Proprietary Notice and Liability Disclaimer

The information disclosed in this document, including all designs and related materials, is the valuable property of NEC Computer Systems Division, Packard Bell NEC, Inc. (hereinafter "NEC CSD") and/or its licensors. NEC CSD and/or its licensors, as appropriate, reserve all patent, copyright and other proprietary rights to this document, including all design, manufacturing, reproduction, use, and sales rights thereto, except to the extent said rights are expressly granted to others.

The NEC CSD product(s) discussed in this document are warranted in accordance with the terms of the Warranty Statement accompanying each product. However, actual performance of each such product is dependent upon factors such as system configuration, customer data, and operator control. Since implementation by customers of each product may vary, the suitability of specific product configurations and applications must be determined by the customer and is not warranted by NEC CSD.

To allow for design and specification improvements, the information in this document is subject to change at any time, without notice. Reproduction of this document or portions thereof without prior written approval of NEC CSD is prohibited.

FaxFlash is a service mark of NEC CSD, Packard Bell NEC, Inc.

NEC and PowerMate are registered trademarks of NEC Corporation, used under license.

All other product, brand, or trade names used in this publication are the trademarks or registered trademarks of their respective trademark owners.

Contents

3 Disassembly and Reassembly

4 System Board

5 Expansion Boards

A Release Notes

Glossary

Index

List of Figures

List of Tables

Preface

This manual contains technical information for servicing and repairing the NEC PowerMate® Professional 9000E Series workstations manufactured by NEC Computer Systems Division, Packard Bell NEC, Inc. The manual contains hardware and interface information for users who need an overview of system design. The manual includes system setup information, disassembly procedures, and illustrated parts lists. The manual is prepared for NEC CSD trained customer engineers, system analysts, service center personnel, and dealers.

The manual is organized as follows.

Section 1 — System Overview, provides an overview of system features and includes brief descriptions of system components.

Section 2 — System Configuration, includes information on system IRQs, jumpers, and video modes. Also included is information on system utilities, including the BIOS update utility, the Symbios Configuration Utility, the NEC OS Restore CD, and NEC Select Install CD.

Section 3 — Disasssembly and Reassembly, provides computer disassembly and reassembly procedures. Each procedure is supported by detailed disassembly illustrations.

Section 4 — System Board, includes information on cable and board connectors, jumper settings, and upgrade sockets. Also provided is information on board components, pin assignments, and memory map.

Section 5 — Expansion Boards, provides cable connector information and pin assignments for the expansion boards installed in the system.

Section 6 — Illustrated Parts Breakdown, includes an exploded view diagram (illustrated parts breakdown) and parts lists for field-replaceable parts.

Section 7 — Preventive Maintenance, provides recommended maintenance information for maintaining the system in top condition.

Section 8 — Troubleshooting, includes information for isolating possible computer problems and finding their solutions.

Section 9 — NEC CSD Information Services, lists telephone numbers for obtaining service. The section also includes information on NEC CSD technical support, website, bulletin board service, and FaxFlash[SM] service.

Section 10 — Specifications, provides specifications on the major components in the system, including the system board, power supply, diskette drive, hard drives, and sound system.

Appendix A — Release Notes, describes recommended operating procedures not documented in other PowerMate Professional 9000E Series documentation.

Abbreviations

A	ampere		dB	decibels
AC	alternating current		DC	direct current
ACK	acknowledge		DCC	direct cable connection
AGP	accelerated graphics port		DCE	data communications equipment
ASIC	application-specific integrated circuit		DDC	Display Data Channel
AT	advanced technology (IBM PC)		DIMM	Dual In-Line Memory Module
			DIP	dual in-line package
ATA	AT attachment		DMA	direct memory access
ATAPI	AT attachment packet interface		DMAC	DMA controller
			DMI	Desktop Management Interface
ATM	asynchronous transfer mode			
BBS	Bulletin Board Service		DOS	disk operating system
BCD	binary-coded decimal		DRAM	dynamic RAM
BCU	BIOS Customized Utility		DVD	digital versatile disc
BIOS	basic input/output system		ECC	error checking and correction
bit	binary digit		ECP	extended capabilities port
BUU	BIOS Upgrade Utility		EDO	extended data output
bpi	bits per inch		EGA	Enhanced Graphics Adapter
bps	bits per second		EIDE	Enhanced IDE
C	capacitance		EISA	enhanced ISA
C	centigrade		email	electronic mail
Cache	high-speed buffer storage		EMI	electromagnetic interference
CAM	constantly addressable memory		EPP	enhanced parallel port
			EPROM	erasable and programmable ROM
CAS	column address strobe			
CD-ROM	compact disk-ROM		ESD	electrostatic discharge
CH	channel		EVGA	Enhanced Video Graphics Array
clk	clock			
cm	centimeter		F	Fahrenheit
CMOS	complementary metal oxide semiconductor		FAX	facsimile transmission
			FCC	Federal Communications Commission
COM	communication			
CONT	contrast		FG	frame ground
CPGA	ceramic pin grid array		FM	frequency modulation
CPU	central processing unit		FP	fast page
DAC	digital-to-analog converter		FRU	field-replaceable unit
DACK	DMA acknowledge		ftp	file transfer protocol

GB	gigabyte		MFM	modified frequency modulation
GND	ground		MHz	megahertz
HEX	hexadecimal		MIDI	musical instrument digital interface
HGA	Hercules Graphics Adapter			
Hz	hertz		mm	millimeter
IC	integrated circuit		MMX	multimedia extensions
ID	identification		modem	modulator/demodulator
IDE	intelligent device electronics		MOS	metal-oxide semiconductor
IDTR	interrupt descriptor table register		MPEG	Motion Picture Experts Group
			ms	millisecond
in.	inch		MSB	most-significant bit
INTA	interrupt acknowledge		NC	not connected
I/O	input/output		NIC	networked information center
IPB	illustrated parts breakdown		NIC	network interface card
IPC	integrated peripheral controller		NMI	Non-maskable Interrupt
			ns	nanosecond
ips	inches per second		NSRC	National Service Response Center
IR	infrared			
IrDA	Infrared Data Association		OCR	optical character recognition
IRR	Interrupt Request register		OS	operating system
ISA	Industry Standard Architecture		PAL	programmable array logic
			PC	personal computer
ISP	internet service provider		PCB	printed circuit board
IRQ	interrupt request		PCI	Peripheral Component Interconnect
K	kilo (1024)			
k	kilo (1000)		PDA	personal digital assistant
KB	kilobyte		PFP	plastic flat package
Kbps	Kilobits per second		PIO	parallel input/output
kg	kilogram		pixel	picture element
kHz	kilohertz		PLCC	plastic leaded chip carrier
lb	pound		PLL	phase lock loop
LAN	local area network		POST	Power-On Self-Test
LED	light-emitting diode		p-p	peak-to-peak
LDCM	LANDesk Client Manager		PPI	programmable peripheral interface
LSB	least-significant bit			
LSI	large-scale integration		PROM	programmable ROM
M	mega (million)		PS/2	personal system/2
mA	milliamps		QFP	quad flat pack
max	maximum		R	read
MB	megabyte		RAM	random-access memory

RAMDAC	RAM digital-to-analog converter		V	volt
RAS	row address strobe		Vac	volts, alternating current
RGB	red green blue		VCR	video cassette recorder
RGBI	red green blue intensity		Vdc	volts, direct current
rms	root mean square		VDT	video display terminal
ROM	read-only memory		VESA	video electronics standards association
rpm	revolutions per minute		VFC	VESA-compliant feature connector
RTC	real-time clock			
R/W	read/write		VGA	Video Graphics Array
S	slave		VHF	very high frequency
SCSI	Small Computer System Interface		VLSI	very large scale integration
			VRAM	video RAM
SDRAM	synchronous dynamic random access memory		W	watt
			WAN	wide area network
S.E.C.	single edge contact cartridge		WRAM	Windows RAM
SG	signal ground		W	write
SGRAM	synchronous graphics random access memory		www	world wide web
SIMM	single inline memory module			
S/N	signal to noise ratio			
SNMP	simple network management protocol			
SPM	standard page mode			
SRAM	static random access memory			
SRS	Sound Retrieval System			
SSI	small scale integration			
SVGA	Super Video Graphics Array			
SW	switch			
T&D	test and diagnostics			
TSC	Technical Support Center			
TTL	transistor/transistor logic			
tpi	tracks per inch			
UART	universal asynchronous receiver/transmitter			
UHF	ultra high frequency			
UL	Underwriter's Laboratories			
UMA	unified memory architecture			
UPS	uninterruptible power supply			
URL	uniform resource locator			
USB	universal serial bus			

1

System Overview

- Configurations
- Features
- Components

This section provides an overview of the NEC PowerMate® Professional 9000E Series workstation configurations. The section highlights system hardware features, front, back, and inside features, and system security features. Also included are brief descriptions of the major components comprising the system.

Configurations

NEC PowerMate Professional 9000E Series workstations are built-to-order systems for commercial offices. The systems feature one or two Intel Pentium® II processors, four dual inline memory module (DIMM) sockets, and synchronous dynamic random access memory (SDRAM). The system also features two universal serial bus (USB) ports, two serial ports, and a parallel port. Ultra direct memory access (DMA), remote wakeup ("Wake-On LAN"), and chassis intrusion monitoring are also supported. All systems come with a sound board.

Build choices include intelligent device electronics (IDE) hard drives of 8.4 gigabyte (GB) or 14.4 GB, and ultra wide SCSI hard drives of 4.55 GB or 9.1 GB. Minimum system memory is 32-megabyte (MB) and is available in 64-MB, 128-MB, and 256-MB DIMM modules. Memory configurations range from 64 MB to 1 GB. Systems come with a choice of workstation-class PCI graphics boards.

Additional build choices include fax/modem, sound, video, and peripheral devices such as CD-ROM drives.

The following figure shows the components shipped with the PowerMate Professional 9000E Series system (the monitor and speakers are optional).

PowerMate Professional 9000E Series System Components

A – Monitor (sold separately) **B** – System Unit
C – Left Speaker (speakers not available with all units)
D – Keyboard **E** – Mouse **F** – Right Speaker (speakers not available with all units)

The following table lists the PowerMate Professional 9000E Series system configurations.

PowerMate Professional 9000E Series System Configuration

Component	Description
System Board	Intel N440BX
CPU*	Pentium II 266 MHz MMX (66 MHz external) Pentium II 300 MHz MMX (66 MHz external) Pentium II 333 MHz MMX (66 MHz external) Pentium II 350 MHz MMX (100 MHz external) Pentium II 400 MHz MMX (100 MHz external) Pentium II 450 MHz MMX (100 MHz external)
System RAM*	64 MB (minimum) to 1 GB of SDRAM X72 100 MHz ECC DIMMs in four sockets

Hard Drive*	IDE Ultra DMA/33:
	   8.4 GB (Maxtor 88400D8, Quantum SE84A012, IBM DHEA-38451)
	   14.4 GB (IBM DTTA-371440)
	Ultra Wide SCSI
	   4.55 GB (Seagate ST34572W, Quantum VK45W012)
	   9.1 GB (Seagate ST39173LW LVD)

Cache	512-KB Pipeline Burst SRAM integrated on processor cartridge
Diskette Drive	3.5-inch 1.44-MB (NEC FD1231H-013, Samsung SFD-321B, or TEAC FD-235HF)
Power Supply	260-watt
Keyboard	Chicony 8963
Mouse*	Logitech MouseMan 3-button M-S35 Microsoft® IntelliMouse
CD-ROM Drive	NEC 32X Lucky Goldstar 32X Lite-On Technology 32X
Fax/Modem Board**	U.S. Robotics® 56.6 Kbps Python (80-661749-00)
Graphics Board*	AccelGRAPHICS® AccelSTAR™ II (Permedia 2) with 8 MB video memory AccelGraphics AccelsEclipse II™ (3D Pro) with 32 MB video memory
SCSI Controller	Symbios SYM53C876 dual function controller with ultra wide and legacy narrow interfaces
LAN Controller	Intel 82558 Controller for 10BASE-T/100BASE-TX
IDE Controller	Ultra DMA/33 dual port IDE controller via PIIX4E
Sound Board	Creative Labs Sound Blaster AWE64D PCI board
Zip Drive**	Iomega® 100-MB Zip Drive
PC Card Adapter**	SCM X2P ISA board and "Swapbox" adapter
Tape Backup Drive**	Seagate Travan 4/8-GB Tape Backup Device
Speakers**	Altec-Lansing 9-watt (ASC-90R)

* Component varies by system
** Built-to-order component

Features

The system's front, back, and inside features are described in the following paragraphs. Also included are descriptions of the system's security features.

Front Features

The following figures identify the components, lamps, and controls on the front of the system. Brief descriptions of the components follow the figures.

PowerMate Professional 9000E Series Front View
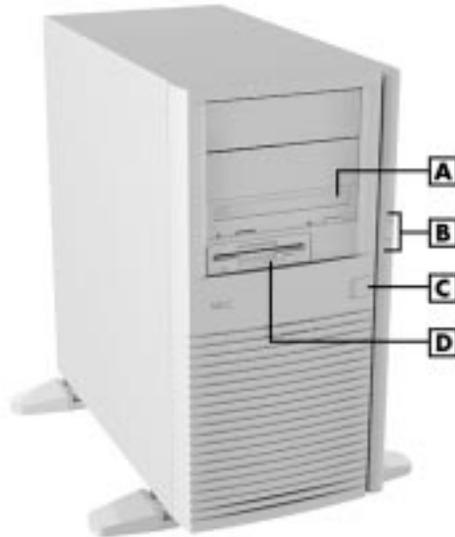
A – 5 1/4-Inch Accessible Device **B** – System Lamps **C** – Power Button
D – Diskette Drive

System Controls and Lamps

A – Power Lamp **B** – Disk Lamp

System controls allow the selection of specific system operations. Lamps visually alert the user to the status of system operation. The system has the following devices, controls, and lamps on the front of the system (see the preceding figures for device, control, and lamp locations).

- Diskette drive — copy data files to and from a diskette or as a bootable drive for loading and starting programs from a diskette.

- CD-ROM drive — load and start programs from a compact disc (CD) and play audio CDs.

- Disk lamp — when lit, indicates that the hard drive is active. A lit lamp indicates that the hard drive is reading or writing data.

- Power lamp — a steady green lamp indicates power is on to all components.

- Power button — turns system power on or off.

Back Features

The back of the workstation contains external connectors, a power socket, and expansion board slots. The following figures identify the connectors on the back of the system. Brief descriptions of each connector follow the figures.

PowerMate Professional 9000E Series Back View
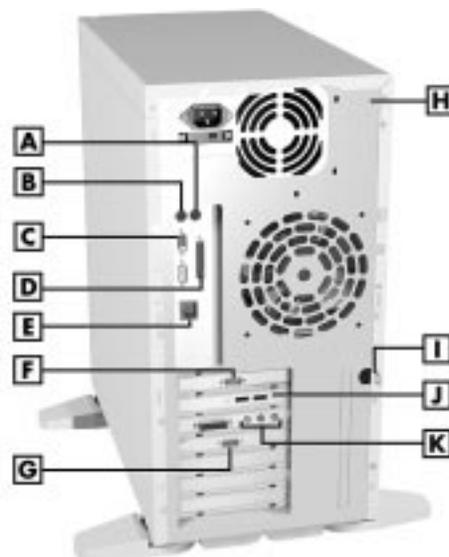
A – Mouse Port **B** – Keyboard Port **C** – COM1 Port **D** – Printer Port
E – LAN Connector **F** – COM2 Port **G** – VGA Monitor Connector
H – Security Slot **I** – Locking Tab **J** – USB Ports **K** – Audio Connectors
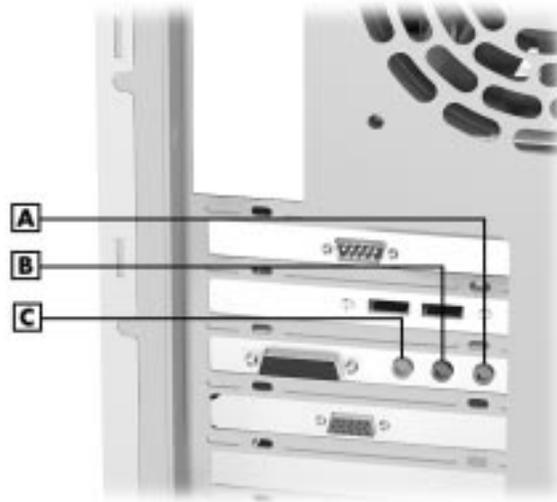
A – Line In Jack **B** – Microphone In Jack **C** – Line Out Jack

External connectors allow the attachment of peripheral devices such as a monitor, keyboard, mouse, and printer. The system has the following external connectors.

- LAN connector — The RJ-45 local area network (LAN) connector on the system board permits connection of the system to an Ethernet LAN for communication with other computers.

  A network board comes with some systems.

- Audio connectors — The following audio connectors are on the back of the sound board:

  — microphone in jack. This jack allows the connection of a microphone for recording audio information in data files.

  — line in jack. This jack allows the connection of a stereo audio device such as a stereo amplifier, cassette, or minidisc player for playback or recording.

  — line out jack. This jack allows the connection of an amplified output device such as powered speakers, stereo tape recorder, or an external amplifier for audio output. Use this jack for ordered speakers.

  — MIDI/game port connector
  Connect a digital musical instrument to create your own musical instrument digital interface (MIDI) files. You can also connect a joystick for playing games.

- USB ports — The two USB ports permit the connection of up to 127 USB-configured peripheral devices such as printers, monitors, modems, mouse, and game pads/joysticks.

- Serial ports — Serial port 1 (COM1) and serial port 2 (COM2) allow the connection of serial devices with 9-pin connectors. The devices include a pointing device, serial printer, or modem.

- Keyboard port — Attach a keyboard (PS/2®-compatible, 101-, 102-, or 104-key) with a 6-pin mini DIN connector to this port.

- Mouse port — Attach a mouse (PS/2-compatible) to this port.

- Printer port — Attach a parallel printer with a 25-pin connector to this port.

- VGA monitor connector — Attach a video graphics array (VGA)-compatible monitor (NEC MultiSync® monitor or other VGA-compatible monitor) with a 15-pin connector to the graphics board connector.

- Expansion board slots — Use these slots to install up to five optional boards (graphics, fax/modem, SCSI).

- Fax/modem ports — Some systems come with a 56-Kbps fax/modem board in an expansion slot. The board allows the connection of a phone line to the system for fax and data communications. The fax/modem board is V.90- and x2-compatible.

Inside Features

The following figure shows the interior of the workstation and its major areas. A list of features follows the figure.

Inside the System
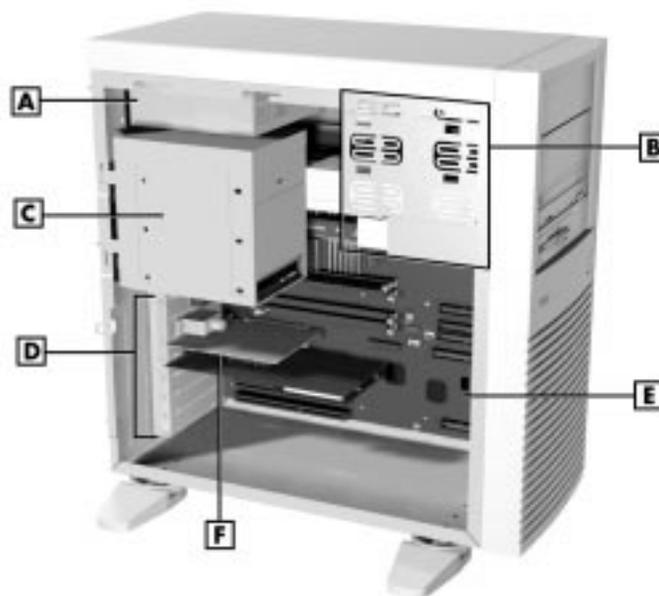
A – Power Supply **B** – Accessible Device Cage **C** – Drive Cage
D – Expansion Slots **E** – System Board **F** – Sound Board

The inside of the system has the following features:

- system board with connectors for the Pentium II processor single edge contact (S.E.C.) cartridges, DIMM memory, IDE devices, diskette drives, five expansion boards, a LAN connector, internal signal and power, and external devices

- graphics board (a built-to-order component)

- sound board

- three accessible 5 1/4-inch bays for expansion

- one accessible 3 1/2-inch diskette drive bay (contains 1.44-MB diskette drive)

- a drive cage with bays for four 1-inch high or three 1.6-inch high, 3 1/2-inch internal devices

- 260-watt power supply.

For more information on the above features, see "Components" in this section.

Stand

The system unit sits on a footed, non-removable stand to prevent it from being tipped over. This is a safety feature to prevent personal injury and equipment damage. Keep the feet of the stand turned out, perpendicular to the system unit.

⚠ WARNING

Keep the feet perpendicular to the length of the system unit. The feet are designed to keep the unit from being tipped over.

Locating the Feet under the System Unit

Security Features

The system has hardware, software, and mechanical security features that offer protection against unauthorized access to the system and data. The following security features are available:

■ Password Security

The BIOS Setup utility includes a feature that allows a user to set either a user or supervisor password, or both.

The user password controls booting of the system and controls access to the BIOS Setup utility and the keyboard. User access to the BIOS Setup utility is limited when a supervisor password is set. The supervisor password allows full access to the system and the BIOS.

