition price as well as other advantages arising out of the present Statement of Limited Warranty balance this limitation of liability.

IRELAND

What this Warranty Covers: *The following is added to this section:*
Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default occurring on the date of occurrence of the last such Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for death or personal injury caused by the negligence of IBM.

2. Subject always to the **Items for Which IBM is Not Liable** below, IBM will accept unlimited liability for physical damage to your tangible property resulting from the negligence of IBM.
3. Except as provided in items 1 and 2 above, IBM's entire liability for actual damages for any one Default will not in any event exceed the greater of 1) EUR 125,000, or 2) 125% of the amount you paid for the Machine directly relating to the Default.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM, its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

SLOVAKIA

Limitation of Liability: *The following is added to the end of the last paragraph:*

The limitations apply to the extent they are not prohibited under §§ 373-386 of the Slovak Commercial Code.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

Limitation of Liability: *The following is added to this section:*

IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

UNITED KINGDOM

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation

to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for:

    a. death or personal injury caused by the negligence of IBM; and

    b. any breach of its obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982, or any statutory modification or re-enactment of either such Section.

2. IBM will accept unlimited liability, subject always to the **Items for Which IBM is Not Liable** below, for physical damage to your tangible property resulting from the negligence of IBM.

3. IBM's entire liability for actual damages for any one Default will not in any event, except as provided in items 1 and 2 above, exceed the greater of 1) Pounds Sterling 75,000, or 2) 125% of the total purchase price payable or the charges for the Machine directly relating to the Default.

These limits also apply to IBM's suppliers and resellers. They state the maximum for which IBM and such suppliers and resellers are collectively responsible.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM or any of its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

loss of, or damage to, data;

1. special, indirect, or consequential loss; or
2. loss of profits, business, revenue, goodwill, or anticipated savings.

Part 3 - Warranty Information

This Part 3 provides information regarding the warranty applicable to your Machine, including the warranty period and type of warranty service IBM provides.

Warranty Period

The warranty period may vary by country or region and is specified in the table below.

Note: "Region" means either Hong Kong or Macau Special Administrative Region of China.

Machine - IBM eServer xSeries 343 Type 8847

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	3 years	1 and 2

* See "Types of Warranty Service" for the legend and explanations of warranty-service types.

A warranty period of 3 years on parts and 1 year on labor means that IBM provides warranty service without charge for:

1. parts and labor during the first year of the warranty period; and

2. parts only, on an exchange basis, in the second and third years of the warranty period. IBM will charge you for any labor provided in performance of the repair or replacement(s) in the second and third year of the warranty period.

Types of Warranty Service

If required, IBM provides repair or exchange service depending on the type of warranty service specified for your Machine in the above table and as described below. Warranty service may be provided by your reseller if approved by IBM to

perform warranty service. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may

not be available in all worldwide locations, additional charges may apply outside IBM's normal service area, contact your local IBM representative or your reseller for country and location specific information.

1. **Customer Replaceable Unit ("CRU") Service**
   IBM will ship CRU parts to you for your replacement. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM's instructions. If you do not return the defective CRU, if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for the replacement.

2. **On-site Service**
   IBM or your reseller will either repair or exchange the failing Machine at your location and verify its operation. You must provide suitable working area to allow disassembly and reassembly of the IBM Machine. The area must be clean, well lit and suitable for the purpose. **For some Machines, certain repairs may require sending the Machine to an IBM service center.**

3. **Courier or Depot Service***
   You will disconnect the failing Machine for collection arranged by IBM. IBM will provide you with a shipping container for you to return your Machine to a designated service center. A courier will pick up your Machine and deliver it to the designated service center. Following its repair or exchange, IBM will arrange the return delivery of the Machine to your location. You are responsible for its installation and verification.

4. **Customer Carry-In or Mail-In Service**
   You will deliver or mail as IBM specifies (prepaid unless IBM specifies otherwise) the failing Machine suitably packaged to a location IBM designates. After IBM has repaired or exchanged the Machine, IBM will make it available for your collection or, for Mail-in Service, IBM will return it to you at IBM's expense, unless IBM specifies otherwise. You are responsible for the subsequent installation and verification of the Machine.