The unattended start security feature, when enabled, allows the system to boot but locks the keyboard until the user password is entered.

See Section 2, "System Configuration," for further information on setting and using passwords and the unattended start feature.

■ Secure mode

Secure mode prevents keyboard or mouse input and unauthorized use of the front panel power switch. A hot-key combination can be used to enter secure mode quickly. The diskette drive can also be write-protected when secure mode is set.

■ Windows Network Security Features

The Windows Network Security features are available through the Windows operating system. Check the Windows documentation for details.

■ Chassis Intrusion Notification

Whenever the chassis cover is removed, the BMC logs the incident.

See Section 2, "System Configuration," for information on the chassis intrusion notification feature.

■ Security slot

The security slot on the back of the chassis accepts a Kensington® Security Standard connector or other locking device. The locking device secures the workstation to an immovable object to prevent theft.

■ Locking Tab

The system also has a locking tab on the rear of the chassis. The tab fits through a slot on the rear edge of the chassis cover when the cover is on. When a padlock is used in the tab, the system is physically protected from chassis intrusion.

Components

The major system components are listed in the following table, along with the page number where each component is briefly described.

System Components

Component	Go to Page
System Board	1-10
Diskette Drive	1-11
Hard Drive*	1-11
Power Supply	1-12
Keyboard	1-12
Mouse*	1-12
Graphics Board*	1-12
CD-ROM Drive	1-13
Speakers**	1-13
Fax/Modem Board**	1-13
Sound Board	1-14
LAN	1-14
SCSI Adapter	1-14
PC Adapter Device**	1-14
Tape Backup Unit**	1-15
Zip Drive**	1-15

* Component varies by system
** Built-to-order component

System Board

The system board contains one or two Pentium II processors mounted in a S.E.C. cartridge, system DIMM memory, the Intel N440BX PCI chipset, National 87309 super I/O controller, the PIIX4 PCI/ISA/IDE accelerator, the Symbios SYM53C876 dual SCSI controller, the Intel 82558 PCI LAN controller, and the Board Management Controller (BMC).

Internal connectors on the system board include four DIMM sockets, two S.E.C. cartridge sockets (slot 1 connectors), dual SCSI connectors, primary and secondary IDE connectors, a diskette drive connector, expansion board connectors, connectors for the internal speaker, and front panel connectors for the power LED, the power switch, and the hard drive LED. Configuration jumper blocks are located on the system board. The system board also has a CD audio in, modem in, Wake-On LAN, chassis intrusion, system fan, and system power connectors.

External connectors on the system board include two serial connectors, a parallel connector, a keyboard port, mouse port, a LAN connector, and a serial port. The second serial port is available on an expansion bracket. The system board supports two USB ports; the connectors are located on an expansion bracket.

The system board supports two diskette drives, up to four IDE devices such as a hard drive, CD-ROM drive, and Zip drive, and up to seven SCSI devices.

The system board conforms to the AT form factor, and has an ATX 2.01 compliant I/O.

For further information on the system board, see Section 4, "System Board." Section 6, "Illustrated Parts Breakdown" lists the NEC CSD part number for the system board.

Diskette Drive

Two diskette drives are supported in the system. The installed 1.44-MB 3 1/2-inch diskette drive is connected by a single ribbon cable with three connectors. The diskette drive cable plugs directly into the system board. There are no switches or jumpers that need to be set and the diskette drive is terminated.

Connector locations for the diskette drive on the riser board are given in Section 4, "System Board." Section 6, "Illustrated Parts Breakdown," lists the NEC CSD part number for the diskette drive. Diskette drive specifications are given in Section 10, "Specifications."

Hard Drive

All systems ship with at least one internal 3 1/2-inch hard drive in the drive cage. The drive cage supports up to four 1-inch high thin-height devices, or three 1.6-inch high devices. IDE hard drives are available in 8.4-GB and 14.4-GB models. SCSI hard drives are available in 4.55-GB and 9.1-GB models.

The system board has two IDE/PCI interface connectors (primary and secondary) for connecting IDE devices. In systems with an IDE hard drive, a three-connector cable connects to the IDE hard drive and the primary connector on the system board. Each connector supports up to two IDE devices.

A second IDE hard drive can be added to the primary channel. If the second hard drive is installed, it connects to the middle connector on the IDE cable.

Systems come with two 3-connector IDE interface cables. If one of the cables is not used, it is provided with the system but not connected.

In systems with a SCSI hard drive, a six-connector LVD SCSI cable connects the drive to the internal SCSI connector on the SCSI adapter board.

Connector locations for the IDE and SCSI connectors on the system board are given in Section 4, "System Board." Section 6, "Illustrated Parts Breakdown" lists the NEC CSD part numbers for the hard drives. Hard drive specifications are given in Section 10, "Specifications."

Power Supply

The power supply is mounted inside the system unit. It supplies power to the system board, option boards, diskette drive, hard drives, CD-ROM drive, keyboard, mouse, and other internal options. A fan inside the power supply provides system ventilation. The power supply provides 260 watts.

The power supply is switch-selectable for 115 or 230 Vac at an operating frequency of 50/60 Hz. It is designed to comply with existing emissions standards and provides sufficient power for a fully loaded system configuration. The power supply voltage selection switch is factory set to 115 Vac for systems used in the United States; it is set to 230 Vac for systems used in Europe.

Power supply connector locations on the system board are given in Section 4, "System Board." Power supply specifications are given in Section 10, "Specifications."

Keyboard

The PS/2-compatible ergodynamic keyboard is standard equipment for the system. The keyboard provides a numeric keypad, separate cursor control keys, 12 function keys, and is capable of up to 48 functions. Key status lamps on the keyboard include Num (Numeric) Lock, Caps (Capital) Lock, and Scroll Lock.

The keyboard's six-pin connector plugs into the back of the system. Keyboard pin assignments are included in Section 4, "System Board." Keyboard specifications are given in Section 10, "Specifications."

Mouse

A Logitech MouseMan 3-button mouse is standard equipment for the system. This mouse is PS/2-compatible

A Microsoft® IntelliMouse® is also available with the system. This PS/2-compatible mouse has two buttons and a cursor control wheel. The mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism.

The six-pin mouse cable connector plugs into the back of the system. Mouse pin assignments are included in Section 4, "System Board." Mouse specifications are given in Section 10, "Specifications."

Graphics Board

Systems come with a workstation-class graphics accelerator board in a PCI expansion slot. The board provides an integrated 3D and 2D graphics and video accelerator for exceptional graphics and superior full-screen, full-motion video.

The board has a standard VGA output connector for connecting a VGA-compatible monitor.

Video modes are given in Section 2, "System Configuration." Graphics board specifications are given in Section 10, "Specifications."

CD-ROM Drive

Some systems come with a 32X CD-ROM drive. The drive features up to 32-speed technology, allowing data to be transferred at up to 4920 KB/second, affording faster data transfer and smoother animation and video. The CD-ROM drive comes with an Enhanced IDE (EIDE) interface. The drive is fully compatible with Kodak Multisession Photo CDs™, CD-I, FMV, and CD Plus, as well as standard CDs. The CD-ROM drive can also play audio CDs (for systems with sound capabilities).

In systems with an IDE hard drive a three-connector device cable connects the drive to the secondary IDE/PCI channel on the riser board. The drive is connected as the master device on the secondary channel. An optional second device can be added to the secondary channel using the free connector on the three-connector cable. In systems with a SCSI hard drive, the CD-ROM is connected as the master device on the primary connector.

Section 6, "Illustrated Parts Breakdown" lists the NEC CSD part number for the CD-ROM drive. Specifications for the CD-ROM drive are given in Section 10, "System Specifications."

Speakers

Some systems come with a high-quality 9-watt stereo speaker set, an AC adapter, and connecting cables. The speaker set features a volume control, power on/off switch, power lamp, and treble control. The speaker set also includes a subwoofer output jack. The speaker set connects to the speaker line out jack on the back of the system.

Section 6, "Illustrated Parts Breakdown" lists the NEC CSD part number for the speakers. Specifications are given in Section 10, "Specifications."

Fax/Modem Board

Some systems come with a fax/modem board preinstalled. The board operates as a fax system and data modem according to the operating system and software installed. The modem board offers a full-duplex speakerphone and 56,600 bits per second (bps) data/14,400 bps fax communications.

Section 4, "System Board," and Section 5, "Riser Board," include cable connection information for the fax/modem. Fax/modem board specifications are provided in Section 10, "Specifications."

Sound Board

Some systems come with a Creative Labs® AWE64D sound board in an expansion slot. The board incorporates the EMU™ 8008 Sound Engine and AudioHQ and Creative WaveSynth/WG software for 32-voice polyphony for wave table audio. Sondius® Sound Synthesis technology allows the creation of customized musical instruments and sound effects. Clear, realistic, three-dimensional sound is supported with the Creative 3D Stereo Enhancement technology.

Specifications for the sound board are given in Section 10, "Specifications."

Local Area Network

All systems come with an onboard local area network (LAN) capability (3COM LAN). Through the RJ-45 LAN connector on the system board and the Intel 82558 PCI LAN controller, the workstation can be connected to another computer, to a LAN, or to the Internet. Systems also have remote startup capability from a server with "Wake-On LAN" technology.

Specifications for the LAN are given in Section 10, "Specifications."

SCSI Adapter

The system board includes an embedded dual-function, PCI SCSI host adapter, providing two independent SCSI controllers that share a single PCI bus master interface. Internally, each controller is identical, capable of operations using either 8- or 16-bit SCSI providing 10 MB/s (Fast-10) or 20 MB/s (Fast-20) throughput, or 20 MB/s (Ultra) or 40 MB/s (Ultra-wide) throughput. As implemented on the system board, controller A attaches to a 68-pin 16-bit (wide) SCSI connector interface capable of supporting a maximum of four 1-inch high SCSI Ultra-wide hard disk drives or three 1.6-inch high SCSI Ultra-wide hard disk drives. Controller B attaches to a 50-pin 8-bit (narrow) SCSI connector interface capable of supporting three 5.25-inch removable media devices.

The Symbios Configuration Utility eliminates the need to handle jumpers or terminators while adding some peripherals. Configuration and terminator settings are controlled via the keyboard (see "Symbios Configuration Utility" in Section 2).

PC Adapter Device

Some systems come with a PC Adapter Device. The PC adapter provides twin PC card slots, which support two Type I/II cards, or one Type I/II card and one Type III. The adapter supports ISA Plug and Play, and allows cards of mixed voltage to be used in the same system. PC cards can provide the system with memory, storage, fax/modem capabilities, video capabilities, or a serial port interface. The PC adapter driver enables full diskette drive or hard disk emulation on flash cards compatible with all compression and PC-utilities software.

The adapter is comprised of a "SwapBox" housed in a 5 1/4-inch accessible bay, a PC ISA adapter card, and a dual cable that connects them on the PC adapter bus.

PC adapter device connector locations are given in Section 4, "System Board." PC adapter device specifications are given in Section 10, "Specifications."

Tape Backup Unit

Some systems come with a tape backup unit. The tape backup unit is a high-capacity, high-performance data storage device that can compress and write data to and read and uncompress data from tape. The unit also comes with backup software used to tailor the backup process so that some or all of the files on the system can be backed up to a tape cartridge. Files backed up to a tape backup unit are compressed to conserve space and to speed up the backup process.

The tape backup unit installs in a 5 1/4-inch accessible bay. The installed tape backup unit is connected to an IDE cable that connects to the riser board. The PCI/IDE channel, and the master/slave configuration of the unit depend on the specific configuration of the system.

Tape backup unit connector locations on the riser board are given in Section 5, "Riser Board." Tape backup unit specifications are given in Section 10, "Specifications."

Zip Drives

Some systems come with an Iomega® Zip® drive. The Zip drive is a high-capacity, high-performance data storage device that writes data on and reads data from Zip disks. A Zip disk is flexible media contained in a durable plastic cartridge. The Zip drive supports removable Zip disks with a formatted capacity of 100 MB. The Zip drive can be used to back up work, archive old files, and transport work between computers.

The Zip drive is installed in a 5 1/4-inch accessible bay. The installed Zip drive is connected to an IDE cable that connects to the riser board. The PCI/IDE channel, and the master/slave configuration of the drive depend on the specific configuration of the system.

Zip drive cable connections are given in Section 4, "System Board." Zip drive specifications are given in Section 10, "Specifications."

2

System Configuration

- Interrupt Requests
- System Board Jumper Settings
- Video Modes
- BIOS Setup Utility
- FLASH Utility
- Symbios Configuration Utility
- NEC OS Restore CD
- NEC Select Install CD

This section provides information for configuring the system. The section describes:

- system interrupt request (IRQ) assignments

- system board jumper settings

- descriptions of video modes

- the BIOS Setup utility to configure the system

- the Symbios Configuration Utility

- the FLASH utility

- NEC OS Restore CD

- NEC Select Install CD

Interrupt Requests

The following paragraphs list the system interrupts (IRQs), parallel addresses and interrupts, and serial addresses and interrupts. Section 4, "System Board," includes information on system resources (memory map, I/O addresses, and DMA settings).

System Interrupts

The system has 16 IRQs (IRQ 0 through 15) assigned to different devices (for example, printer, modem, keyboard, or mouse). Initial IRQ settings are assigned at the factory, with settings dependent on the installed device(s). Several IRQs are unassigned for the installation of add-on devices. See "BIOS Setup Utility" in this section for information on using the utility to assign or change the interrupts.

The following table lists the IRQ settings. Note that assignments 0 through 15 are in order of decreasing priority.

Interrupt Level Assignments

Interrupt	I/O APIC level	Description
INTR	INT0	Processor interrupt
NMI	N/A	NMI from BUD to processor
IRQ0	INT2	Timer interrupt from PIIX4
IRQ1	INT1	Keyboard interrupt
IRQ2		Interrupt signal from second 8259 in PIIX4
IRQ3	INT3	Serial port A or B interrupt from 87309VLJ device (user can configure)

Interrupt Level Assignments

Interrupt	I/O APIC level	Description
IRQ4	INT4	Serial port A or B interrupt from 87309VLJ device (user can configure)
IRQ5	INT5	Open for use
IRQ6	INT6	Diskette
IRQ7	INT7	Parallel port
IRQ8_L	INT8	RTC interrupt
IRQ9	INT9	Reserved for SCI (ACPI)
IRQ10	INT10	Open for use
IRQ11	INT11	Open for use
IRQ12	INT12	Mouse interrupt
	INT13	
IRQ14	INT14	Compatibility IDE interrupt from primary channel IDE devices 0 and 1
IRQ15	INT15	Secondary IDE interrupt
PCI_INTA_L	INT16	PCI Interrupt signal A
PCI_INTB_L	INT17	PCI Interrupt signal B
PCI_INTC_L	INT18	PCI Interrupt signal C
PCI_INTD_L	INT19	PCI Interrupt signal D

System Board Jumper Settings

Jumpers on the system board are used to set the system configuration. Functions that are configured by jumper settings include:

- BMC forced update mode

- chassis intrusion detection

- FRB timer enable

- boot block write protect

- recovery boot

- password clear

- CMOS clear

- BMC bootblock write protect

- Wake-On LAN enable

The following figure shows locations of system board jumpers. The table "System Board Jumper Summary" lists the system board jumpers and their functions, with factory-default settings shown in bold.

⚠ **CAUTION**

Jumpers are set correctly at the factory for your configuration.

If your system requires a jumper change, change only the setting for that condition. Otherwise, keep the jumpers at their factory settings.

Locating System Board Jumpers
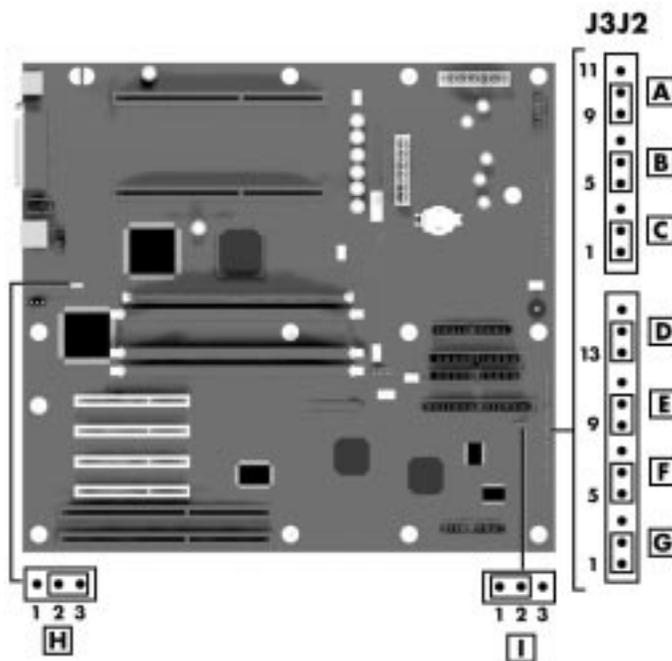
A - BMC Forced Update Mode B - Chassis Intrusion Detection
C - FRB Timer Enable D - Boot Block Write Protect
E - Recovery Boot F - Password Clear G - CMOS Clear
H - Reserved I - Reserved

System Board Jumper Summary

Jumper	Function	Pins (default in bold)	What it does at system reset
A	BMC Forced Update Mode	**9-10**	System boots normally.
		10-11	System tries to boot BMC firmware.
B	Chassis Intrusion Detection	**5-6, Enable**	Switch installed on chassis indicates when cover has been removed.
		6-7, Disable	Chassis intrusion switch is bypassed.

System Board Jumper Summary

Jumper	Function	Pins (default in bold)	What it does at system reset
C	FRB Timer Enable	**1-2, Enable**	FRB operation is enabled (system boots from processor 1 if processor 0 fails).
		2-3, Disable	FRB is disabled.
D	Boot Block Write Protect	**13-14, Protect**	BIOS boot block is write-protected.
		14-15, Erase/Program	BIOS boot block is erasable and programmable.
E	Recovery Boot	**9-10, Normal**	System attempts to boot using the BIOS stored in flash memory.
		10-11, Recovery	BIOS attempts a recovery boot, loading BIOS code from a diskette into the flash device. This is typically used when the BIOS code has been corrupted.
F	Password Clear	**5-6, Protect**	Maintains the current system password.
		6-7, Erase	Clears the password.
G	CMOS Clear	**1-2, Protect**	Preserves the contents of NVRAM.
		2-3, Erase	Replaces the contents of NVRAM with the manufacturing default settings.
H	Reserved	**2-3**	Required. Do Not Change.
I	Reserved	**1-2**	Required. Do Not Change.

Video Modes

Video modes for the AccelSTAR II and AccelECLIPSE II graphics boards are given in the following tables.

AccelECLIPSE II Video Modes

Resolution (pixels)	Refresh Rate (Hz)	Color Depth
640 x 480	60, 72, 75, 85	16.7M (true color)
800 x 600	60, 72, 75, 85	16.7M
1024 x 768	60, 70, 72, 75, 85	16.7M
1280 x 1024	60, 75, 85	16.7M

AccelSTAR II Video Modes

Resolution (pixels)/ Vertical Refresh Rate (Hz)	Color Depth*	Buffers S=Single D=Double	Available Texture Mapping Memory in Double Buffered Mode
640 x 480 60, 72, 75, 85, 100	256	S	Not Available
800 x 600 60, 75, 85, 100	256	S or D	5 MB**
	32K	S or D	5 MB
	16.7m (true color)	S	Not Available
1024 x 768 1152 x 870 60, 75, 85, 100	265	S or D	5 MB**
	32K	S or D	3.5 MB @ 1024 2 MB @ 1152
	16.7M (true color)	S or D***	Not Available
1280 x 1024 60, 75, 85, 100	265	S or D	3 MB**
	32K, 65K	S or D	0.5 MB
	16.7M (true color)	S	Not Available
	256	S	Not Available

* BPP = Bits Per Pixel
** 256 color texture mapping is not recommended
*** Acceleration is set to 24-bitmoode, but 3D rendering is actually in 16-bitmode

BIOS Setup Utility

The BIOS Setup utility configures system parameters. The parameters are saved in nonvolatile memory in a CMOS chip backed by a battery on the system board. The battery supplies continuous power to maintain parameter configuration information when system power is off.

Note: Before changing parameters or replacing the battery, print out or write down the current setup parameter settings and store in a safe place. Use this information to restore the system to the current parameters if a wrong setting is made or if the battery needs replacement (see Section 3 for battery replacement).

When to Use BIOS Setup

The BIOS Setup utility is used to view and set parameters. Use the Setup utility to:

- set the time and date

- update or check parameters when adding or removing expansion options

- change or set power management features

- correct a hardware discrepancy when the Power-On Self-Test (POST) displays an error message and prompts to run Setup

- check the installation of optional memory by comparing the amount of memory installed with the amount of memory displayed by Setup

- change certain operating parameters, such as boot device sequence and keyboard parameters

- configure system connections for peripherals such as diskette drive, hard drives, and devices connected to the printer port and serial ports

- customize the system with security features such as passwords, diskette drive restriction, virus check reminder, and system backup reminder

- set system parameters after the CMOS battery is replaced.

Using the BIOS Setup Utility

You access the BIOS Setup utility when you turn on or reboot your system. To run the BIOS Setup utility, perform the following procedure:

1. Power-on or reboot the system.

2. Press **F2**. The BIOS Setup utility starts and the Main Menu is displayed. The menu bar at the top of the Main Menu lists the selections in the following table:

BIOS Setup Utility Menus

Menu	Use
Main	Use this menu for basic system configuration.
Advanced	Use this menu for setting the Advanced Features available on your system.
Security	Use this menu to set User and Supervisor Passwords and secure mode features.
Server	Use this menu for configuring Server Management features.
Boot	Use this menu to configure Boot Device priority.
Exit	Exits the current menu.

Use the arrow keys to select a menu or an item on a displayed menu. Press the value keys (listed in the table below) to cycle through the allowable values for the selected field. Use the Exit menu's "Save Values" selection to save the current values on all the menus.

To display a submenu, position the cursor on a selection that has a submenu and press Enter. Selections with submenus are preceded by an arrow.

See the following table for information on the keys you use with BIOS Setup. These keys are also listed at the bottom of the Setup menu.

BIOS Setup Utility Navigation Keys

Key	Function in Setup Menu
F1 or Alt-H	Get Help about an item.
ESC	Exit the current menu and return to the previous menu.
Left or right arrow keys	Move between menus.
Up or down arrow keys	Move cursor up and down. The cursor moves only to the settings that you can change.
HOME or END	Move cursor to top or bottom of window.
PAGE UP or PAGE DOWN	Move cursor to next or previous page.
F5 or -	Select the previous value for the field.
F6 or + or SPACE	Select the next value for the field.
F9	Load default configuration values for this menu.
F10	Save configuration values and exit.
ENTER	Execute command or select submenu.

BIOS Setup Configuration Settings

The following BIOS Setup configuration tables show the features that are controlled from the BIOS Setup utility. Recommended values are bold in the tables. Descriptions of settings are also provided.

Main Menu

Use the Main menu and its submenus for basic system configuration.

Main Menu

Feature	Choices	Description
System Time	HH:MM:SS	Sets the system time.
System Date	MM/DD/YYYY	Sets the system date.
Legacy Diskette A:	Disabled 360KB 1.2 MB 720KB **1.44/1.25 MB** 2.88 MB	Selects the diskette type.
Legacy Diskette B:	**Disabled** 360KB 1.2 MB 720KB 1.44/1.25 MB 2.88 MB	Selects the diskette type.
Primary IDE Master	Press **Enter**	See the table "Primary IDE Master and Slave Submenu."
Primary IDE Slave	Press **Enter**	See the table "Primary IDE Master and Slave Submenu."
Secondary IDE Master	Press **Enter**	See the table "Secondary IDE Master and Slave Submenu."
Secondary IDE Slave	Press **Enter**	See the table "Secondary IDE Master and Slave Submenu."
Keyboard Features	Press **Enter**	See the table "Keyboard Submenu."
Memory Cache	**Enabled** Disabled	Enables processor cache.
CPU Speed Setting	Processor Speed List	Processor speed list is determined by the speed of the processor(s) installed. Select speed to match speed of installed processor(s). Caution: DO NOT select a speed above the speed of the installed processor(s).
Language	**English (US)** Francais Espanol Deutsch Italiano	Selects which language BIOS displays.

Primary IDE Master and Slave Submenu

Feature	Choices	Description
Type	**Auto** None CD-ROM User	Auto allows the system to attempt auto-detection of the drive type. None informs the system to ignore this drive. CD ROM allows the manual entry of fields described below. User allows the manual entry of all fields described below.
Multi-Sector Transfer	Disabled 2, 4, 8, or 16 sectors	Determines the number of sectors per block for multi-sector transfers. This field is informational only for Type Auto.
LBA Mode Control	Disabled Enabled	Enabling LBA causes logical block addressing to be used in place of cylinders, heads, and sectors. This field is informational only for Type Auto.
32 Bit I/O	Disabled Enabled	Enabling allows 32 bit IDE data transfers.
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4	Selects the method for moving data to and from the drive. This field is informational only for Type Auto.
Ultra DMA Mode	Disabled Enabled	Selects the Ultra DMA Mode for moving data to and from the drive. Autotype the drive to select the optimum transfer mode. This field is informational only for Type Auto.

Secondary IDE Master and Slave Submenu

Feature	Choices	Description
Type	Auto **None** CD-ROM User	Auto allows the system to attempt auto-detection of the drive type. None informs the system to ignore this drive. CD ROM allows the manual entry of fields described below. User allows the manual entry of all fields described below.
Multi-Sector Transfer	Disabled 2, 4, 8, or 16 sectors	Determines the number of sectors per block for multi-sector transfers. This field is informational only for Type Auto.
LBA Mode Control	Disabled Enabled	Enabling LBA causes logical block addressing to be used in place of cylinders, heads, and sectors. This field is informational only for Type Auto.
32 Bit I/O	Disabled Enabled	Enabling allows 32 bit IDE data transfers.
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4	Selects the method for moving data to and from the drive. This field is informational only for Type Auto.
Ultra DMA Mode	Disabled Enabled	Selects the Ultra DMA Mode for moving data to and from the drive. Autotype the drive to select the optimum transfer mode. This field is informational only for Type Auto.

Keyboard Submenu

Feature	Choices		Description
NumLock	Auto On **Off**		Selects power-on state for Num Lock
Key Click	**Disabled** Enabled		Enables or disables key click
Keyboard auto-repeat rate	**30/sec** 26.7/sec 21.8/sec 18.5/sec	13.3/sec 10/sec 6/sec 2/sec	Selects key repeat rate
Keyboard auto-repeat delay	1/4 sec **1/2 sec** 3/4 sec 1 sec		Selects delay before key repeat

Advanced Menu

Use the Advanced menu and its submenus for setting the advanced features available on your system.

Advanced Menu

Feature	Choices	Description
Plug and Play OS	**No** Yes	Select Yes if you are booting a Plug and Play capable operating system. Select No if you want the BIOS to configure non-boot devices.
Reset Configuration Data	**No** Yes	Select Yes if you want to clear the system configuration data during next boot. System automatically resets to No in next boot.
PCI Configuration	Press **Enter**	See the table "PCI Configuration Submenu."
Integrated Peripherals Configuration	Press **Enter**	See the table "Integrated Peripherals Configuration Submenu."
Advanced Chipset Control	Press **Enter**	See Advanced Chipset Control Submenu."
Use Multiprocessor Specification	**1.1** 1.4	Selects the version of multiprocessor specification to use. Some operating systems require version 1.1.
Large Disk Access Mode	**LBA** CHS	Select LBA for IDE drives.
Delay on Option ROMs	**Disabled** Enabled	Forces a short delay at the end of each Option ROM scan.

PCI Configuration Submenus

Feature	Choices	Description
PCI Device, Embedded SCSI Devices	Press **Enter**	N/A
Option ROM Scan	**Enabled** Disabled	Enables option ROM scan of the selected device.
Enable Master	**Enabled** Disabled	Enabled selects the device as a PCI bus master.
Latency Timer	Default 0020h **0040h** 0060h 0080h 00A0h 00C0h 00E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device may be master on a PCI bus.

PCI Device, Slot 1 - Slot 4 Submenus

Feature	Choices	Description
Enable Master	**Enabled** Disabled	Enables selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device may be master on a PCI bus.

Integrated Peripheral Configuration Submenu

Feature	Choices	Description
COM 1: (Serial Port A)	Disabled **Enabled** Auto OS Controlled	Auto forces BIOS to configure the port. OS Controlled forces OS to configure the port.
Base I/O Address	**3F8** 2F8 3E8 2E8	Selects the base I/O address for COM port A.
Interrupt	IRQ 3 **IRQ 4**	Selects the IRQ for COM port A.
COM 2: (Serial Port B)	Disabled **Enabled** Auto OS Controlled	Auto forces BIOS to configure the port. OS Controlled forces OS to configure the port.
Base I/O Address	3F8 **2F8** 3E8 2E8	Selects the base I/O address for COM port B.
Interrupt	**IRQ 3** IRQ 4	Selects the IRQ for COM port B
Parallel Port	Disabled **Enabled** Auto OS Controlled	Auto forces BIOS or the OS to configure the port. OS Controlled displays when the OS configures the port.
Mode	Output only Bi-directional EPP **ECP**	Selects parallel port mode.

Integrated Peripheral Configuration Submenu

Feature	Choices	Description
Base I/O Address	**378** 278 3BC	Selects the base I/O address for LPT port.
Interrupt	IRQ 5 **IRQ** 7	Selects the IRQ for LPT port.
DMA Channel	**DMA 1** DMA 3	Selects the DMA channel.
Floppy disk controller	Disabled **Enabled**	Enables onboard diskette controller.

Advanced Chipset Control

Feature	Choices	Description
640 - 768K	Disabled **Enabled**	If enabled, ISA Master and DMA cycles are forwarded to PCI.
Delayed Transaction	Disable **Enabled**	Enable the delayed transaction mechanism when PIIX4 is target of a PCI transaction.
Passive Release	Disabled **Enabled**	Enable the Passive Release mechanism on PHOLD# signal when PIIX4 is a PCI MASTER.

Security Menu

Use the Security menu to set User and Supervisor Passwords and configure Secure Mode options.

> 📑 **Note:** Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case sensitive.

Security Menu

Feature	Choices	Description
User Password is	**Clear** Set	Status only; user cannot modify. User password controls access to the system at boot.
Supervisor Password is	**Clear** Set	Status only; user cannot modify. Supervisor password controls access to the BIOS Setup utility.
Set User Password	Press **Enter**	When the Enter key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to "System Board Jumper Settings" in this chapter).

Security Menu

Feature	Choices	Description
Set Supervisor Password	Press **Enter**	When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to "System Board Jumper Settings" in this chapter).
Password on Boot	**Disabled** Enabled	Requires password entry before boot. System will remain in secure mode until password is entered. Password on Boot takes precedence over Secure Mode Boot.
Diskette Access	**Administrator** User	Controls access to diskette drives.
Fixed Disk Boot Sector	**Normal** Write Protect	Write-protects boot sector on hard disk to protect against viruses.
Secure Mode Timer	**Disabled** 1 min 2 min 5 min 10 min 20 min 1 hr 2 hr	Period of key/PS/2 mouse inactivity after which secure mode activates. A password is required for secure mode to function. Cannot be enabled unless at least one password is enabled.
Secure Mode Hot Key (Ctrl-Alt-)	[ ] [A, B, ..., Z]	Key assigned to invoke the Quicklock feature. Cannot be enabled unless at least one password is enabled.
Secure Mode Boot	**Disabled** Enabled	System will boot in secure mode. The user must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled. An Enabled setting for Password on Boot overrides the Secure Mode Boot setting.
Video Blanking	**Disabled** Enabled	Blank video when secure mode is activated. The user must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.
Floppy Write Protect	**Disabled** Enabled	When secure mode is activated, the diskette drive is write protected. The user must enter a password to be able to write to the diskette drive. Cannot be enabled unless at least one password is enabled.

Server Menu

Use the Server menu to configure server features.

Server Menu

Feature	Choices	Description
System Management	Press **Enter**	See the table "System Management Submenu."
Console Redirection	Press **Enter**	See the table "Console Redirection Submenu."
PCI IRQs to IO-APIC mapping	**Disabled** Enabled	If enabled, BIOS will describe direct PCI interrupt connections to IO APIC in multiprocessor table. Do not enable if OS does not support this feature.
Processor Retest	**No** Yes	Select Yes to have BIOS clear all processor status and retest the processor(s) on bootup.

System Management Submenu

Feature	Choices	Description
System Event Logging	Disabled **Enabled**	When enabled, system events will be logged by BIOS and BMC.
Clear Event Log	**No** Yes	Yes clears the system Event log.
Sever Management Info	Press **Enter**	See the table "System Management Info Submenu."
EMP Password Switch	**Disabled** Enabled	
EMP ESC Sequence	See Chapter 6.	
EMP Hangup Line String	Refer to your modem documentation.	
Modem Init String	Refer to your modem documentation.	
High Modem Init String	Refer to your modem documentation.	
EMP Access Mode	**Disabled** Enabled	
EMP Restricted Mode Access	**Disabled** Enabled	
EMP Direct Connect/Modem Mode	**Direct Connect**	

Server Management Information Submenu*

Feature	Choices	Description
Board Part Number	N/A	Information field only
Board Serial Number	N/A	Information field only
System Part Number	N/A	Information field only
System Serial Number	N/A	Information field only
Chassis Part Number	N/A	Information field only
Chassis Serial Number	N/A	Information field only
BMC Revision	N/A	Information field only
Primary HSBP Revision	N/A	Information field only

* No items on this menu can be modified by the user. If items require changes, consult
  your system administrator.

Console Redirection Submenu

Feature	Choices	Description
COM Port Address	**Disabled** 3F8 2F8 3E8	When enabled, console redirection uses the I/O port specified.
IRQ #	**None** 3 4	When console redirection is enabled, this displays the IRQ assigned per the address chosen in the COM Port Address field.
Baud Rate	9600 19.2k 38.4k 115.2k	Communications line dependent.
Console Type	PC ANSI VT100	Communications line dependent.
Flow Control	None CTS/RTS XON/XOFF CTS/RTS + CD	Communications line dependent.

Boot Menu

Use the Boot menu and its submenus to configure Boot Device priority.

Boot Menu

Feature	Choices	Description
Floppy Check	Disabled **Enabled**	If Enabled, system verifies diskette drive type on boot. Disabled results in a faster boot.
Boot Device Priority	Press **Enter**	See the table "Boot Device Priority Submenu."
Hard Drive	Press **Enter**	See the table "Hard Drive Submenu."
Removable Devices	Press **Enter**	See the table "Removable Devices Submenu."

Boot Device Priority Submenu

Boot Priority	Device	Description
1.	Removable Devices	Attempts to boot from a removable media device.
2.	ATAPI CD-ROM Drive	Attempts to boot from an ATAPI CD-ROM drive.
3.	Hard Drive	Attempts to boot from a hard drive device.
4.	LANDesk® Service Agent II	Attempts to boot from server.

IDE Hard Drive Submenu

Option	Description
1. Drive #1 Identifier	N/A
2. Other Bootable Device	Covers all the boot devices that are not reported to the system BIOS through the BIOS boot specification mechanism.

Removable Devices

Option	Description
1. Legacy Floppy Drive	N/A

Use the Exit menu to save or discard changes in the BIOS settings, or to exit the BIOS Setup utility.

> 📝**Note:** Pressing Esc does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Exit Menu	
Choices	**Description**
Exit Saving Changes	Exits after writing all modified Setup item values to CMOS.
Exit Discarding Changes	Exits leaving CMOS unmodified.
Load Setup Defaults	Loads default values for all Setup items.
Load Custom Defaults	Loads settings from custom defaults.
Save Custom Defaults	Saves present Setup values to custom defaults.
Discard Changes	Reads the previous value of all Setup items from CMOS.
Save Changes	Writes all Setup item values to CMOS.

FLASH Utility

The system BIOS resides on a flash read only memory (ROM) chip in your system. The flash ROM can be updated with a very simple procedure.

Two diskettes are used when updating the Flash ROM. The first diskette updates the BMC and HSC firmware. The second diskette contains the latest version of the BIOS code. You can get the diskettes from NEC CSD or download the BMC and HSC firmware and the BIOS from the NEC CSD website or Bulletin Board System (BBS). See Chapter 6 for download information.

Update the BIOS from the diskettes using the instructions that come with the diskettes, or from information on the BBS.

See Chapter 6 for information about using the website or the bulletin board.

Symbios Configuration Utility

The Symbios Configuration Utility detects the two SCSI host adapters located on the system board. Use the utility to:

- change adapter and SCSI device default values

- check and/or change SCSI device settings that may conflict with those of other devices in the server

- perform low-level formatting or verify operations on SCSI drives.

Running the Symbios Configuration Utility

Use the following steps to run the Symbios Configuration Utility.

1. Power on the system. The system boots up.

2. This message appears on the video monitor:

Press Ctrl-C to start the Symbios Configuration Utility

Press **Ctrl+C** to run this utility.

The utility starts and the Main Menu displays.

Symbios Configuration Utility Main Menu

Adapter	Port Number	IRQ Level	Status		NVRAM Found
			Current	Next Boot*	
SYM53C875	F800	11	On	On*	Yes
SYM53C875	F400	10	On	On	Yes

Change Adapter Status - Press **Enter** twice to change adapter Next Boot Status.

Adapter Boot Order - Press **Enter** to select and change boot order of each SCSI adapter.

Additional Adapter Configuration - Not used.

Display Mode=Verbose - Press **Enter** to change display mode.

Mono/Color - Press **Enter** to change display from black/white to color.

Language - Not used.

Help/Quit

* Next Boot Status for this controller must be turned OFF if you install the optional AMI MegaRAID EXPRESS(r) 762 Controller board in your system. See "Change Adapter Status" above.

The following keys are active for all SCSI Configuration screens:

Symbios SCSI Configuration Keys

Key	Action
Arrows	Up and down arrows move from one parameter to another within a screen.
Enter	Displays options for a configurable parameter. Selects an option.
ESC	Moves back to previous screen or parameter or EXIT if at the Main menu.

Changing the Adapter and Device Configurations

The SCSI Configuration Utility Main Menu lists the two onboard SCSI adapters and shows their current settings. The first adapter listed controls the operation of the SCSI hard drives in your system; the second adapter listed controls any SCSI removable media devices installed in your system.

1. Using the down arrow key, select the adapter you want to reconfigure. Press **Enter**.

2. Select "Adapter Setup" and press **Enter**. The Adapter Setup screen displays (see the table on the following page).

3. Highlight the function you want to change and press **Enter**. You are prompted to save changes when you exit the configuration utility.

Adapter Setup Screen

Description	Recommended Setting or Display Only	Your Configuration SYM53C875 1	Your Configuration SYM53C875 2
SCAM Support	Off		
Parity	On		
Host SCSI ID	7		
Scan Order	Low to High		
Removable media support	None		
CHS Mapping	SCSI Plug and Play Mapping		

To change device configuration parameters, perform the following steps:

1. At the SCSI Configuration Utility Main Menu, select the adapter that connects to the SCSI device you are reconfiguring. The first adapter listed controls the operation of the hard drives; the second controls SCSI removable media devices. Press **Enter**.

2. Select "Device Selections" and press **Enter**. The Devices 0 to 7 screen displays (see the following table).

3. Select the SCSI device you are reconfiguring and press **Enter**. For SCSI hard drives, see the table "SYM53C875 Adapter 1" on the following page; for SCSI removable media devices, see the table "SYM53C875 Adapter 2" for recommended settings.

4. Highlight the function you want to change and press **Enter**. You are prompted to save changes when you exit the configuration utility.

> ▤ **Note:** If you wish to format a disk or verify disk media, select "Format" or "Verify" from the Device Setup menu.

SYM53C875 Adapter 1 - SCSI Hard Disk Drives

Description	Recommended Setting or Display Only	Your Configuration			
Device Selections	Press Enter for menu. Select device and press **Enter**.	Dev0	Dev1	Dev2	Dev3
Sync Rate	40				
Width (bits)	16				
Disconnect	On				
Read/Write I/O timeout (secs)	10				
Scan for device at boot time	Yes				
Scan for SCSI LUNS	Yes				
Queue Tags	On				

SYM53C875 Adapter 2 - SCSI Removable Media Devices

Description	Recommended Setting or Display Only	Your Configuration			
Device Selections	Press Enter for menu. Select device and press **Enter**.	Dev0	Dev1	Dev2	Dev3
Sync Rate	10				
Width (bits)	8				
Disconnect	On				
Read/Write I/O timeout (secs)	10				
Scan for device at boot time	Yes				
Scan for SCSI LUNS	No				
Queue Tags	On				

NEC OS Restore CD

The following procedures describe how to use the NEC OS Restore CD that ships with your system.

Please read the following sections in their entirety before using the NEC OS Restore CD to restore the Windows NT operating system or the factory-installed drivers on your system.

Introducing OS Restore Options

Your system comes with an NEC OS Restore compact disc (CD). This CD contains the Windows NT operating system and device drivers for the hardware that was factory-installed in your system. Should a problem occur that causes data loss or corruption, you can restore your system to its working state using this CD.

After restoring the operating system, use the NEC Select Install CD to install your applications, optional drivers, and online documents.

> 📄**Note:** The computer also comes with the NEC Select Install CD. This CD contains applications and online documents. The CD also contains a full suite of optional drivers that are compatible with hardware options offered by NEC CSD. See "NEC Select Install CD" for information about installing or restoring applications, optional drivers, and online documents.

⚠ CAUTION

If possible, back up your data before performing an OS restore.

Choosing a Restore Program

The OS Restore program allows you to repartition and/or reformat your hard drive and then reinstall the Windows NT operating system from the CD. You can rebuild the disk and reinstall your operating system in one of two ways.

- Auto, which reformats and repartitions the hard drive before restoring Windows NT and factory-shipped drivers (see "Auto Rebuild and Restore")

- Custom, which reformats the hard drive with the option to repartition before restoring Windows NT and factory-shipped drivers (see "Custom Rebuild and Restore").

The operating system and factory-shipped drivers are always restored regardless of which program you choose.

After performing an OS restore, run the Selective Application Restore program to reinstall any application that came with your system. See "NEC Select Install CD" for directions on running this program.

Auto Rebuild and Restore

To perform an auto OS Restore that also repartitions and reformats your hard drive, boot the system from the OS Restore CD. When the system boots from the CD, it automatically loads the MS-DOS(r)-based Operating System Restore program.

⚠ **CAUTION**

The OS Restore program deletes all the data on your hard drive. If possible, back up your data before performing an OS restore.