* This type of service is called ThinkPad EasyServ or EasyServ in some countries.

The IBM Machine Warranty World Wide Web site at http://www.ibm.com/servers/support/machine_warranties/ provides a worldwide overview of IBM Limited Warranty for Machines, a Glossary of IBM definitions, Frequently Asked Questions (FAQs) and Support by Product (Machine) with links to Product Support pages. **The IBM Statement of Limited Warranty is also available on this site in 29 languages.**

To obtain warranty service contact IBM or your IBM reseller. In Canada or the United States, call 1-800-IBM-SERV (426-7378). In the EU countries, see the telephone numbers below.

EU Country Telephone List

Phone numbers are subject to change without notice.

Austria -- 43-1-24592-5901	Italy -- 39-02-482-9202
Belgium -- 02-718-4339	Luxembourg -- 352-360385-1
Denmark -- 4520-8200	Netherlands -- 020-514-5770
Finland -- 358-9-4591	Portugal -- 351-21-7915-147
France -- 0238-557-450	Spain -- 34-91-662-4916
Germany -- 07032-15-4920	Sweden -- 46-8-477-4420
Greece -- 30-210-688-1220	United Kingdom -- 01475-555-055
Ireland -- 353-1-815-4000	

Appendix B: Equipment Log and Configuration Worksheet

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

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
System Baseboard			
Processor Speed and Cache			
Keyboard			
Mouse			
Floppy Drive			
CD-ROM Drive			
Hard Disk Drive (1)			
Hard Disk Drive (2)			
First Installed Power Supply			
Second Installed Power Supply			
PCI Slot (1)			
PCI Slot (2)			
PCI Slot (3)			
PCI Slot (4)			
PCI Slot (5)			
PCI Slot (6)			

Appendix C: Safety Information

Related Service Information

Note

> The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this manual.

Safety Information

The following section contains the safety information that you need to be familiar with before servicing an IBM computer.

General Safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
    1. Ensure you can stand safely without slipping.
    2. Distribute the weight of the object equally between your feet.
    3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
    4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.
  Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.

Reinstall all covers correctly before returning the machine to the customer.

Electrical Safety

CAUTION

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  — Performing a mechanical inspection
  — Working near power supplies
  — Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  — Ensure that another person, familiar with the power-off controls, is near you.
    Remember: Another person must be there to switch off the power, if necessary.
  — Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
    Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  — When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  — Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  — Power supply units
  — Pumps
  — Blowers and fans
  — Motor generators

  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  — Use caution; do not become a victim yourself.
  — Switch off power.
  — Send another person to get medical aid.

Safety Inspection Guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items.
However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.
If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.
Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
   Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
   b. The power cord should be the appropriate type as specified in the parts listings.
   c. Insulation must not be frayed or worn.
3. Remove the cover.
4. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
5. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
6. Check for worn, frayed, or pinched cables.
7. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling Electrostatic Discharge-sensitive Devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.

- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

  Note

  The use of a grounding system is desirable but not required to protect against ESD damage.

  — Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
  — Use an ESD common ground or reference point when working on a double- insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
  — Use the round ground-prong of the ac plug on ac-operated computers.

Grounding Requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety Notices (multi-lingual translations)

The caution and danger safety notices in this section are provided in the following languages:
- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Korean
- Spanish

Important

All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

— **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**

— **Connect all power cords to a properly wired and grounded electrical outlet.**

— **Connect to properly wired outlets any equipment that will be attached to this product.**

— **When possible, use one hand only to connect or disconnect signal cables.**

— **Never turn on any equipment when there is evidence of fire, water, or structural damage.**

— **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**

— **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2

CAUTION

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

— Throw or immerse into water

— Heat to more than 100 °C (212 °F)

— Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Statement 3

CAUTION

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

1. Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
2. Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

CAUTION

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.
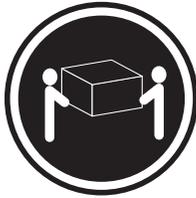
Statement 4

≥18 kg (39.7 lb)　　≥32 kg (70.5 lb)　　≥55 kg (121.2 lb)

CAUTION

Use safe practices when lifting.