Follow these steps to rebuild your hard drive and restore your original operating system and drivers using OS Restore:

1. Power on or restart the system and immediately insert the NEC OS Restore CD into the CD-ROM drive.

After the system boots from the CD, the Operating System Restore Welcome screen appears (see the following screen).

Welcome Screen

2. Click **Continue** to continue (or **Exit** to exit the program).

A License Agreement screen appears with three options: Back, Reject, and Accept.

- The **Back** button returns you to the Welcome screen.

- The **Reject** button terminates the restoration process.

- The **Accept** button signals that you accept the terms of the license and allows you to continue.

3. Read the license agreement and click Accept to continue.

The Restore Mode screen appears with three options: Back, Auto, and Custom.

- The **Back** button returns you to the License Agreement screen.

- The **Auto** button selects a restore process designed for basic users who require limited manual control of restore functions.

- The **Custom** button selects a more advanced restore process for users who want more control of restore functions.

Click Custom or Auto to repartition and/or reformat your hard drive before reinstalling the operating system.

4. Click **Auto** to do a basic operating system restore.

The FAT16 Partition warning screen appears indicating that the system is about to partition and format your hard drive using the FDISK program. This warning screen contains three options: Back, Exit, and Continue.

- Click **Back** to return to the Partition Information screen.

- Click **Exit** to terminate the restore process.

- Click **Continue** to perform FDISK.

5. If you click Continue, the system performs FDISK and reboots the system. After the reboot, all partitions are formatted. When all the partitions have been formatted, the OS loads from the CD. The Installing Applications screen appears. This screen also displays the version of Windows OS being installed.

The drivers and other software components required for the operating system are also loaded from the CD.

After the OS finishes loading, the "Operating System Restore Completed" screen appears.

6. Remove the CD from the CD tray.

7. Click **OK** to reboot.

This completes the Auto Rebuild and Restore procedure.

To reinstall any of the applications or online documents, or to install device drivers that did not come with your system, follow the procedures in "NEC Select Install CD."

Restore any application or driver that was not provided by NEC by using the vendor diskette(s) or CD-ROM(s) included in its original packaging.

Custom Rebuild and Restore

To perform a custom OS Restore with choices on repartitioning and/or reformatting the hard drive, boot the system from the NEC OS Restore CD. When the system boots from the CD, it automatically loads the MS-DOS-based Operating System Restore program.

⚠ CAUTION

The OS Restore program deletes all the data on your hard drive. If possible, back up your data before performing an OS restore.

Follow these steps to perform a customized restore of your original, factory-installed operating system using OS Restore:

1. Power on or restart the system and immediately insert the NEC OS Restore disc into the CD-ROM drive.

After the system boots from the CD, the Operating System Restore Welcome screen appears (see the following screen).

Welcome Screen

2. Click **Continue** to continue (or **Exit** to exit the program).

A License Agreement screen appears with three options: Back, Reject, and Accept.

■ The **Back** button returns you to the Welcome screen.

■ The **Reject** button terminates the restoration process.

■ The **Accept** button signals that you accept the terms of the license and allows you to continue.

3. Read the license agreement and click **Accept** to continue.

The Restore Mode screen appears with three options: Back, Auto, and Custom.

■ The **Back** button returns you to the License Agreement screen.

■ The **Auto** button selects a restore process designed for basic users who require limited manual control of restore functions.

■ The **Custom** button selects a more advanced restore process for more control of restore functions.

Click Custom or Auto to repartition and reformat your hard drive before reinstalling the operating system.

4. Click **Custom** on the Restore Mode screen if you wish to customize the OS restore.

After you click Custom, the integrity of your system's existing FAT table is verified. If the existing partition table is not functional, the system automatically follows the Auto restore scheme described in the previous section.

5. If you want to partition and reformat the hard drive, go to step 7. Otherwise, click **Skip** to retain the present partition structure on the hard drive.

The Format Mode screen appears with four options: Back, Quick, Full, and Exit.

■ Click **Back** to return to the Partition Information screen.

■ Click **Quick** to do a quick hard drive format.

■ Click **Full** to do a full hard drive format.

■ Click **Exit** to terminate the restore process.

6. After you select the type of hard drive format you want to do (Quick or Full), the Formatting Drive(s) screen appears with a status bar showing the progress of the formatting.

After the drive has been reformatted, the Installing Applications screen appears, indicating the status of the restore process as the operating system loads from the CD. This screen also displays the version of Windows OS being installed.

The drivers and other software components required for the operating system are also loaded from the CD.

After the OS finishes loading, the "Operating System Restore Completed" screen appears. Skip to step 8.

7. To partition the hard drive, click **Continue** on the Partitioning the Hard Drive screen. The FAT16 Partition warning appears indicating that the system is about to partition and format your hard drive using the FDISK program. This warning screen contains three options: Back, Exit, and Continue.

- Click **Back** to return to the Partition Information screen.

- Click **Exit** to terminate the restore process.

- Click **Continue** to perform FDISK.

If you click Continue, the system performs FDISK and reboots the system. After the reboot, all partitions are formatted. When all the partitions have been formatted, the OS loads from the CD. The Installing Applications screen appears. This screen displays the version of Windows OS being installed.

The drivers and other software components required for the operating system are also loaded from the CD.

After the OS finishes loading, the "Operating System Restore Completed" screen appears.

8. Remove the CD from the CD tray.

9. Click **OK** to reboot.

This completes the Custom Rebuild and Restore procedure.

To reinstall any of the applications or online documents, or to install device drivers that did not come with your computer, follow the procedures in "NEC Select Install CD."

Restore any application or driver that was not provided by NEC by using the vendor diskette(s) or CD-ROM(s) included in its original packaging.

NEC Select Install CD

The following procedures describe how to use the NEC Select Install CD that ships with your system.

Please read the following sections in their entirety before using the NEC Select Install CD to install or restore any software on your system.

Introducing Select Install Options

Your system comes with an NEC Select Install compact disc (CD). Use this CD to install any or all of the software that comes with your system, including

- applications
- device drivers
- the online NEC PowerMate Professional 9000 Series User's Guide
- the Healthy Environment online brochure.

Should a problem occur that causes data loss or corruption, you can restore these files to your computer using one of the programs on the CD.

Choosing the Correct Installation Method

The NEC Select Install CD has two types of programs; choose a program according to the type of files you are installing or reinstalling on your hard drive.

- NEC Selective Restore program

  The NEC Selective Restore program installs applications, the online NEC PowerMate Professional 9000 Series User's Guide, and the Healthy Environment online brochure. See "Installing Applications and Online Documents."

- Driver setup.exe programs

  Each driver that is delivered on the NEC Select Install CD comes with its own setup.exe program. Use these programs to install drivers. See "Installing Drivers."

Installing Applications and Online Documents

Use the Selective Application Restore program to install selected applications from the CD after rebuilding your hard drive, or at any time to install a software package or online document that came on the NEC Select Install CD. Use the NEC Select Install CD once Windows NT is running.

Follow these steps to install any of the applications or online documents that came on the CD.

> 📑 **Note:** To install an optional driver from the NEC Select
> Install CD, see "Installing Drivers."

1. After logging on the first time, reboot the system.

2. With the Windows NT operating system running, insert the NEC Select
Install CD into the CD-ROM drive.

3. Start the Selective Application Restore program.

- Click **Start** on the taskbar and point to and click Run. The Run window
  appears.

- In the Open field, type **Q:\setup.exe** where Q represents the letter
  assigned to the CD-ROM drive.

- Click **OK**. The NEC Selective Restore window appears (see the
  following screen).

NEC Selective Restore Window

4. Double click one or more of the entries in the list of applications and online
documents. A checkmark should appear to the left of each entry that is
double clicked. To deselect an entry, double click it again so that the
checkmark disappears.

Items that appear grayed-out are already installed on your system.

5. Click **OK**. The selected files load sequentially, and a progress bar appears
for each item you selected.

6. When all the files have finished installing, remove the CD.

7. Click **Restart Computer** to reboot and ensure that the installation process
completes successfully.

This completes the Selective Application Restore procedure.

After the Selective Application Restore process completes, you can reinstall any personal applications. These applications are not on the NEC Select Install CD and must be reinstalled after the Selective restore process completes.

Using the Selective Restore Program on a Remote CD

If the computer is connected to a network and set up to access a shared CD-ROM drive, a System Administrator can install the applications from the NEC Select Install CD in the remote CD-ROM drive.

1. Insert the NEC Select Install CD into the shared CD-ROM drive.

2. Do a map connection to the shared CD-ROM drive.

- From the system with the shared CD-ROM drive, double click **My Computer** and right click on the CD-ROM drive. (For example, right click on **Q:** if the shared CD-ROM drive is designated as drive Q.)

- In the popup menu, right click on **Sharing**. The Properties screen appears.

- In the Properties screen, click **Shared As**.

- Click the **New Share** button, then type a name in the Share Name field. (For example, type CD-ROM in the field.)

- Click **OK**. This returns you to the Properties screen.

3. On the Client desktop, double click **Network Neighborhood**.

4. Double click **Entire Network**.

5. Click the name of the computer with the shared CD-ROM drive. Double click the name of the shared CD-ROM drive.

6. To install the any of the applications or online documents that NEC CSD provided with the system, double click the **setup.exe** program.

The NEC Selective Restore window appears (see the screen on the following page).

7. Double click one or more of the entries in the list of applications and online documents. A checkmark should appear to the left of each entry that is double clicked. To deselect an entry, double click it again so that the checkmark disappears.

Items that appear grayed-out are already installed on your system.

8. Click **OK**. The selected files load sequentially, and a progress bar appears for each item you selected.

9. When all the files have finished installing, remove the CD.

10. Click **Restart Computer** to reboot and ensure that the installation process completes successfully.

This completes the Selective Application Restore procedure.

After the Selective Application Restore process completes, you can reinstall any personal applications. These applications are not on the NEC Select Install CD and must be reinstalled after the Selective restore process completes.

Installing Drivers

Your system comes with an NEC Select Install CD. The CD contains the device drivers that were delivered on your system, and a full suite of optional drivers that correspond to hardware options offered by NEC CSD. If you install optional hardware in the system, or make other system enhancements, use the NEC Select Install CD to install the drivers required for system operation.

Note: When you restore the operating system, the drivers that were factory-shipped are automatically installed.

When you restore the operating system using the NEC OS Restore program, the drivers that were factory-shipped are automatically installed.

Please read this section in its entirety before using the NEC Select Install CD to install drivers on your system.

Installing Drivers with the NEC Select Install CD

Follow these steps to install drivers.

⚠ **CAUTION**

Do not select and install drivers for any hardware that is not currently installed on the system. Doing so can damage the operating system.

---

1. Install the device that will require the new driver before installing the driver.

2. With the operating system running, insert the NEC Select Install CD into the CD-ROM drive.

3. Access the subdirectory that corresponds to the driver you wish to install.

4. Double click the **setup.exe** icon corresponding to the driver you wish to install.

5. Follow the prompts in the installation wizard to install the driver.

6. Repeat steps 1 through 5 for each driver you wish to install.

7. Restart the computer to ensure that the installation process completes successfully.

Installing Drivers from a Remote CD

If the computer is connected to a network and set up to access a shared CD-ROM drive, a System Administrator can install the optional drivers from the NEC Select Install CD in the remote CD-ROM drive.

⚠ **CAUTION**

Do not select and install drivers for any hardware that is not currently installed on the system. Doing so can damage the operating system.

---

1. Install the device that will require the new driver before installing the driver.

2. Insert the NEC Select Install CD into the shared CD-ROM drive.

3. Do a map connection to the shared CD-ROM drive.

- From the system with the shared CD-ROM drive, double click **My Computer** and right click on the CD-ROM drive. (For example, right click on **Q:** if the shared CD-ROM drive is designated as drive Q.)

- In the popup menu, right click on **Sharing**. The Properties screen appears.

- In the Properties screen, click **Shared As**.

- Click the **New Share** button, then type a name in the Share Name field. (For example, type CD-ROM in the field.)

- Click **OK**. This returns you to the Properties screen.

4. On the Client desktop, double click **Network Neighborhood**.

5. Double click **Entire Network**.

6. Click the name of the computer with the shared CD-ROM drive. Double click the name of the shared CD-ROM drive.

7. Access the subdirectory that corresponds to the driver you wish to install.

8. Double click the **setup.exe** icon corresponding to the driver you wish to install.

9. Follow the prompts in the installation wizard to install the driver.

10. Restart the computer to ensure that the installation process completes successfully.

3

Disassembly and Reassembly

- System Unit Cover Removal
- Expansion Board Removal
- Front Panel Removal
- 3 1/2-Inch Diskette Drive Removal
- 5 1/4-Inch Device Removal
- 3 1/2-Inch Internal Hard Drive Removal
- DIMM Removal
- Processor Subsystem Removal
- Power Switch Removal
- LED Assembly Removal
- Intrusion Switch Removal
- System Board Removal
- Power Supply Removal
- System Fan Removal
- Internal Speaker Removal
- Expansion Board Guide Removal
- CMOS Battery Removal
- Chassis Foot Removal

This section contains step-by-step disassembly procedures for the system unit. Unless stated otherwise, reassembly is performed by reversing the disassembly sequence. A simplified disassembly illustration is provided with most procedures. Section 6 includes a parts list and an illustrated parts breakdown showing an exploded view of the system.

A Phillips-head screwdriver is the only required tool. For complete disassembly of the system unit, follow the disassembly order listed in the following table. To reassemble, follow the table and procedures in reverse order.

Individual removal procedures do not require the total disassembly of the workstation. Each of the following subsections lists the parts that must be removed before beginning the removal procedure.

PowerMate Professional 9000E Series Disassembly Sequence

Sequence	Part Name	See Page
1	System unit cover	3-3
2	Expansion board	3-9
3	Front panel	3-10
4	3 1/2-inch diskette drive	3-12
5	5 1/4-inch device	3-12
6	3 1/2-inch hard drive	3-14
7	DIMM memory module	3-16
8	Processor subsystem	3-17
9	Power switch	3-20
10	Power and hard drive LED	3-21
11	Intrusion switch	3-22
12	System board	3-22
13	Power supply	3-24
14	System fan	3-25
15	Internal speaker	3-25
16	Expansion board guide	3-26
17	CMOS battery	3-27
18	Chassis foot	3-29

When disassembling the system unit, follow these general rules.

- Before opening the system or handling boards or chips, touch the frame to discharge static.

- Disconnect all peripherals before disassembling the system unit.

- Do not disassemble parts other than those specified in the procedure.

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

- Label any connector before removing it. Note where the connector goes and in what position it was installed.

On completion of any reassembly, perform a power-on test. If a fault occurs, verify that the reassembly was performed correctly.

⚠ CAUTION

Before handling boards or chips, ground yourself to release static.

System Unit Cover Removal

The following sections describe how to remove and replace the system unit side covers and top cover.

Removing the Side Covers

Before installing optional hardware inside your computer, you must first remove one or both of the side covers on the system unit. The left side cover must be removed whenever the interior of the system unit is accessed. Less frequently, the right side cover must be removed. The following procedure applies to either cover.

⚠ WARNING

Before you remove a system unit cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

1. Turn off and unplug the system unit.

2. Disconnect the keyboard, mouse, monitor, and any other attached device (such as speakers or a printer) from the rear of the system unit.

⚠ CAUTION

Electrostatic discharge can damage computer components.
Discharge static electricity by touching a metal object before
removing the system unit cover.

3. If you have a chassis lock that connects to the Kensington® Security Standard connector, remove it.

4. If you have a padlock in the locking tab on the rear edge of the chassis, remove it.

5. Remove the three side cover screws on the rear of the system unit.

Locating Cover Screws

A - Right Side Cover Screws **B** - Top Cover Screws
C - Left Side Cover Screws

6. Slide the side cover back about one-half inch; if necessary, anchor one hand on the rear of the system unit as you slide the cover.

📄**Note:** The cover fits tightly. You might need to anchor one hand on the rear of the system unit as you slide the cover.

7. Pull the top edge of the side cover out about one-half inch from the top of the chassis (see arrow 1 in the figure on the following page).

8. Lift the cover up and away from the system unit (see arrow 2 in the figure on the following page).
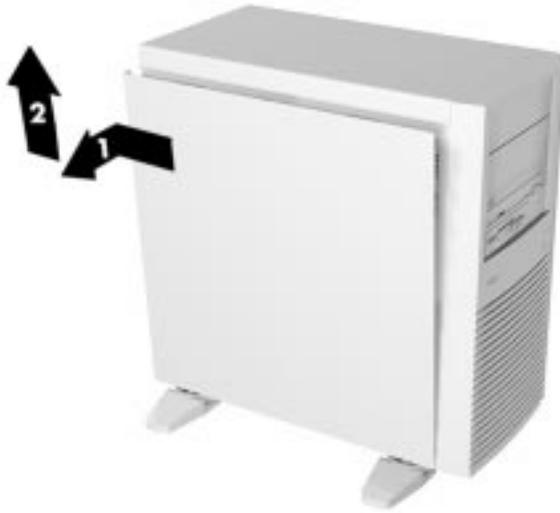
Repeat this procedure if the other side cover must also be removed.

To replace the cover, see "Replacing the Side Covers."

Replacing the Side Covers

Replace the covers as follows:

⚠ **CAUTION**

To prevent damage to system cables, carefully tuck the
cables out of the path of the cover.

1. Position the cover against the chassis with its front edge about one-half inch
behind the front of the chassis.

2. Fit the cover into the chassis. Make sure that the tabs along the top, back,
and bottom edges of the cover are aligned with the notches and rails in the
chassis (see the figure on the following page).

Aligning a Cover
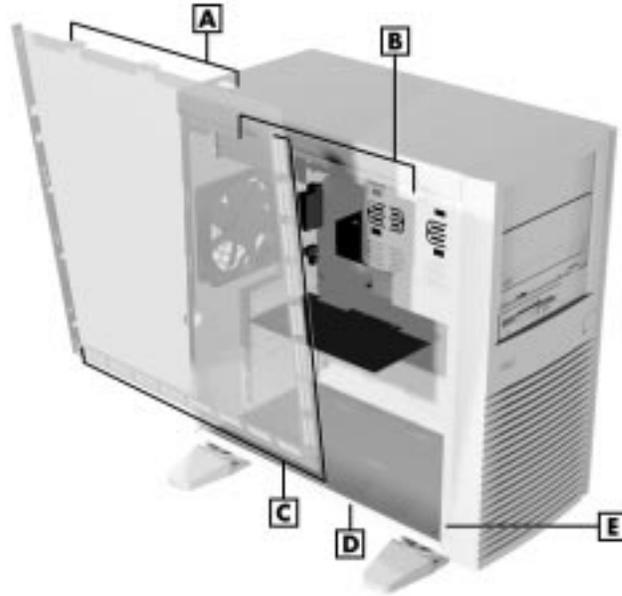
A - Metal Tabs **B** - Slots **C** - Tabs **D** - Securing Rail
E - Securing Rail

3. Slide the cover forward to meet the front panel.

> ⧉**Note:** The cover fits tightly. If the cover does not slide
> all the way to the front panel, make sure that the tabs along
> the top, back, and bottom of the cover are aligned with the
> notches and rails in the chassis.

4. Secure the cover with the three screws (see "Removing the Side Covers").

5. If you have a chassis lock that connects to the Kensington® Security Standard connector, reconnect it to the chassis.

6. If you have a padlock for the locking tab on the rear edge of the chassis, replace it.

7. Reconnect all external peripherals.

8. Plug in the system power cables.

Repeat this procedure if the other cover must be replaced.

Removing the Top Cover

Before the accessible device cage can be removed from your workstation, you must remove the top cover on the system unit. Both side covers must be removed before the top cover can be removed.

⚠️ WARNING

Before you remove a system unit cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Remove both side covers (see "Removing the Side Covers").

2. Remove the two top cover screws on the rear of the system unit (see the figure "Locating Cover Screws" in "Removing the Side Covers."

3. Slide the cover back about one-half inch; if necessary, anchor one hand on the rear of the system unit as you slide the cover.

   Note: The top cover fits tightly. You might need to anchor one hand on the rear of the system unit as you slide the cover.
   ---

4. Lift the back edge of the cover up about one inch to free the tabs underneath. Then lift the cover off the system unit.
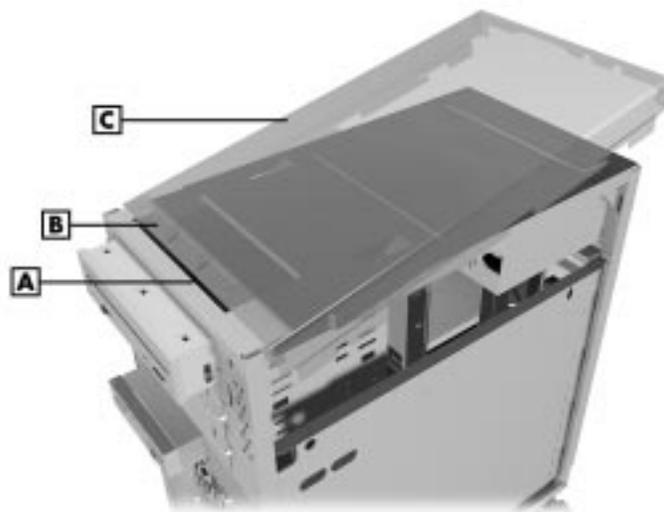
To replace the cover, see "Replacing the Top Cover."

Replacing the Top Cover

Replace the top cover as follows:

> 📖 **Note:** Replace both side covers before replacing the top cover.