Statement 5

CAUTION

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
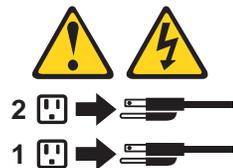
Statement 10

CAUTION

Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

>82 kg

Importante

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1

PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:
1. **Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.**
2. **Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.**
3. **Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.**
4. **Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.**
5. **Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.**
6. **Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.**
7. **Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.**

Para Conectar:	Para Desconectar:
1. DESLIGUE Tudo.	1. DESLIGUE Tudo.
2. Primeiramente, conecte todos os cabos aos dispositivos.	2. Primeiramente, remova os cabos de alimentação das tomadas.
3. Conecte os cabos de sinal aos conectores.	3. Remova os cabos de sinal dos conectores.
4. Conecte os cabos de alimentação às tomadas.	4. Remova todos os cabos dos dispositivos.
5. LIGUE os dispositivos.	

Instrução 2

CUIDADO

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um móídulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de mídulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

1. Jogue ou coloque na água
2. Aqueça a mais de 100°C (212°F)
3. Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

Instrução 3

PRECAUCIÓN

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ítica, transmissores, etc.) estiverem instalados, observe o seguinte:

1. Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
2. A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

PERIGO

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos íticos, e evite exposição direta ao raio.

Instrução 4

≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

CUIDADO

Ao levantar a máquina, faça-o com segurança.

Instrução 5

CUIDADO

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da.

2
1
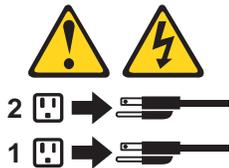
Instrução 10

CUIDADO

> Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre
> dispositivos montados em rack.

>82 kg

重要：

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 2

警告：

更换锂电池时，只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同
类型的电池。

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模
块进行更换。电池中含有锂，如果使用、拿放或处理不当，可能会发生
爆炸。

请勿对电池进行下列操作：
扔入或浸入水电　　。
加热超过 100　（212 F）
进行修理或分解
请按本地法规要求处理电池。

声明 3

警告：

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时，应注
意以下事项：

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险，本设备中
没有用户可维修的部件。

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的
危险。

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，
避免直接暴露于光束之下。

声明 4

≥18 kg (37 磅)   ≥32 kg (70.5 磅)   ≥ 55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5

警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。

声明 6

警告：

如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至
使用方便的电源。

声明 7

警告：

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定
以避免造成人员伤害。外门支撑不了设备的重量。

声明 8

警告：
不要拆除电源外盖或贴有下列标签的任何部件。

贴有此标签的组件内部存在高电压、高电流的危险。这些组件中
没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服
务技术人员联系。

声明 9

警告：

为避免人员伤害，拆除设备上的风扇前应拨下热插拨风扇电缆。

声明 10

警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。

> 82 kg (180 磅)

声明 11

警告：

下面的标签表明附近有锋利的边、角或接头。

声明 12

警告：
下面的标签表明附近有高热表面。

重要資訊：

Server Library 中所有「注意」及「危險」的聲明均以數字開
始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲
明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將
出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

－ 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
－ 請將電源線接至接線及接地正確的電源插座。
－ 請將本產品隨附的設備連接至接線正確的插座。
－ 儘可能使用單手來連接或切斷信號電纜線。
－ 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
－ 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
－ 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開啓裝置的電源。	

聲明 2

注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相
當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同
廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會
引發爆炸。

請勿將電池：
– 丟入或浸入水中
– 加熱超過 100 ℃ (212 ℉)
– 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3

注意：

安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列事項：

− 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。

− 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。

危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。

聲明 4
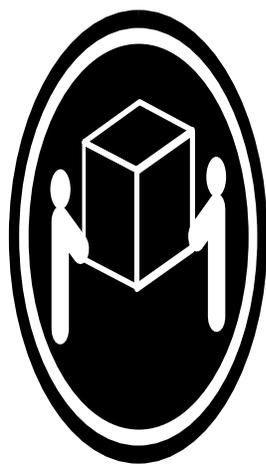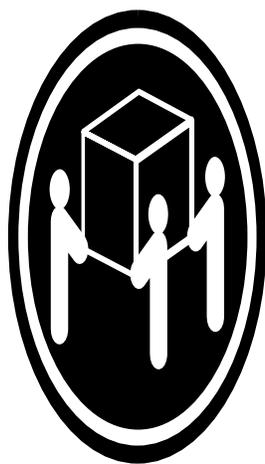
≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅)   ≥ 55 公斤 (121.2 磅)