1. Replace both side covers (see "Replacing the Side Covers").

2. Line up the top cover tabs with the cutaway on the top of the chassis. The front edge of the cover should be about one-half inch behind the front of the chassis. The rear edge of the cover should be held higher than the front edge. See the following figure.

Aligning the Top Cover

A - Chassis Cutaway **B** - Top Cover Tabs (on underside of cover)
C - Top Cover

> 📖 **Note:** Although the figure shows the system without a side cover, both side covers must be replaced before the top cover can be replaced.

3. Slide the cover forward to meet the front panel as you lower the rear edge. The top cover should slide over the tops of the side covers.

> 📖 **Note:** The cover fits tightly. If the cover does not slide all the way to the front panel, make sure that the tabs under the top cover are aligned with the cutaway on the top of the chassis and that the top cover is over the tops of the side covers.

4. Secure the cover with the two screws (see the figure "Locating Cover Screws" in "Removing the Side Covers").

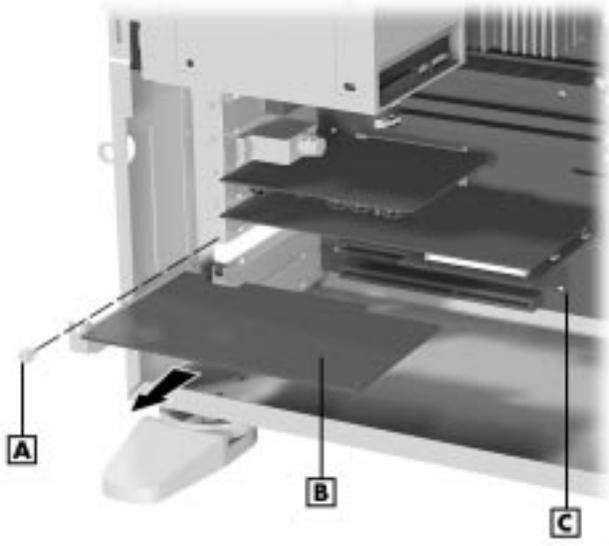**5.** Replace the side covers (see "Replacing the Side Covers").

Expansion Board Removal

Remove any installed expansion board(s) as follows.

To remove an expansion board, perform the following steps:

1. Remove the left cover of the system unit (see "Removing the Side Covers").

2. Label and remove any cables connected to the expansion board.

3. Remove the screw that secures the board to the support bracket. Set the screw aside (use it to secure the slot cover after the board is removed).

4. Pull the board out of the connector. Remove the board from the expansion slot.

Removing an Expansion Board

A - Screw **B** - Expansion Board **C** - System Board

5. Replace the slot cover and slot cover screw.

6. Replace the left cover of the system unit (see "Replacing the Side Covers").

Front Panel Removal

Remove the front panel before installing a device in one of the 5 1/4-inch accessible device bays. The front panel does not need to be removed if you are installing a 3 1/2-inch hard drive. If you are going to install a 5 1/4-inch device, you also need to remove the blank panel that covers the bay on the front panel, and the metal bay cover that covers the accessible device bay.

Remove the front panel as follows:

1. Six metal tabs hold the front panel to the front of the system unit. Remove the front panel by evenly pulling it away from the system unit to release the tabs.
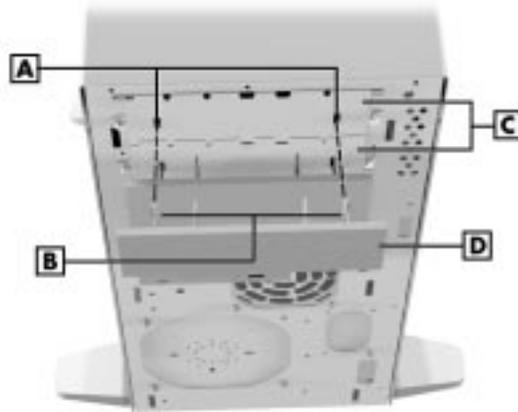
Removing the Front Panel

A - Front Panel

2. Identify the accessible device bay where the device will be installed.

3. Press the tabs on the back side of the blank plastic panel together slightly and pull the panel free from the metal bay cover (see the figure on the following page). Set the panel aside.

Locating Blank Panel Tabs

A - Blank Panel Tab Slots **B** - Blank Panel Tabs **C** - Bay Covers
D - Blank Panel

4. Remove the screws securing the bay cover to the chassis. Set the screws and the bay cover aside.

Locating Metal Bay Covers

A - Bay Covers

5. Install the device.

3 1/2-Inch Diskette Drive Removal

Remove the 3 1/2-inch diskette drive as follows.

1. Remove the system unit cover as previously described.

2. Remove the front panel as previously described.

3. Label and unplug the signal and power cables from the back of the diskette drive.

    > 📰 **Note:** When reinstalling the diskette drive, note that all power cables are keyed to fit only in the correct position.

4. Remove the screws holding the diskette drive to the diskette drive bracket. Access the bracket through the cutout in the chassis wall.

5. Remove the diskette drive from the chassis.

5 1/4-Inch Device Removal

The following sections describe how to remove 5 1/4-inch accessible devices. The lower 5 1/4-inch accessible device is removed in a different way than the upper 5 1/4-inch accessible devices, and it includes removal of the 5 1/4-inch accessible device cage.

Removing a 5 1/4-Inch Device from an Upper Bay

Use the following procedure to remove a 5 1/4-inch device from either of the upper two 5 1/4-inch accessible device bays. If you are removing a device from the lowest 5 1/4-inch bay, see "Removing a 5 1/4-Inch Device from the Lowest Bay."

1. Remove both side covers of the system unit (see "Removing the Side Covers").

2. Remove the front panel (see "Removing the Front Panel").

3. Label and disconnect the device cables.

4. Remove the screws holding the device in the bay (see the figure on the following page).

5. Slide the device out of the device bay.

Removing a 5 1/4-Inch Device from the Lowest Bay

Use the following procedure to remove a 5 1/4-inch device from the lowest of the three 5 1/4-inch accessible device bays. If you are removing a device from one of the upper two 5 1/4-inch bays, see "Removing a 5 1/4-Inch Device from an Upper Bay."

1. Follow all directions on removing the 5 1/4-inch accessible device cage (see "Removing the Accessible Device Cage").

2. Remove the four screws (two to a side) securing the device in the lowest bay of the accessible device cage.

3. Slide the device out of the bay.

Removing the Accessible Device Cage

Remove the 5 1/4-inch accessible device cage by following these steps.

1. Remove both side covers and the top cover of the system unit (see "Removing the Side Covers" and "Removing the Top Cover").

2. Remove the front panel (see "Front Panel Removal").

3. Label and disconnect all cables going to devices in the 5 1/4-inch accessible device cage.

4. Remove the seven screws securing the 5 1/4-inch accessible device cage to the chassis (see the figure on the following page).
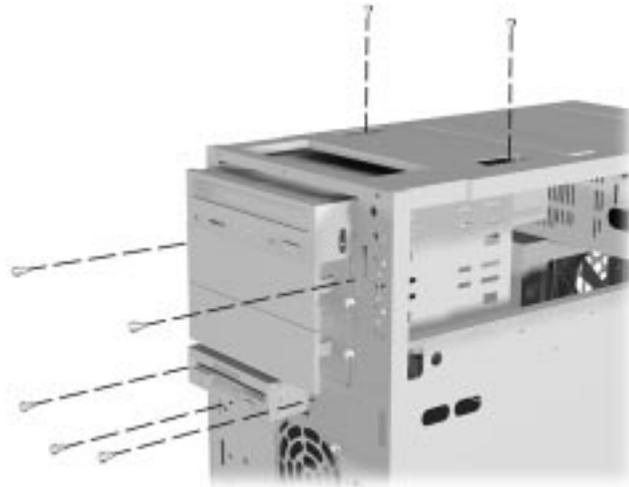
5. Slide the 5 1/4-inch accessible device cage out of the chassis.

3 1/2-Inch Internal Hard Drive Removal

Your system supports two internal hard drives in the drive cage within the chassis. You can upgrade the system by replacing an existing hard drive, or by adding an additional hard drive.

Remove a 3 1/2-inch internal hard drive by following these steps:

1. Follow all the instructions for removing the drive cage from the chassis (see "Removing the Drive Cage").

2. Remove the four screws securing the drive to the drive cage and remove the drive from the drive cage.

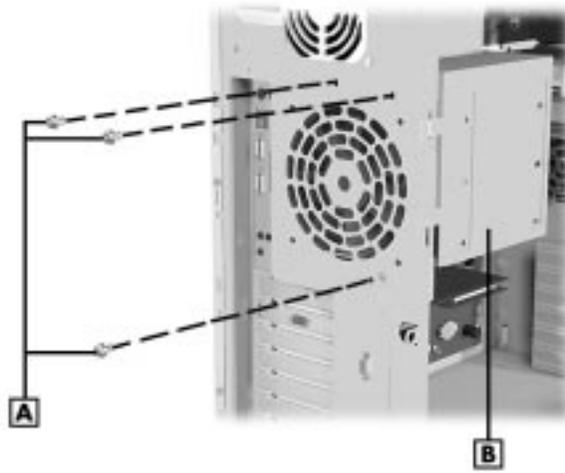*Removing Internal Hard Drive Screws*

Removing the Drive Cage

Remove the drive cage by following these steps:

1. Remove the left cover of the system unit (see "Removing the Side Covers").

2. Label and disconnect all cables connected to devices in the drive cage.

3. Remove the three screws securing the drive cage to the rear of the chassis.

Locating Drive Cage Screws

A - Drive Cage Screws **B** - Drive Cage

4. Large hooked tabs hold the left rear edge of the drive cage to the left rear edge of the chassis. Swing the drive cage out of the chassis using the tabs like a hinge.

Removing the Drive Cage

A - Drive Cage

5. Lift the drive cage up slightly to free the large hooked tabs from the slots in the chassis.

6. Pull the drive cage away from the chassis.

DIMM Removal

Remove a DIMM module from the system board as follows.

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

⚠ CAUTION

Before opening the computer and before handling boards or memory modules, reduce static discharge by touching the system's metal chassis.

---

1. Remove the system unit cover (see "Removing the Side Covers").

2. Locate the system memory upgrade sockets on the system board (see the figure "Processor and DIMM Sockets on the System Board" in Section 4). Any socket (or all) can contain a DIMM memory module.

3. Label and disconnect any cables that block the DIMM sockets.

4. Press the plastic clips at the outer edges of the socket away from the memory module. This ejects the DIMM from the socket.

Removing a DIMM
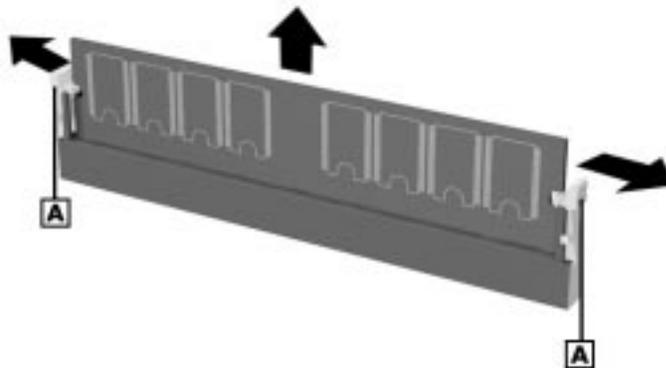
A - Plastic Clip

Processor Subsystem Removal

Incorrect installation of the processor can damage the processor, system board, or both. Follow the installation instructions carefully.

⚠ CAUTION

The system requires a heatsink on the processor. Verify that you have the correct heatsink for the processor being installed.

If you are adding a second processor to the system, use a heatsink fan on the processor.

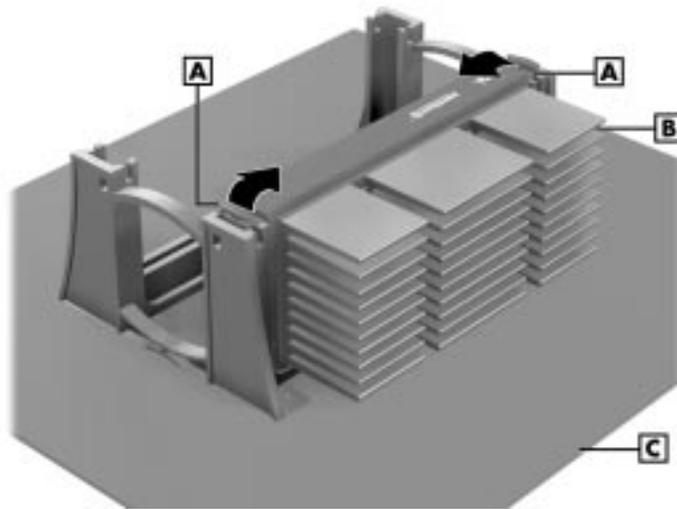## Removing the Processor

Remove the processor as follows.

⚠ WARNING

If the system has been running, any processor and heatsink already installed on the board will be hot. To avoid the possibility of a burn, let the components cool for 10 minutes before continuing with the procedures described here.

1. Let the components within the system cool for about 10 minutes before removing a processor.

2. Remove the left cover of the system unit (see "Removing the Side Covers").

3. Remove the drive cage (see "Removing the Drive Cage").

4. Locate the processor socket (see the figure "Processor and DIMM Sockets on the System Board" in Section 4). Label and disconnect any cables that block the processor.

5. Release the locking tabs holding the processor in the retention mechanism by pressing them toward the processor. The tabs should click open (see the figure on the following page).

Releasing the Processor Locking Tabs

A - Locking Tab **B** - CPU/Heatsink **C** - System Board
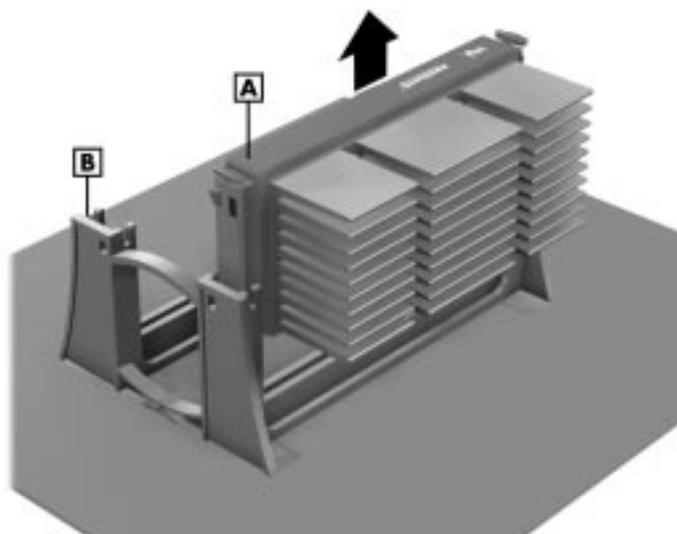

⚠ **CAUTION**
Before picking up the processor, reduce static discharge by
touching the metal frame of the system unit.

---

6. Lift the processor out of the retention mechanism.

Removing the Processor

A - CPU/Heatsink **B** - Retention Mechanism

7. Terminate the processor socket if it is to remain empty. Otherwise, install
the upgrade processor.

Removing a Termination Board

If your system has one processor and you are adding a second processor, then you must remove the termination board in the empty Slot 1 secondary connector.

Remove the termination board by following these steps.

1. Squeeze the tabs on the top of the termination board bracket toward each other to release them from the retention mechanism.

2. While still holding the tabs, pull the termination board bracket out of the retention mechanism.
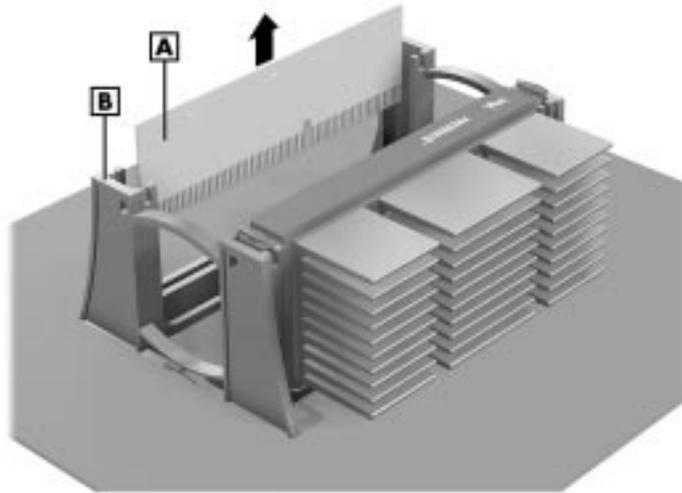
Removing the Termination Board Bracket
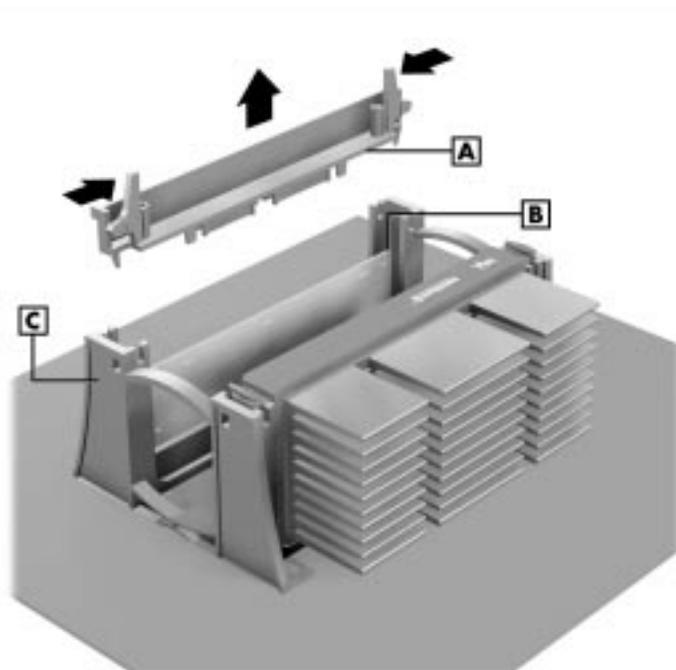
A - Termination Board Bracket **B** - Termination Board
C - Retention Mechanism

3. Pull the termination board out of the processor socket (see the figure on the following page).

A - Termination Board **B** - Retention Mechanism

4. Store the termination board and bracket appropriately.

Power Switch Removal

Remove the power switch by following these steps.

1. Power off the system and remove the left side cover as described earlier in this section.

2. Label and disconnect the power switch cable from the system board.

3. Remove the front panel as described earlier in this section.

4. Using a small Phillips-head screwdriver, remove the two screws securing the power switch to the front of the chassis. Remove the power switch assembly.

Removing the Power Switch
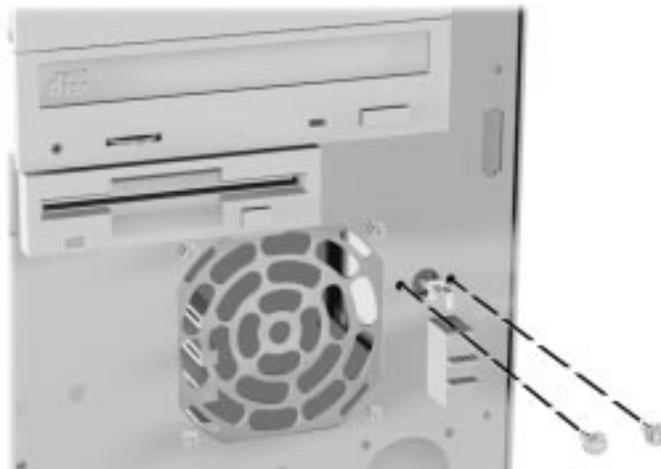
LED Assembly Removal

Remove the power and hard drive activity LED assembly by following these steps.

1. Power off the system and remove the left and right side covers as described earlier in this section.

2. Label and disconnect the power and hard drive LED cables from the system board.

3. Remove the front panel as described earlier in this section.

4. Using a small screwdriver or ball-point pen, push down on the top tab of the LED assembly while pulling the assembly away from the front of the chassis.

Power and Hard Drive LED Assembly Removal
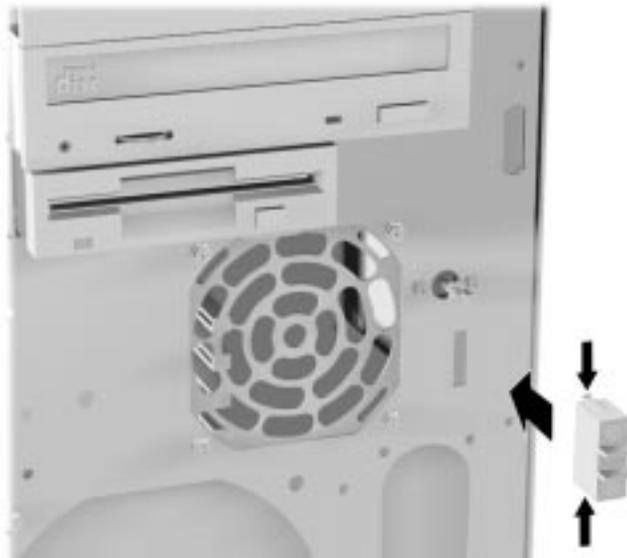
5. Feed the cables through the right side of the system chassis and remove the LED assembly.

Intrusion Switch Removal

Remove the intrusion switch assembly by following these steps.

1. Power off the system and remove the left side cover as described earlier in this section.

2. Remove the drive cage (see "Removing the Drive Cage").

3. Label and disconnect the intrusion switch cable from the system board connector.

4. Using a small Phillips-head screwdriver, remove the two screws securing the intrusion switch to the rear of the chassis. Remove the intrusion switch and cable assembly.

Intrusion Alarm Switch Cable Connection

# System Board Removal

Remove the system board by following these steps:

1. Remove the left side cover on the system unit (see "Removing the Side Covers").

2. Label and disconnect any cables connected to devices in the drive cage.

3. Remove the drive cage (see "Removing the Drive Cage").

4. Label and disconnect any cables connected to devices in the 5 1/4-inch accessible device cage.

5. Remove the accessible device cage (see "Removing the Accessible Device Cage").

6. Label and disconnect any cables connected to the system board or any expansion board.

7. Remove all expansion boards from the system (see "Expansion Board Removal").

8. Loosen and remove the ten screws securing the system board to the side of the chassis.

Locating System Board Screws and Posts
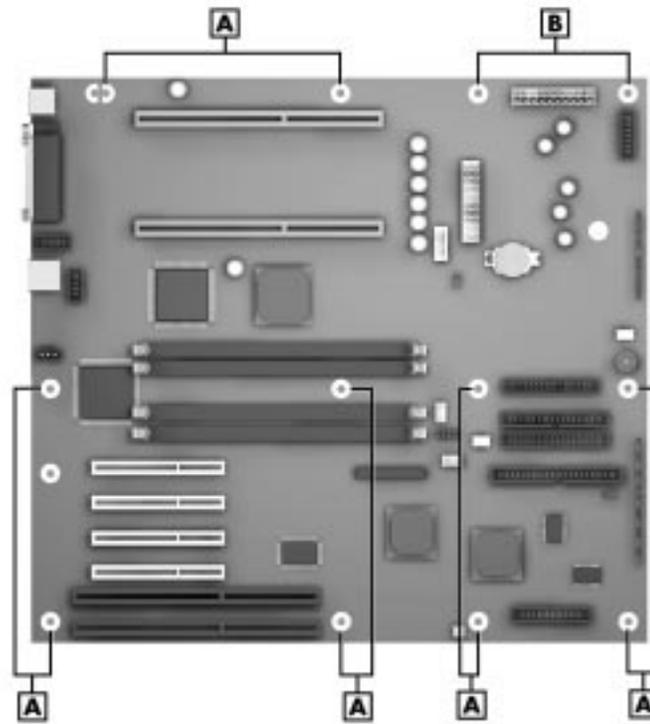
A – System Board Screws **B** – Plastic Posts

9. Pinch each of the two plastic posts still securing the board to the chassis so the board slides off the posts. Pull the system board out of the system unit.

Be careful not to scrape the surface of the board against brackets or edges within the chassis as the board is removed.

> ≣**Note:** If the board is being replaced, be sure to remove and keep the DIMMs and processor subsystem(s) for use on a new board.

Power Supply Removal

Remove the power supply by following these steps.

⚠ WARNING

Before removing the system unit cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

1. Power off the system and remove the left side cover (see "Removing the Side Covers").

2. Remove the drive cage (see "Removing the Drive Cage").

3. Label and disconnect power cables connected to the system board.

4. Label and disconnect the power cables connected to all internal peripheral devices.

5. Support the bottom of the power supply and remove the four screws that secure the power supply to the rear of the chassis.

Locating Power Supply Screws
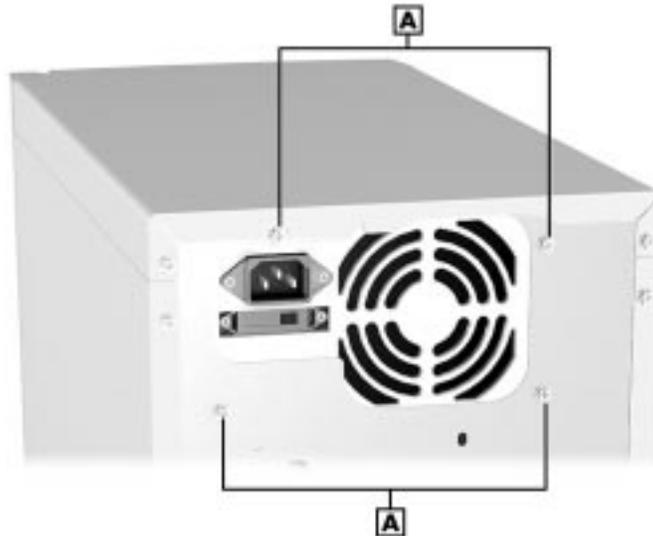
A – Power Supply Screws

6. Remove the power supply from the system.

System Fan Removal

Remove the system fan by following these steps.

1. Power off the system and remove the left side cover as described earlier in this section.

2. Remove the drive cage as described earlier in this section.

3. Label and disconnect the fan cable connected to the system board.

4. Remove the four screws that secure the fan to the rear of the chassis.

Locating System Fan Screws
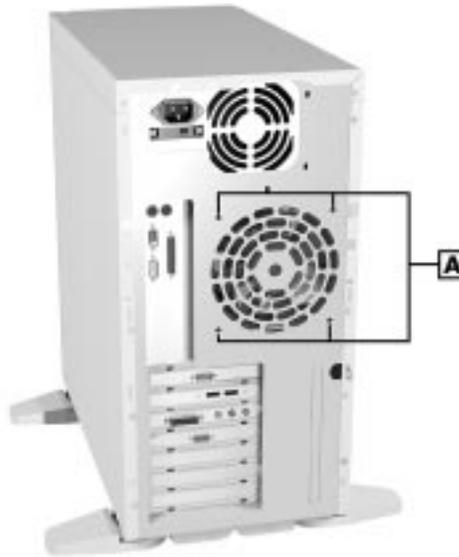
A – System Fan Screws

5. Remove the fan from the system.

Speaker Removal

Remove the internal speaker by following these steps.

1. Power off the system and remove the left side cover as described earlier in this section.

2. The speaker is supported by three tabs and is located at the front of the chassis (see the figure on the following page).
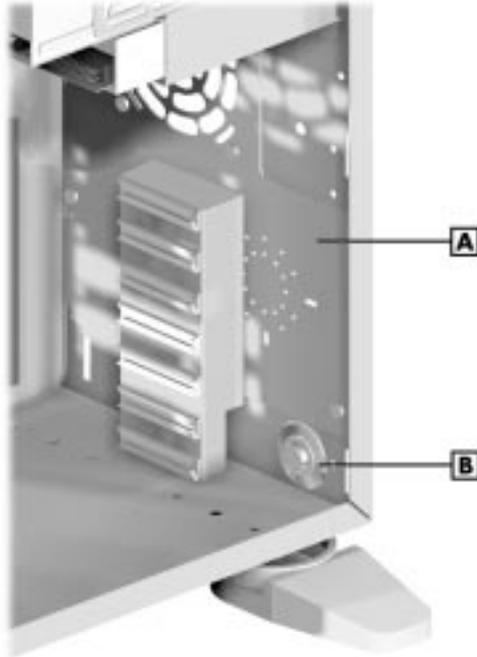
A – Front of Chassis **B** – Internal Speaker

3. Label and disconnect the speaker cable from the system board.

4. Slide the speaker upwards and out of the three tabs to remove it from the chassis.

Expansion Board Guide Removal

Remove the expansion board guide as follows.

1. Power off the system and remove the left side cover and the front panel as described earlier in this section.

2. Locate the board guide on the front inner wall of the chassis.

3. Press the top and bottom sides together to release the locking tabs securing the board guide to the chassis.

4. Pull the board guide away from the chassis wall and out of the chassis.

CMOS Battery Removal

Remove the 3-volt lithium battery from the system board as follows.

1. Turn off and unplug the system unit and any external options connected to the system.

⚠ CAUTION

Removing the battery from the system board causes the workstation to lose system configuration information. If possible, run Setup and record the system configuration settings before removing the battery. Use that information to restore the system after replacing the battery.

---

2. Remove the left side cover as previously described.

3. Locate the battery and its socket on the system board (see the following figure).

Locating the Battery
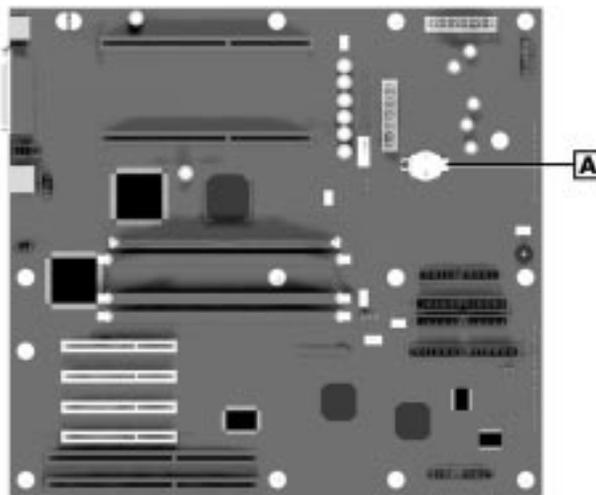
A – Battery

4. Label and disconnect any cables that block the battery socket.

5. Use your fingers to carefully remove the battery from the battery socket on the system board (see the figure on the following page).
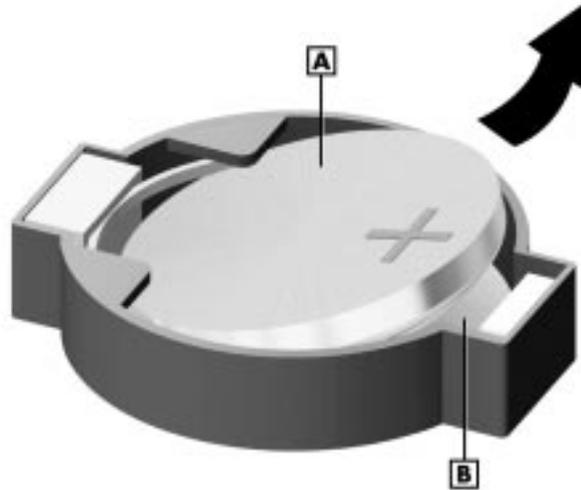
A – Battery **B** – Battery Socket

⚠ **WARNING**

The battery can explode if it is incorrectly replaced or improperly discarded. Use only the same battery or an equivalent type recommended by the manufacturer when replacing the battery.

Lithium acts as a catalyst when exposed to water and causes spontaneous combustion on contact. Discard used batteries according to the manufacturer's instructions.

---

6. Reconnect any cables that were disconnected to reach to battery.

7. Replace the system unit cover and front panel as previously described.

8. Connect external peripherals and power cables.

9. Run Setup to reconfigure system parameters (see Section 2, "System Configuration").

Chassis Foot Removal

Remove the chassis feet as follows.

1. Remove the left cover as previously described (see "Removing the Side Covers").

2. Label and disconnect any cables connected to expansion boards.

3. Remove all expansion boards (see "Expansion Board Removal").

4. Remove the screws securing the feet to the chassis.

5. Remove the feet from under the chassis.

⚠ WARNING

Replace the feet before reassembling or using the system.

Before using the system, turn the feet perpendicular to the length of the system unit. The feet are designed to keep the unit from being tipped over.

4

System Board

- Sockets and Connectors
- Jumpers
- Components
- Resources

This section describes the locations of connectors, sockets, and jumpers on the system board, including external cable connectors, internal board connectors, upgrade sockets, and jumper locations.

Included in this section are procedures for setting jumpers on the system board and a DIMM memory upgrade path for the DIMM sockets. Also included are descriptions of system board components, and component pin assignments.

Connectors and Sockets

The following paragraphs describe the system board external cable connector locations, internal board connector locations, jumper locations, and upgrade sockets. Included are procedures for setting jumpers on the system board and a table showing the upgrade path for the DIMM sockets.

System Board Internal Connectors

Connector	Go to Page
Parallel Interface Connector	4-3
Serial Interface Connectors (COM1/COM2)	4-4
Keyboard and Mouse Connectors	4-4
Universal Serial Bus Connectors	4-5
Processor Socket	4-5
DIMM Sockets	4-5
IDE Connectors	4-10
SCSI Connectors	4-11
Diskette Drive Connector	4-12
PCI Connectors	4-14
ISA Bus Connectors	4-15
Power Supply Connectors	4-16
Chassis Fan Connectors	4-18
Heatsink Fan Connectors	4-18
LAN Connector	4-18
Front Panel Connectors	4-19

External Cable Connectors

Locations of the external cable connectors on the system board at the back of the system unit are shown in the figure on the following page. For descriptions of the connectors, see Section 1, "System Overview."

External Connectors
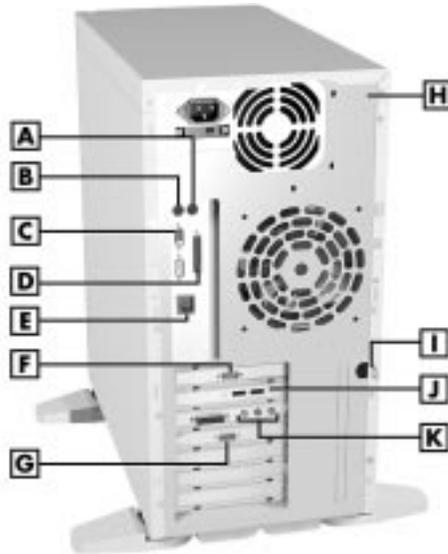
A – Mouse Port **B** – Keyboard Port **C** – COM1 Port **D** – Printer Port
E – LAN Connector **F** – COM2 Port **G** – VGA Monitor Connector
H – Security Slot **I** – Locking Tab **J** – USB Ports **K** – Audio Connectors

Parallel Interface Connector

The following table lists the pin assignments for the parallel interface connector on the system board.

Parallel Interface Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Strobe	14	AUFDXT_L
2	Data Bit 0	15	ERROR_L
3	Data Bit 1	16	INIT_L
4	Data Bit 2	17	SLCT IN_L
5	Data Bit 3	18	Ground
6	Data Bit 4	19	Ground
7	Data Bit 5	20	Ground
8	Data Bit 6	21	Ground
9	Data Bit 7	22	Ground
10	ACK	23	Ground
11	BUSY	24	Ground
12	PE	25	Ground
13	SLCT	--	--

Serial Interface Connectors

The following table lists the pin assignments for the serial interface connectors.

Serial Interface Pin Assignments

Port A (External Header)		Port B (Internal Header)	
Pin	**Signal Name**	**Pin**	**Signal Name**
1	DCD	1	DCD
2	RXD	2	DSR
3	TXD	3	RXD
4	DTR	4	RTS
5	GND	5	TXD
6	DSR	6	CTS
7	RTS	7	DTR
8	CTS	8	RIA
9	RIA	9	GND
		10	NC

Keyboard and Mouse Connectors

The keyboard and mouse are PS/2-style connectors and can be plugged into either connector on the system board. The system unit detects their presence at power on. Pin assignments are given in the following table.

Keyboard and Mouse Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Data	4	+5 V (fused)
2	No connection	5	Clock
3	Ground	6	No connection

The pin assignments for the universal serial bus (USB) connectors are provided in the following table.

Universal Serial Bus Connector Pin Assignments

Pin	Signal
1	+5V (cable power)
2	- Data
3	+ Data
4	Ground (cable ground)

Processor Sockets

The processor socket is designed for easy processor upgradeability through use of a Single Edge Contact (S.E.C.) cartridge. The cartridge contains the processor, second level cache, thermal plate, and back cover. In addition, a heatsink is connected to the cartridge.

The 242-pin edge connector sockets (Slot 1) on the system board hold one or two processor S.E.C. cartridges. The cartridges are held in place in the socket by a retention mechanism. With a cartridge plugged into the socket, the processor's pins automatically set the system board voltage regulator and processor speed (100 MHz).

To remove a processor, see Section 3, "Disassembly and Reassembly."

Processor and DIMM Sockets on the System Board
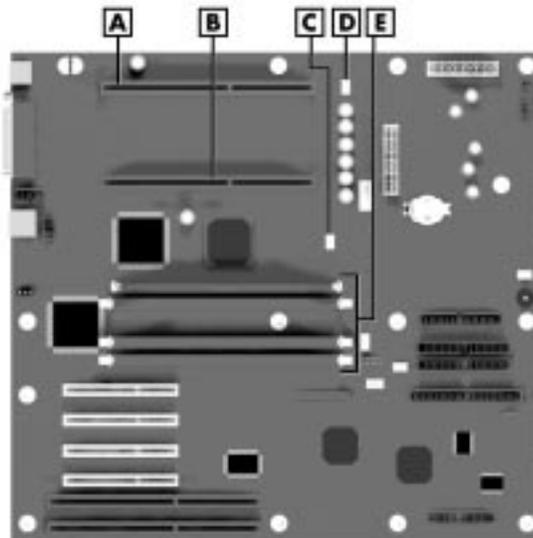
A – Secondary Processor Connector   **B** – Primary Processor Connector
C – Secondary Heatsink Fan Connector   **D** – Primary Heatsink Fan Connector
E – DIMM Sockets

DIMM Sockets

The system board has four, 168-pin, gold-plated DIMM sockets. The sockets support up to 1 GB of high-speed SDRAM memory. NEC provides DIMMs in 64-, 128-MB, and 256-MB 100-MHz memory configurations. DIMM modules:

- can be installed in one, two, three, or four sockets

- size can vary between sockets

- run at 100 MHz

- can be single- and double-sided.

For DIMM socket locations, see the figure in the previous section. See the following tables for supported DIMMs and for sample DIMM upgrade paths. To determine the memory needed for a memory upgrade, see "Checking System Memory." Pin assignments for DIMM sockets are included in this section.

Supported DIMMs

DIMM Size	ECC Configuration
64 MB	8 MByte x 72
128 MB	16 MByte x 72
256 MB	32 MByte x 72

Sample DIMM Upgrade Paths

Total Memory	DIMM Socket 1	DIMM Socket 2	DIMM Socket 3	DIMM Socket 4
64 MB	64 MB	empty	empty	empty
128 MB	128 MB	empty	empty	empty
192 MB	128 MB	64 MB	empty	empty
256 MB	256 MB	empty	empty	empty
320 MB	256 MB	64 MB	empty	empty
384 MB	256 MB	128 MB	empty	empty
448 MB	256 MB	128 MB	64 MB	empty
512 MB	256 MB	256 MB	empty	empty
576 MB	256 MB	256 MB	64 MB	empty
640 MB	256 MB	256 MB	128 MB	empty
704 MB	256 MB	256 MB	128 MB	64 MB
768 MB	256 MB	256 MB	256 MB	empty
832 MB	256 MB	256 MB	256 MB	64 MB
896 MB	256 MB	256 MB	256 MB	128 MB
1024 MB	256 MB	256 MB	256 MB	256 MB

Checking System Memory

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

1. On the Windows NT 4.0 desktop, point to **My Computer** and click the right mouse button.

2. With the left mouse button, click **Properties**. The General tab shows the random access memory (RAM). This is the amount of system memory in your computer.

> ▤ **Note:** If a discrepancy is found in the amount of memory displayed at the Power-On Self-Test or in Windows with the amount of memory installed, check that the memory modules were installed correctly.

DIMM Socket Pin Assignments

The following table lists the pin assignments for system board DIMM sockets.

DIMM Socket Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	VSS	57	DQ18	113	DQM5
2	DQ0	58	DQ19	114	NC
3	DQ1	59	VDD	115	RAS
4	DQ2	60	DQ20	116	VSS
5	DQ3	61	NC	117	A1
6	VDD	62	NC (VREF)	118	A3
7	DQ4	63	CKE1	119	A5
8	DQ5	64	VSS	120	A7
9	DQ6	65	DQ21	121	A9
10	DQ7	66	DQ22	122	BA0
11	DQ8	67	DQ23	123	NC (A11)
12	VSS	68	VSS	124	VDD
13	DQ9	69	DQ24	125	CK1
14	DQ10	70	DQ25	126	NC (A12)
15	DQ11	71	DQ26	127	VSS
16	DQ12	72	DQ27	128	CKE0
17	DQ13	73	VDD	129	NC
18	VDD	74	DQ28	130	DQM6

DIMM Socket Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal
19	DQ14	75	DQ29	131	DQM7
20	DQ15	76	DQ30	132	NC (A13)
21	CB0	77	DQ31	133	VDD
22	CB1	78	VSS	134	NC
23	VSS	79	CK2	135	NC
24	NC	80	NC	136	DB6
25	NC	81	NC	137	CB7
26	VDD	82	SDA	138	VSS
27	WE	83	SCL	139	DQ48
28	DQm0	84	VDD	140	DQ49
29	DQM1	85	VSS	141	DQ50
30	S0	86	DQ32	142	DQ51
31	NC	87	DQ33	143	VDD
32	VSS	88	DQ34	144	DQ52
33	A0	89	DQ35	145	NC
34	A2	90	VDD	146	NC (VREF)
35	A4	91	DQ36	147	NC
36	A6	92	DQ37	148	VSS
37	A8	93	DQ38	149	DQ53
38	A10	94	DQ39	150	DQ54
39	NC (BA1)	95	DQ40	151	DQ55
40	VDD	96	VSS	152	VSS
41	VDD	97	DQ41	153	DQ56
42	CK0	98	DQ42	154	DQ57
43	VSS	99	DQ43	155	DQ58
44	NC	100	DQ44	156	DQ59
45	S2	101	DQ45	157	VDD
46	DQM2	102	VDD	158	DQ60
47	DQM3	103	DQ46	159	DQ61
48	NC	104	DQ47	160	DQ62
49	VDD	105	CB4	161	DQ63
50	NC	106	CB5	162	VSS
51	NC	107	VSS	163	DK3
52	CB2	108	NC	164	NC

Pin	Signal	Pin	Signal	Pin	Signal
53	CB3	109	NC	165	SA0
54	VSS	110	VDD	166	SA1
55	DQ16	111	CAS	167	SA2
56	DQ17	112	DQM4	168	VDD

IDE, SCSI, and Diskette Drive Cable Connectors

The IDE and diskette cable connectors are shown in the following figure. Pin assignments are given in the tables following the figure.