注意：

抬起裝置時，請注意安全措施。

聲明 5
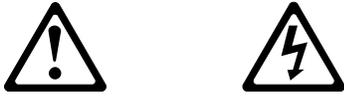
注意：
裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。
本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。

2
1
聲明 10
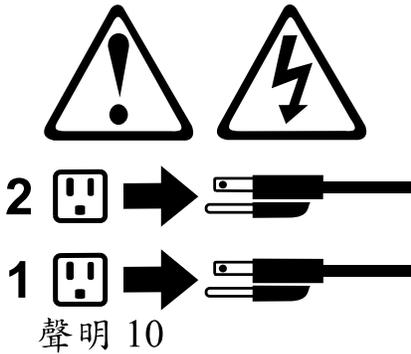
注意：
請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。

> 82 公斤 (180 磅)

Important

> Toutes les consignes Attention et Danger indiquées dans la bibliothèque IBM documentation sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

> Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

> Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Notice n° 1

DANGER

> **Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.**

> **Pour éviter tout risque de choc électrique:**
> 1. **Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.**
> 2. **Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.**
> 3. **Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.**
> 4. **Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.**
> 5. **Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.**
> 6. **Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).**
> 7. **Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.**

Connexion	Déconnexion
1. Mettez les unités hors tension.	1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.	2. Débranchez les cordons d'alimentation des prises.
3. Branchez les câbles d'interface sur des connecteurs.	3. Débranchez les câbles d'interface des connecteurs.
4. Branchez les cordons d'alimentation sur des prises.	4. Débranchez tous les câbles des unités.
5. Mettez les unités sous tension.	

Notice n° 2

ATTENTION

Remplacez la pile au lithium usagée par une pile de référence identique
exclusivement - voir la référence IBM - ou par une pile équivalente
recommandée par le fabricant. Si votre système est doté d'un module contenant
une pile au lithium, vous devez le remplacer uniquement par un module
identique, produit par le même fabricant. La pile contient du lithium et présente
donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

1. Ne la jetez pas à l'eau.
2. Ne l'exposez pas à une température supérieure à 100 °C.
3. Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

Notice n° 3

ATTENTION

Si des produits laser sont installés (tels que des unités de CD-ROM ou de
DVD, des périphériques contenant des fibres optiques ou des émetteurs-
récepteurs), prenez connaissance des informations suivantes:

1. N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez
   effectuer aucune opération de maintenance à l'intérieur.
2. Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et
   d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.

CAUTION

Certains produits laser contiennent une diode laser de classe 3A ou 3B.
Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le
faisceau ou de l'observer à l'aide d'instruments optiques. évitez une
exposition directe au rayon.

Notice n° 4

≥18 kg (39.7 lb)   **≥32 kg (70.5 lb)**   **≥55 kg (121.2 lb)**

ATTENTION

Faites-vous aider pour soulever ce produit.

Notice n° 5

ATTENTION

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur
d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant
électrique à l'intérieur de la machine. Il se peut que votre unité dispose de
plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau
électrique, débranchez tous les cordons d'alimentation des socles de prise de
courant.
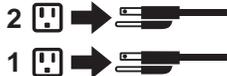
Notice n° 10

ATTENTION

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en
armoire.

>82 kg

Wichtig

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1

VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:
1. **Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.**
2. **Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
3. **Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
4. **Signalkabel möglichst einhändig anschließen oder lösen.**
5. **Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.**
6. **Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.**
7. **Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.**

Kabel anschlieβen:	Kabel lösen:
1. Alle Geräte ausschalten und Netzstecker ziehen.	1. Alle Geräte ausschalten.
2. Zuerst alle Kabel an Einheiten anschließen.	2. Zuerst Netzstecker von Steckdose lösen.
3. Signalkabel an Anschlußbuchsen anschließen.	3. Signalkabel von Anschlußbuchsen lösen.
4. Netzstecker an Steckdose anschließen.	4. Alle Kabel von Einheiten lösen.
5. Gerät einschalten.	