Drive Cable Connectors
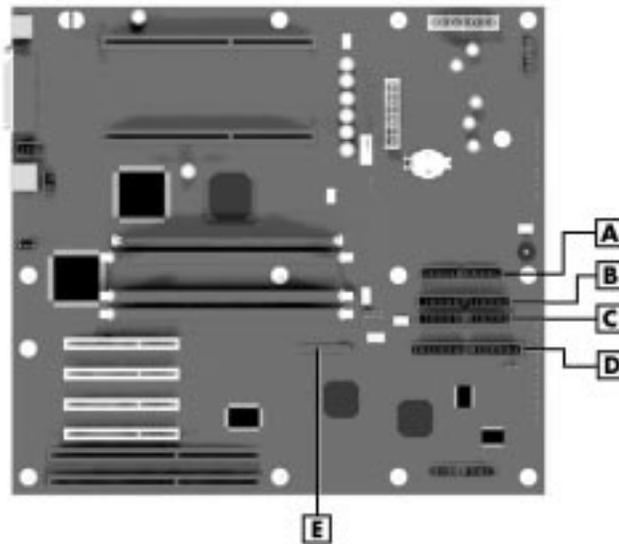
A - Diskette Drive Connector **B** - Primary IDE Connector
C - Secondary IDE Connector **D** - Narrow SCSI Connector
E - Wide SCSI Connector

IDE Connectors

The pin assignments for the primary and secondary IDE connectors are listed in the following table. The signals in parentheses are for the secondary connector.

IDE Interface Pin Assignments

Pin	Signal Name	Pin	Signal Assignment
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DRQ0 (DRQ1)	22	Ground
23	I/O Write-	24	Ground
25	I/O Read-	26	Ground
27	IOCHRDY	28	IDE_CSEL
29	DDACKO (DDACK1)	30	Ground
31	IRQ14 (IRQ15)	32	No Connection
33	Addr 1	34	No Connection
35	Addr 0	36	Addr 2
37	Chip Select 1	38	Chip Select 3P (3S)
39	Activity-	40	Ground

SCSI Connectors

The pin assignments for the wide and narrow connectors are listed in the following tables.

SCSI Narrow Interface Pin Assignments

Pin	Signal Name	Pin	Signal Assignment
1	GND	26	TERMPWR
2	SCD0_L	27	RESERVED
3	GND	28	RESERVED
4	SCD1_L	29	GND
5	GND	30	GND
6	SCD2_L	31	GND
7	GND	32	SATN_L
8	SCD3_L	33	GND
9	GND	34	GND
10	SCD4_L	35	GND
11	GND	36	SBSY_L
12	SCD5_L	37	GND
13	GND	38	SACK_L
14	SCD6_L	39	GND
15	GND	40	SRESET_L
16	SCD7_L	41	GND
17	GND	42	SMSG_L
18	SCDP_L	43	GND
19	GND	44	SSEL_L
20	GND	45	GND
21	GND	46	SCD_L
22	GND	47	GND
23	RESERVED	48	SREQ_L
24	RESERVED	49	GND
25	NC	50	SIO_L

SCSI Wide Interface Pin Assignments

Pin	Signal Name	Pin	Signal Assignment
1-16	GND	49-50	GND
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	NC	53	NC
20-34	GND	54	GND
35	SCD12_L	55	SATN_L
36	SCD13_L	56	GND
37	SCD14_L	57	SBSY_L
38	SCD15_L	58	SACK_L
39	SCDPH_L	59	RESET_L
40	SCD0_L	60	SMSG_L
41	SCD1_L	61	SSEL_L
42	SCD2_L	62	SCD_L
43	SCD3_L	63	SREQ_L
44	SCD4_L	64	SI/O_L
45	SCD5_L	65	SCD8_L
46	SCD6_L	66	SCD9_L
47	SCD7_L	67	SCD10_L
48	SCDP_L	68	SCD11_LD

Diskette Drive Connector

The pin assignments for the diskette drive connector are given in the following table.

Diskette Drive Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Ground	2	FD_DENSEL
3	Ground	4	N/C
5	Key	6	FD_DRATE0
7	Ground	8	FD_INDEX_L
9	Ground	10	FD_MTR0_L
11	Ground	12	FD_DR1_L
13	Ground	14	FD_DR0_L
15	Ground	16	FD_MTR1_L

Diskette Drive Pin Assignments

Pin	Signal Name	Pin	Signal Name
17	FD_MSEN1	18	FD_DIR_L
19	Ground	20	FD_STEP_L
21	Ground	22	FD_WDATA_L
23	Ground	24	FD_WGATE_L
25	Ground	26	FD_TRK0_L
27	FD_MSEN0	28	FD_WPROT_L
29	Ground	30	FD_RDATA_L
31	Ground	32	FD_HDSEL_L
33	Ground	34	FD_DSKCHG_L

PCI and ISA Board Connectors

The PCI and ISA connectors are shown in the following figure. Pin assignments are given in the tables following the figure.

PCI and ISA Cable Connector Locations
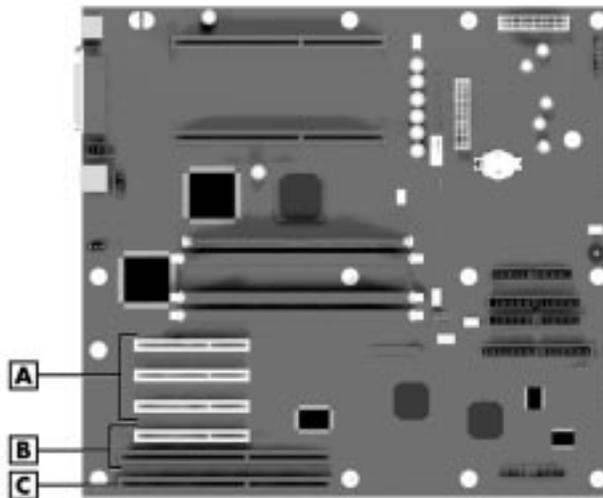
A - PCI Connectors **B** - PCI/ISA Connector **C** - ISA Connector

PCI Connectors

Pin assignments for the 124-pin PCI connectors are given in the following table.

PCI Bus Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	B1	-12 V	A32	AD16	B32	AD17
A2	+12 V	B2	TCK	A33	+3.3 V *	B33	CBE2_L
A3	TMS	B3	GND	A34	FRAME_L	B34	GND
A4	TDI	B4	TD0 (NC)	A35	GND	B35	IRDY_L
A5	+5 V	B5	+5 V	A36	TRDY_L	B36	+3.3 V *
A6	INTA_L	B6	+5 V	A37	GND	B37	DEVSEL_L
A7	INTC_L	B7	INTB_L	A38	STOP_L	B38	GND
A8	+5 V	B8	INTD_L	A39	+3.3 V *	B39	LOCK_L
A9	Reserved	B9	PRSNT1_L	A40	SDONE	B40	PERR_L
A10	+5 V	B10	Reserved	A41	SBO_L	B41	+3.3 V *
A11	Reserved	B11	PRSNT2_L	A42	GND	B42	SERR_L
A12	GND	B12	GND	A43	PAR	B43	+3.3 V *
A13	GND	B13	GND	A44	AD15	B44	CBE1_L
A14	Reserved	B14	Reserved	A45	+3.3 V *	B45	AD14
A15	RST_L	B15	GND	A46	AD13	B46	GND
A16	+5 V	B16	PCICLK	A47	AD11	B47	AD12
A17	GNT_L	B17	GND	A48	GND	B48	AD10
A18	GND	B18	REQ_L	A49	AD9	B49	GND
A19	Reserved	B19	+5 V	A50	KEY	B50	KEY
A20	AD30	B20	AD31	A51	KEY	B51	KEY
A21	+3.3 V *	B21	AD29	A52	CBE0_L	B52	AD8
A22	AD28	B22	GND	A53	+3.3 V *	B53	AD7
A23	AD26	B23	AD27	A54	AD6	B54	+3.3 V *
A24	GND	B24	AD25	A55	AD4	B55	AD5
A25	AD24	B25	+3.3 V *	A56	GND	B56	AD3
A26	IDSEL	B26	CBE3_L	A57	AD2	B57	GND
A27	+3.3 V *	B27	AD23	A58	AD0	B58	AD1
A28	AD22	B28	GND	A59	+5 V	B59	+5 V
A29	AD20	B29	AD21	A60	REQ64_L	B60	ACK64_L
A30	GND	B30	AD19	A61	+5 V	B61	+5 V
A31	AD18	B31	+3.3 V *	A62	+5 V	B62	+5 V

ISA Bus Connector

The pin assignments for the ISA bus connector are given in the following table.

ISA Bus Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	IOCHK_L	B1	GND	A26	SA5	B26	DACK2_L
A2	SD7	B2	RESET	A27	SA4	B27	TC
A3	SD6	B3	+5V	A28	SA3	B28	BALE
A4	SD5	B4	IRQ9	A29	SA2	B29	+5V
A5	SD4	B5	-5V	A30	SA1	B30	OSC
A6	SD3	B6	DRQ2	A31	SA0	B31	GND
A7	SD2	B7	-12V	Connector key		Connector key	
A8	SD1	B8	SRDY_L	C1	SBHE_L	D1	MEMCS16_L
A9	SD0	B9	+12V	C2	LA23	D2	IOCS16_L
A10	IOCHRDY	B10	GND	C3	LA22	D3	IRQ10
A11	AEN	B11	SMEMW_L	C4	LA21	D4	IRQ11
A12	SA19	B12	SMEMR_L	C5	LA20	D5	IRQ12
A13	SA18	B13	IOW_L	C6	LA19	D6	IRQ15
A14	SA17	B14	IOR_L	C7	LA18	D7	IRQ14
A15	SA16	B15	DACK3_L	C8	LA17	D8	DACK0_L
A16	SA15	B16	DRQ3	C9	MEMR_L	D9	DRQ0
A17	SA14	B17	DACK1_L	C10	MEMW_L	D10	DACK5_L
A18	SA13	B18	DRQ1	C11	SD8	D11	DRQ5
A19	SA12	B19	REFRESH_L	C12	SD9	D12	DACK6_L
A20	SA11	B20	BCLK	C13	SD10	D13	DRQ6
A21	SA10	B21	IRQ7	C14	SD11	D14	DACK7_L
A22	SA9	B22	IRQ6	C15	SD12	D15	DRQ7
A23	SA8	B23	IRQ5	C16	SD13	D16	+5V
A24	SA7	B24	IRQ4	C17	SD14	D17	MASTER16_L
A25	SA6	B25	IRQ3	C18	SD15	D18	GND

Power Supply Cable Connectors

The power supply cable connector pin assignments are given in the tables following the figure.

Power Supply ATX Power Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	+3.3V	11	+3.3V / 3.3 V sense
2	+3.3V	12	-12V
3	COM	13	COM
4	+5V	14	PS-ON
5	COM	15	COM
6	+5V	16	COM
7	COM	17	COM
8	PW-OK	18	-5V
9	5 VSB	19	+5V
10	+12V	20	+5V

Power Supply Main Power Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	+5 VDC	7	COM
13	+5 VDC	19	COM
2	+5 VDC	8	COM
14	+5 VDC	20	COM
2	- 5 VDC	9	COM
15	+5 VDC	21	COM
4	-12 VDC	10	+3.3 VDC
16	+5 VDC	22	+3.3 VDC
5	COM	11	+12V
17	COM	23	+3.3 VDC
6	COM	12	+12 VDC
18	COM	24	+12 VDC

Auxiliary Power (non-ATX Connector)

Pin	Signal Name
1	5V remote sense return
2	5V remote sense
3	3.3 V remote sense
4	3.3V remote sense return
5	Not connected
6	Not connected
7	GND
8	POWER_GOOD
9	PS_ON
10	COM*
11	5 VSB
12	Key
13	Not connected
14	COM

System Board Auxiliary Connectors

Additional system board connectors are provided in the following sections.

System Board Auxiliary Cable Connectors
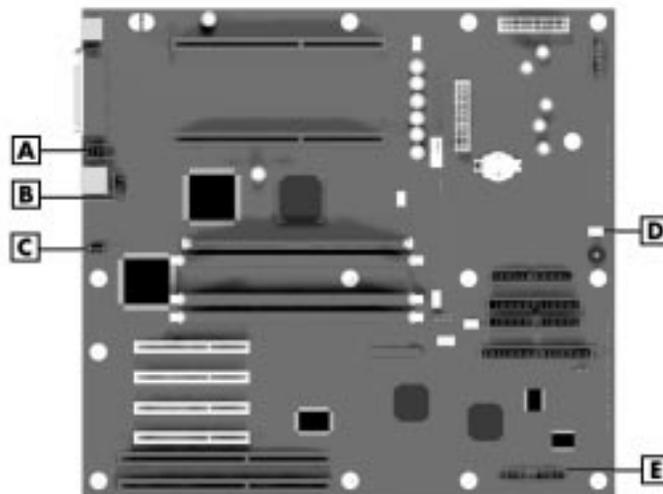
A - Serial Port B (COM2) Connector **B** - USB Connector
C - Chassis Intrusion Alarm Connector
D - System Fan Connector **E** - Not Used

Chassis Fan Connector

The pin assignments for the heatsink fan connector are as follows.

Chassis Fan Connector

Pin	Signal Name
1	GND
2	Fan Sensor
3	+12V

Heatsink Fan Connector

The pin assignments for the heatsink fan connector are as follows.

Heatsink Fan Connector

Pin	Signal Name
1	**GND**
2	+12V
3	Fan Sensor

LAN Connector

The pin assignments for LAN connector RJ-45 are as follows.

LAN Connector RJ-45 Pin Assignments

Pin	Signal Name
1	TX -
2	TX -
3	RX +
4	No Connect
5	No Connect
6	RX -
7	No Connect
8	No Connect

Front Panel Connector

The pin assignments for front panel connectors J4 are as follows.

Front Panel Connector Location
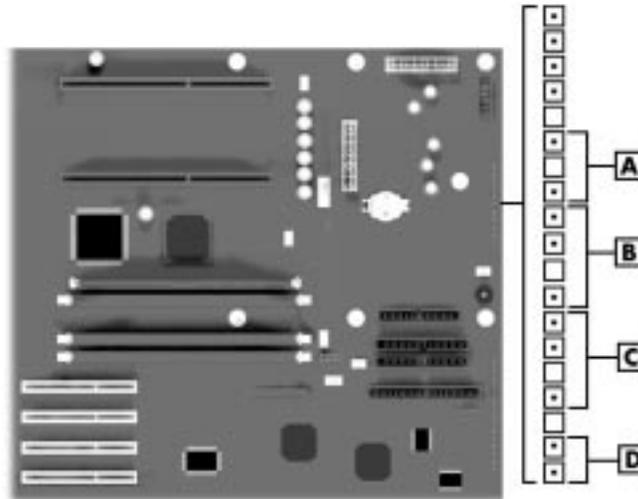
A - Front Panel Power LED Connector B - Speaker Connector
C - Hard Drive LED Connector D - Power Switch Connector

Front Panel Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	GND	2	Hard disk activity LED
3	Front panel reset	4	Front panel power switch
5	+5V	6	NC
7	Front panel NMI switch	8	+5V
9	Fan failure indicator LED	10	Chassis intrusion switch
11	Power fault LED	12	+5V standby
13	I2C data line	14	GND
15	I2C clock line	16	GND

AT-Style Front Panel Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Power Button	7	+5V
2	GND	8	NC
3	+5V	9	GND
4	Key	10	GND
5	HD LED	11	Reset Button
6	+5V		

System Board Jumpers

The figure on the following page shows the location of jumper blocks on the system board. To reconfigure jumper block, see the following paragraphs. (The factory-set jumper settings are included in Section 2, "System Configuration.")

Locating System Board Jumpers
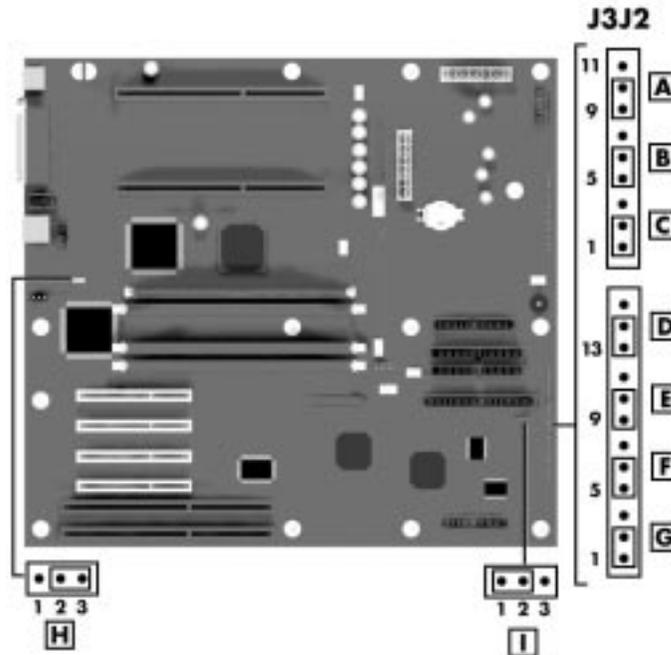
A - BMC Forced Update Mode **B** - Chassis Intrusion Detection
C - FRB Timer Enable **D** - Boot Block Write Protect
E - Recovery Boot **F** - Password Clear **G** - CMOS Clear
H - Reserved **I** - Reserved

Moving System Board Jumpers

⚠ WARNING

Before doing the procedures in this section, make sure that your system is powered off and the AC power cord is unplugged from the back of the chassis. Failure to disconnect power before moving the jumpers can result in personal injury and equipment damage.

Observe static precautions. Use an antistatic wrist strap.

To configure the system board options:

1. Power off the system and remove the left panel as described in Section 3 of this manual.

2. Check to ensure the system power cord is removed from the back of the system.

3. Locate the jumpers on the system board you need to change. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove the jumper from its current location. Position the jumper over the two pins for the desired setting and press it onto the pins. Be careful not to bend the pins. Refer to the table "System Board Jumper Summary" for system board jumper settings.

4. Replace the side cover and power up the system.

Resetting the CMOS NVRAM

To reset the CMOS NVRAM:

1. Power off your system. Remove the left side panel as described in Section 3 of this manual.

2. Move the CMOS Clear jumper from pins 1-2 to pins 2-3. See the figure "Locating System Board Jumpers" to locate this jumper.

3. Power on the system. Wait for POST to complete and for the messages "Invalid NVRAM setting by" and "Press F2 to enter Setup" to appear. This automatically reprograms CMOS and RTC to their default settings.

4. Power off the system.

5. Move the CMOS Clear jumper back to pins 1-2.

6. Replace the left side panel and power on the system.

7. Run the BIOS Setup utility to check the configuration of your system.

Clearing and Changing the Passwords

To clear and change the passwords:

1. Power off the system and remove the left panel as described in Section 3 of this manual.

2. Move the Password Clear jumper from pins 5-6 to pins 6-7. See "Locating System Board Jumpers" to locate this jumper.

3. Power on the system and wait for POST to complete. This automatically clears the old password.

4. Power off the system.

5. Move the Password Clear jumper back to pins 5-6.

6. Replace the panel and power on the system.

7. To specify a new password, run the BIOS Setup utility as described earlier.

Recovering the BIOS

This procedure should only be performed under the guidance of qualified technical personnel.

You can obtain the BIOS Recovery program by downloading it to a diskette from the NEC CSD Bulletin Board System (BBS), the NEC CSD File Transfer Protocol (FTP) site, or the NEC CSD website. See Section 9 for information on how to access the files and download them onto a diskette.

Boot Block Write Protect

The jumper at pins 13, 14, and 15 controls whether the BIOS boot block is protected from being erased and reprogrammed.

⚠ **CAUTION**

Leave the boot block jumper at the factory-default setting: Programming the boot block incorrectly prevents the system from booting. Programming should only be done by a technically qualified person. The procedure requires a special Boot Block Update utility. Contact your dealer or sales representative for more information.

Fault Resilient Booting Timer Enable Jumper

Fault resilient booting (FRB) prevents the system from stopping due to a boot problem. Two sets of timers are implemented that automatically reset the system if the system should halt for some reason.

■ FRB 2 - 5 second timer. If the primary processor does not come up in 5 seconds, the system automatically resets and switches to the secondary processor secondary (if installed, otherwise it tries to boot again off of the primary processor).

■ FRB 3 - 7 minute timer. If the system does not make it up to the end of POST in 7 minutes, the system automatically resets and tries again. It is assumed that the processor failed regardless of what may have caused the system to hang. The primary processor is taken off line and the system boots off the secondary processor (if installed, otherwise it tries to boot again off of the primary processor.) Bad memory or a bad plug-in card can cause an FRB 3 failure.

All failures are logged to the system event log.

The system remembers all FRB errors and displays them at the end of POST until you select the Processor Retest option from the BIOS Setup utility.