Hinweis 2

ACHTUNG

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

1. mit Wasser in Berührung bringen.
2. über 100 C erhitzen.
3. reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3

ACHTUNG

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

1. Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM- Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD- ROM-Laufwerks nicht öffnen.
2. Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

Hinweis 4

≥18 kg (39.7 lb)   **≥32 kg (70.5 lb)**   **≥55 kg (121.2 lb)**

ACHTUNG

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5

ACHTUNG

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.
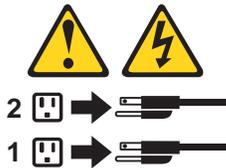
Hinweis 10

ACHTUNG

Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.

>82 kg

Importante

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1

PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:
1. **Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.**
2. **Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.**
3. **Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.**
4. **Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.**
5. **Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.**
6. **Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.**
7. **Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.**

Per collegare:	Per scollegare:
1. SPEGNERE tutti i dispositivi.	1. SPEGNERE tutti i dispositivi.
2. Collegare prima tutti i cavi alle unità.	2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.
3. Collegare i cavi di segnale ai connettori.	3. Rimuovere i cavi di segnale dai connettori.
4. Collegare i cavi di alimentazione alle prese elettriche.	4. Rimuovere tutti i cavi dalle unità.
5. ACCENDERE le unità.	

Avviso 2

ATTENZIONE

> Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.
>
> Evitare di:
> 1. Gettarla o immergerla in acqua
> 2. Riscaldarla ad una temperatura superiore ai 100°C
> 3. Cercare di ripararla o smontarla
>
> Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

Avviso 3

ATTENZIONE

> Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:
> 1. Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
> 2. L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

PERICOLO

> Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:
>
> Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

Avviso 4
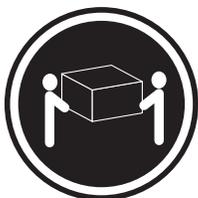
≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

ATTENZIONE

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5

ATTENZIONE

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.

Avviso 10

ATTENZIONE

Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

>82 kg

중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로
시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는
번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의
경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을
읽으십시오.

경고문 1

위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는
위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의
  설치, 유지보수 또는 재구성을 하지 마십시오.

- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.

- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에
  연결하십시오.

- 가능한한 신호 케이블을 한 손으로 연결하거나
  끊으십시오.

- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지
  마십시오.

- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를
  열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크
  및 모뎀을 끊어 주십시오.

- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때
  다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:	연결을 끊으려면:
1. 모든 스위치를 끕니다.	1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.	2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에 연결합니다.	3. 신호 케이블을 커넥터에서 제거합니다.
4. 콘센트에 전원 코드를 연결합니다.	4. 장치에서 모든 케이블을 제거합니다.
5. 장치 스위치를 켭니다.	

경고문 2

주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서
권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를
갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈
유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리
또는 처분하지 않으면 폭발할 수 있습니다.

다음을 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100℃(212℉) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

⚠

주의:

레이저 제품(**CD-ROMs, DVD** 드라이브, 광 장치 또는 트랜스미터 등과
같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우
위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를
받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한
레이저 광선에 노출될 수 있습니다.

⚠

위험

일부 레이저 제품에는 클래서 3A 또는 클래스 3B 레이저
다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를
직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4

≥18 kg (37 lbs)   ≥ 32 kg (70.5 lbs)   ≥ 55 kg (121.2 lbs)

주의:
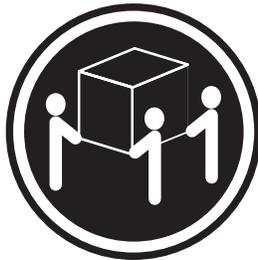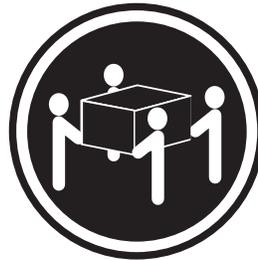
기계를 들 때는 안전하게 들어 올리십시오.

경고문 5

주의:
장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는 지 확인하십시오.

경고문 4

≥18 kg (37 lbs)   ≥ 32 kg (70.5 lbs)   ≥ 55 kg (121.2 lbs)

주의:
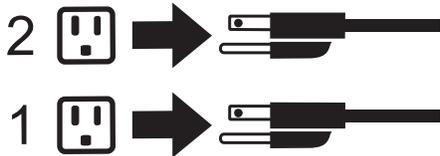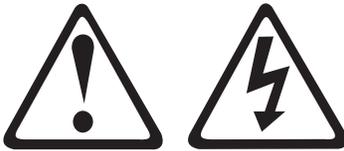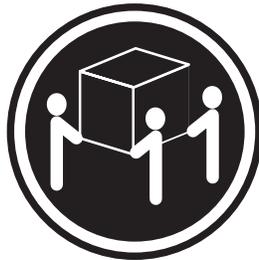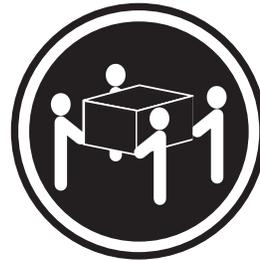
기계를 들 때는 안전하게 들어 올리십시오.

Importante

Todas las declaraciones de precauciín de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaraciín de precauciín o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta secciín.

Por ejemplo, si una declaraciín de peligro empieza con el número 1, las traducciones de esta declaraciín de precauciín aparecen en esta secciín bajo Declaraciín 1.

Lea atentamente todas las declaraciones de precauciín y peligro antes de llevar a cabo cualquier operaciín.

Declaración 1

PELIGRO

La corriente eléctrica de los cables telefínicos, de alimentaciín y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:
1. **No conecte ni desconecte ningún cable ni realice las operaciones de instalaciín, mantenimiento o reconfiguraciín de este producto durante una tormenta.**
2. **Conecte cada cable de alimentaciín a una toma de alimentaciín eléctrica con conexiín a tierra y cableado correctos.**
3. **Conecte a tomas de alimentaciín con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.**
4. **Si es posible, utilice una sola mano cuando conecte o desconecte los cables de sent.al.**
5. **No encienda nunca un equipo cuando haya riesgos de incendio, de inundaciín o de daños estructurales.**
6. **Desconecte los cables de alimentaciín, sistemas de telecomunicaciones, redes y mídems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalaciín y configuraciín.**
7. **Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operaciín de instalaciín, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.**

Para la conexin	Para la desconexiín
1. APÁGUELO todo.	1. APÁGUELO todo.
2. En primer lugar, conecte los cables a los dispositivos.	2. En primer lugar, retire cada cable de alimentaciín de la toma de alimentaciín.
3. Conecte los cables de señal a los conectores.	3. Retire los cables de señal de los conectores.
4. Conecte cada cable de alimentaciín a la toma de alimentaciín.	4. Retire los cables de los dispositivos.
5. ENCIENDA el dispositivo.	

Declaración 2

PRECAUCIÓN

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un mídulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de mídulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

1. Arrojarla al agua o sumergirla
2. Calentarla a una temperatura que supere los 100°C (212°F)
3. Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislaciín local.

Declaración 3

PRECAUCIÓN

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias siguientes:

1. No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
2. El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposiciín perjudicial a las radiaciones.

PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiaciín láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ípticos; evite la exposiciín directa al rayo.

Declaración 4
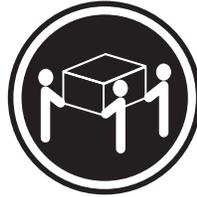
≥18 kg (39.7 lb)   **≥32 kg (70.5 lb)**   **≥55 kg (121.2 lb)**

PRECAUCIÓN

    Tome medidas de seguridad al levantar el producto.

Declaración 5

PRECAUCIÓN

    El botín de control de alimentaciín del dispositivo y el interruptor de alimentaciín de la fuente de alimentaciín no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentaciín. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentaciín de la fuente de alimentaciín.

Declaración 10

PRECAUCIÓN

    No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.

>82 kg

Appendix C: Safety Information

Appendix D: Product Notices

Notices

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Important Notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Maximum memory may require replacement of the standard memory with an optional memory module.

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