⚠ CAUTION

For normal operation, leave the FRB Timer Enable jumper at the factory-default setting.

To disable the FRB Timer Enable:

1. Power off the system and remove the left panel as described in Section 3 of this manual.

2. Move the FRB Timer Enable jumper from pins 1-2 to pins 2-3. See "Locating System Board Jumpers" to locate this jumper.

3. Replace the side cover (see "Replacing the Side Covers" in Section 3).

4. Power on the system and wait for POST to complete.

5. Run the BIOS Setup utility to configure the system.

BMC Forced Update Mode

⚠ CAUTION

Leave the BMC Forced Update Mode jumper at the factory-default setting: Setting this jumper incorrectly prevents the system from booting. Programming should only be done by a technically qualified person. Contact your dealer or sales representative for more information before changing this jumper.

Components

The system board has the following features:

■ Intel N440BX chipset used for PCI/ISA, memory, and peripheral control

■ National 87309 Super I/O controller (integrates standard PC I/O functions: two serial ports, one EPP/ECP-capable parallel port, floppy disk interface, real time clock, keyboard and mouse controller; support for two USB ports

■ four dual in-line memory module (DIMM) 72-bit sockets with support for up to 1 GB of SDRAM using 100 MHz ECC DIMMs

■ Phoenix Technologies Limited (PTL) BIOS in a flash memory device supporting system setup and PCI auto-configuration

■ 32-KB internal dual write-back cache integrated on the processor

■ pipelined 32-bit addressing

■ 64-bit data

- 32 MB to 1 GB of SDRAM upgradeable with 32-MB, 64-MB, 128-MB, or 256-MB increments through DIMM sockets on system board

- 512-KB write-back secondary cache memory on processor

- System Setup utility built into the BIOS

- 2-Mb Flash ROM for fast economical BIOS upgrades

- PCI local bus for fast data transfer

- Board Management Controller (BMC) chip for monitoring voltage, temperature, and security

- external connectors for connecting the following external devices:

- Personal system/2 (PS/2(r))-style mouse

- PS/2-style keyboard

- Bi-directional Enhanced Parallel Port (EPP) and Enhanced Capabilities Port (ECP) support for a parallel printer

- Serial devices through two buffered 16C550 UART serial ports, supporting up to 115.2 KB per second (one external connector is on a bracket in an expansion slot)

- Two USB devices (external connectors are on a bracket in an expansion slot).

The following table lists the major components on the system board.

System Board Components

Component	Function
Pentium II Processor (mounted in a S.E.C. cartridge)	266-MHz Pentium II processor 300-MHz Pentium II processor 333-MHz Pentium II processor 350-MHz Pentium II processor 400-MHz Pentium II processor 450-MHz Pentium II processor
Intel N440BX Chipset:	
82371EB PCI ISA IDE Xcelerator (PIIX4E)	Functions as a PCI to ISA bridge; PCI IDE functionality; a USB controller; integrated dual channel enhanced IDE interface with support for Ultra DMA/33; enhanced DMA controller; interrupt controller, with support for 15 interrupts; real-time clock with 256-byte, battery-backed CMOS static RAM (SRAM); 16-bit counters based on 82C54.
82558 LAN controller	The Intel 82558 LAN controller provides an Ethernet LAN interface for both 10Base-T and 100Base-TX connectivity. The controller features: CSMA/CD protocol engine PCI compatibility DMA engine for movement of command, status, and network data across the PCI bus Standard MII interface for access to IEEE 802.3 compliant physical layer interface.

Processor and Secondary Cache

The system uses one or two Intel Pentium II processors with an internal clock speed of 266 MHz, 300 MHz, 333 MHz, 350 MHz, 400 MHz, or 450 MHz.

The processor is an advanced pipelined 32-bit addressing, 64-bit data processor designed to optimize multitasking operating systems. The 64-bit registers and data paths support 64-bit addresses and data types.

To use the Pentium processor's power, the system features an optimized 64-bit memory interface and 512 KB of secondary write-back cache on the processor.

The processor is compatible with 8-, 16-, and 32-bit software written for the Intel386™, Intel486™, Pentium, and Pentium Pro processors. The Pentium II processor is mounted in S.E.C. cartridge with an attaching heatsink that installs as a unit in Slot 1 on the system board.

System BIOS

The ISA- and PCI-compatible BIOS is contained in a flash memory device on the system board. The BIOS provides the Power-On Self-Test (POST), the system Setup program, a PCI and IDE auto-configuration utility, and BIOS recovery code.

The system BIOS is always shadowed. Shadowing allows any BIOS routine to be executed from fast 32-bit DRAM on the system board, instead of from the slower 8-bit flash device.

NEC's Flash ROM allows fast, economical BIOS upgrades. The Flash ROM is a reprogrammable EPROM containing both the system and video BIOS. Using the Flash ROM to change the ROM BIOS provides the following advantages:

- the BIOS upgrade is performed quickly and easily

- the expense of replacing ROM BIOS chips is eliminated, so system maintenance costs are reduced

- there is less chance of inadvertently damaging the system board than when physically replacing ROMs

- new technology can be incorporated while maintaining corporate standards

- network administrators can exercise company-wide control of BIOS revisions.

The BIOS programs execute the Power-On Self-Test, initialize processor controllers, and interact with the display, diskette drive, hard drives, communication devices, and peripherals. The system BIOS also contains the Setup utility. The POST copies the ROM BIOS into RAM (shadowing) for maximum performance.

The Flash ROM allows the system and video BIOS to be upgraded with the BIOS Update utility, without having to physically remove the ROM (see Section 2 for further information on the BIOS Update utility). The Flash ROM supports the reprogramming of the system BIOS and the video BIOS.

System Memory

The system comes with between 64 MB and 1 GB of SDRAM installed in DIMM sockets on the system board.

The memory configuration consists of four sockets. The DIMM sockets accept 168-pin, 72-bit (ECC) 32-, 64-, 128-, and 256-MB DIMMs. See "DIMM Sockets" for a list of supported DIMMs.

BMC

One major function of the BMC is to autonomously monitor system management events, and log their occurrence in the non-volatile System Event Log (SEL). These include events such as over-temperature and over-voltage conditions, fan failure, or chassis intrusion. To enable accurate monitoring, the BMC maintains the non-volatile Sensor Data Record (SDR), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so software running on the server can poll and retrieve the server's current status.

ISA Bus

The system board uses the ISA bus for transferring data between the processor and some I/O peripherals and expansion boards. The ISA bus supports 16-bit data transfers and typically operates at 8 MHz.

PCI Local Bus

The 32-bit PCI local bus is the primary I/O bus for the system. The PCI bus is a highly integrated I/O interface that offers the highest performance local bus available for the Pentium processor. The bus supports burst modes that send large amounts of data across the bus, allowing fast displays of high-resolution images.

The PCI local bus is a high-performance bus that provides a processor-independent data path between the CPU and high-speed peripherals. The PCI bus is a robust interconnect mechanism designed specifically to accommodate multiple high performance peripherals for graphics, full motion video, SCSI, and LAN.

The PCI local bus supports memory transfer rates of over 100 MB per second for reads and over 120 MB per second for writes, depending on processor configuration.

PCI/IDE Ports

The system board supports two high-performance PCI/IDE ports: a primary port and a secondary port. Each port supports up to two devices for a total of four IDE devices. The primary PCI/IDE port has an enhanced IDE interface that supports PIO Mode 4 devices with 16 MB per second 32-bit wide data transfers on the high-performance PCI local bus. Each port supports Ultra DMA/33.

The installed hard drive is connected to the primary PCI/IDE connector with a three-connector cable. If a CD-ROM drive is included in the system, it is connected to the secondary PCI/IDE port with a three-connector cable. A second device can be added to the primary PCI/IDE port.

Parallel Interface

The system has a 25-pin bidirectional parallel port on the system board. Port specifications conform to the IBM-PC standards. The port supports Enhanced Capabilities Port (ECP) and Enhanced Parallel Port (EPP) modes for devices that require ECP or EPP protocols. The protocols allow high-speed bi-directional transfer over a parallel port and increase parallel port functionality by supporting more devices.

The BIOS has automatic ISA printer port sensing that works with most devices. If the BIOS detects an ISA printer port mapped to the same address, the built-in printer port is disabled. (Verify in the BIOS Setup that printer ports mapped to the same address are enabled or disabled appropriately.) The BIOS also sets the first parallel interface port it finds as LPT1 and the second port it finds as LPT2. The interrupt is set at IRQ7 via the BIOS Setup utility. Software-selectable base addresses are 228h, 378h, and 278h.

Sets of I/O addresses for the parallel port are given in the following table (see Section 2, "System Configuration," for interrupt levels). This is a list of all possible configurations; the parallel port uses only one set.

Parallel interface signals are output through the system board's 25-pin, D-subconnector. The connector is located at the back of the system unit. Pin assignments for the parallel interface connector are included at the end of this section.

Serial Interface

The system has two 16C550 UART compatible serial ports (COM1 and COM2) integrated on the I/O controller. The serial ports support the standard RS-232C interface. The buffered high-speed serial ports support transfer rates up to 115.2 KB. These ports allow the installation of high-speed serial devices for faster data transfer rates.

See Section 2, "System Configuration," for information on resetting the port through the BIOS Setup utility. See Section 10, "Specifications," for the serial interface specifications.

Serial interface signals are output through the system board's 9-pin, D-subconnectors. The connectors are located at the back of the system unit. Pin assignments for the serial interface connector are included at the end of this section.

USB Interface

The Universal Serial Bus (USB) ports allow new Plug and Play serial devices to be added without having to open the system. One USB device may be plugged into each USB port for direct system connection. With a hub and the proper cabling, up to 127 USB devices can be addressed by the system. The USB determines system resources for each peripheral and assigns them without user intervention. Boot support for a USB keyboard is present so the system can be booted with a USB keyboard instead of a standard keyboard.

Resources

System memory starts ad address 0, and is continuous up to the maximum amount of DRAM installed, except in ranges defined as memory holes. Base and extended memory are both supported.

System Memory Addresses

Memory range	address
Base memory	00000h to 9FFFFh (to 640 KB)
Extended memory	0100000h to FFFFFFFFh (1 MB to 4 GB)*

* Top physical memory is a maximum of 1 GB (to 3FFFFFFFh)

5

Expansion Boards

- Sound Board
- Graphics Board
- Network Board

This section provides connector locations, connector pin assignments, jumper locations, and jumper settings for the expansion boards in the system. The following table gives the page locations for connector information.

Connector	Go to Page
Microphone In Connector	5-2
Line In Connector	5-3
Line Out Connector	5-3
CD Audio In Connector	5-3
Modem In Connector	5-4
AccelSTAR II VGA Connector	5-4
AccelSTAR II VGA Feature Connector Video In	5-5
AccelSTAR II VGA Feature Connector Video Out	5-5
AccelECLIPSE II VGA Connector	5-6
RJ-45 Connector	5-6

Sound Board

This section provides connector pin assignments for the sound board in the system.

Microphone In Connector

The pin assignments for the microphone in connector are provided in the following table.

Microphone In Connector Pin Assignments

Pin	Signal
1	Ground
2	Mic-In
3	Vic Voltage Ref.

Line In Connector

The pin assignments for the microphone in connector are provided in the following table.

Line In Connector Pin Assignments

Pin	Signal
1	Ground
2	Line-In Left
3	Line-In Right

Line Out Connector

The pin assignments for the line out connector are provided in the following table.

Line Out Connector Pin Assignments

Pin	Signal
1	Ground
2	Line Out Left
3	Line Out Right

CD Audio In Connector

The pin assignments for CD audio in connector are as follows.

CD Audio In Connector Pin Assignments

Pin	Signal
1	Left channel
2	Ground
3	Ground
4	Right channel

Modem In Connector

The pin assignments for modem in connector are as follows.

Modem In Connector Pin Assignments

Pin	Signal
1	Logic ground
2	Modem MIC out
3	Logic ground
4	Modem speaker in

Graphics Board

The following sections provide pin assignments for the VGA connectors and the video in and out connectors on the graphics boards.

AccelSTAR II Connectors

The following sections provide the pin assignments for the AccelSTAR II VGA connector, the video in and the video out.

AccelSTAR II VGA Interface Connector

Video signals are output from the PCI video board through a VGA interface connector, which is a 15-pin, D-subconnector located on an expansion board bracket the rear of the system unit. The following table lists the pin assignments.

AccelSTAR II VGA Interface Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Signal ground	11	Not connected
2	Green	7	Signal ground	12	Not connected
3	Blue	8	Signal ground	13	H Sync (TTL)
4	Not connected	9	Not connected	14	V Sync (TTL)
5	Signal ground	10	Signal ground	15	Not connected

The following table lists the pin assignments for the 26-pin VESA video in connector.

AccelSTAR II Video In Pin Assignments

Pin	Signal	Pin	Signal
1	GND	2	VSAData0
3	GND	4	VSAData1
5	GND	6	VSAData2
7	VSCtl5	8	VSAData3
9	VSCtl1	10	VSAData4
11	VSCtl3	12	VSAData5
13	SBCLK	14	VSAData6
15	GND	16	VSAData7
17	GND	18	VSAClk
19	GND	20	HRef VSCtl7
21	GND	22	Not connected
23	GND	24	Not connected
25	SBData	26	GND

AccelSTAR II Feature Connector Video Out

The following table lists the pin assignments for the 26-pin VESA video in connector.

AccelSTAR II Video Out Pin Assignments

Pin	Signal	Pin	Signal
1	VDD 12V	2	VSBData0
3	VSBData1	4	GND
5	GND	6	VSBData2
7	VSBData3	8	VSBData4
9	VCC	10	VSBData5
11	VSBData6	12	VSBData7
13	Not connected	14	VSCtl0
15	VSCtl1	16	VSCtl2
17	VSCtl3	18	VCC
19	GND	20	VSAResetN
21	VSGPChipSelectN	22	GND

AccelSTAR II Video Out Pin Assignments

Pin	Signal	Pin	Signal
23	VSGPDataStrobeN	24	VSGReadWriteN
25	VDD_3V3	26	VSGPDataAckN
27	Not connected	28	VSCtl4
29	Not connected	30	Not connected
31	VCC	32	VDD_3V3
33	VSBClk	34	GND
35	VSBResetN	36	Not connected
37	Not connected	38	Not connected
39	Not connected	40	Not connected

AccelECLIPSE II VGA Interface Connector

Video signals are output from the PCI video board through a VGA interface connector, which is a 15-pin, D-subconnector located on an expansion board bracket the rear of the system unit. The following table lists the pin assignments.

AccelECLIPSE II VGA Interface Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Signal ground	11	Not connected
2	Green	7	Signal ground	12	Not connected
3	Blue	8	Signal ground	13	H Sync (TTL)
4	Not connected	9	Not connected	14	V Sync (TTL)
5	Signal ground	10	Signal ground	15	Not connected

Network Board

The following table lists the pin assignments for the RJ-45 connector on the 3Com 3C905-TX network board.

3C905-TX Network Board RJ-45 Pin Assignments

Pin	Signal	Pin	Signal
1	TD+	5	BI_DI3-
2	TD-	6	RD-
3	RD+	7	BI_DI4+
4	BI_DI3+	8	BI_DI4-

6

Illustrated Parts Breakdown

- Parts and Options
- Field Replaceable Unit (FRU) List
- Illustrated Parts Breakdown (IPB)
- Documentation and Packaging

This section contains the illustrated parts breakdown (IPB) and NEC CSD part numbers for the PowerMate Professional 9000E Series Build-to-Order (BTO) systems.

The following tables list

- telephone numbers for ordering system parts and options

- field-replaceable parts for the system

- documentation and packaging for the system.

The PowerMate Professional 9000E Series system illustrated parts breakdown figure is after the field-replaceable parts list (FRU).

Parts and Options

The following table lists the telephone numbers to use when ordering spare parts and options.

Ordering Parts and Options

Items	Telephone Number
To order spare parts (Dealers)	1-800-632-4525
To order spare parts (Customers)	In the U.S. 1-800-233-6321 In Canada 1-800-727-2787
To order options	1-888-863-2669 (1-888-8NEC-NOW)

Field Replaceable Unit (FRU) List

The following tables list the field replaceable units (FRUs), documentation, and packaging part numbers for the PowerMate Professional 9000E Series of workstations.

PowerMate Professional 9000E Series System FRU List*

Item	Description	Part Number
1	Cable, AC Power, 115 V	233-00002
2	Cable, Phone Cord Extension	146585
3	Keyboard, Ergonomic (Mist White) PEA	229-00012
4	Mouse, 3-button (Mist White)	230-00028
5a	Heatsink (passive), Pentium II	130254
5b	Heatsink Clip for Pentium II	130255
6	Terminator Board for Slot 1 Connector	130152

* This data was prepared September 1998. For an up-to-date listing of spare parts, call FaxFlash at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102318.

PowerMate Professional 9000E Series System FRU List*

Item	Description	Part Number
7a	IC CPU OEM 333MHz QDF/S	081909
7b	IC CPU OEM 350MHZ PII 5	081915
7c	IC CPU OEM 400MHZ PII 5	081916
7d	IC CPU OEM 450MHZ PII 5	081917
7e	IC CPU 300MHz SL2HA ECC	082050
7f	IC CPU 266MHZ ECC W/512	081788-01
8	I/O Panel	149970
9	System Board	181897
10a	IC DIMM 64MB	082062
10b	IC DIMM 128MB	082059
11	Front Panel	149969
12	Blank Plastic Panels, 5.2 inch	210-00238
13	Speakers, Altec ACS90R (Mist White)	160323
14	Rail (right), 5 1/4-inch device	146838
15	Rail (left), 5 1/4-inch device	146837
16	Power Supply, 260W ATX/LPX	190172
17	Zip Drive ATAPI	320703
18	DAT Tape Drive (DDS-3 12)	320548
19	CD-ROM Drive 32X (Mist White) LTN-301	730337
20	Cradle with Face Plate for PCMCIA drive (Mist White)	237-00128
21	PCMCIA Drive (Urban White)	237-00038
22	Diskette Drive 3.5-inch (Mist White)	219-00012
23a	Hard Drive, 8.6GB ST38641A UDMA	300836
23b	Hard Drove, 14.4GB DTTA-371440	300849
23c	Hard Drive, 4GB ST34573LW SCSI 6	300911-01
23d	Hard Drive, 9GB ST39173LW SCSI 6	300913-01
24	Fan, 120X25-3 WSSP 12V 9	306-00001-000
25	Internal Speaker	231-00047
26	Cable, Diskette Drive 34C 106-1	070170
27	Cable, IDE 520MM 3-connector	233-00015
28	Cable Assembly, 3-connector 50P 23	233-00131
29	Cable, SCSI, 4-connector 50PIN	070168
30	Cable, 4-connector PCMCIA	233-00123
31	Cable, 6-connector, SCSI Ultra Wide LVD	070981
32	SCSI Terminator (DM4000-02)	130167

* This data was prepared September 1998. For an up-to-date listing of spare parts, call FaxFlash at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102318.

PowerMate Professional 9000E Series System FRU List*

Item	Description	Part Number
33	Cable Assembly, CD-ROM 2 Audio	233-00122
34	Chassis Intrusion Switch Assembly	210-00245
35	Cable, Wake-ON LAN	233-00129
36	Harness, Power LED	210-00253
37	Harness, Power Switch	210-00254
38	Chassis Foot Assembly	210-00255
39	PCMCIA Adapter Board, 2-connector ISA	207-00127
40a	Graphics Board, PCI, 32 MB	060232
40b	Graphics Board, PCI, 8 MB	060233
40c	Graphics Board, PCI, 32 MB	060234
41	Sound Board, AWE64D PCI	030402
42	Fax/Modem Board, V.90 PYTHON 3	155-00001-000
43	Network Board, PCI 3C9	154-00001-000
44	USB Dual Port Panel Assembly	130155
45	Serial Port 2 Panel Assembly	233-00031
--	Power Cable and Switch Assembly	233-00034
--	Bracket, Hard Drive Bridge (not shown)	246-00001-000
--	I/O Window (not shown)	780-00046
--	Chassis Intrusion Switch Housing (not shown)	207-00039
--	Mounting Kit Assembly, Zip Drive (not shown)	146835
--	Face Plate, Zip Drive (Apple) (not shown)	146836
--	Diskette, 3.5-inch (PBMF2HD) (not shown)	140076
--	CD, ACCELVIEW (not shown)	370-00320
--	CD, PC McLAN Software (not shown)	363-00002-000
--	Diskette, PCMCIA Software (PCMCIA WIN PCMC) (not shown)	142731
--	Software Assembly, PC McLAN/Hummingbird (not shown)	355-00011-000
--	Zip Disk 100MB NAT (not shown)	380-00002
--	Diskette, SCSI Boot (not shown)	380-00074
--	Diskette, Data Cartridge DDS-3 (not shown)	143059
--	ZDS Screw Pan PHP 6-32 (not shown)	146852
--	ZDS Screw PAN PHP 3X5MM (not shown)	146860

* This data was prepared September 1998. For an up-to-date listing of spare parts, call FaxFlash at 1-888-329-0088
  (or 1-978-635-6090 outside the U.S.) and order document 42102318.

Illustrated Parts Breakdown (IPB)

The following figure shows the illustrated parts breakdown (IPB) for PowerMate Professional 9000E Series workstations. Each FRU on the IPB is identified with a number that is a cross-reference to the FRU list.

PowerMate Professional 9000E Series Illustrated Parts Breakdown*
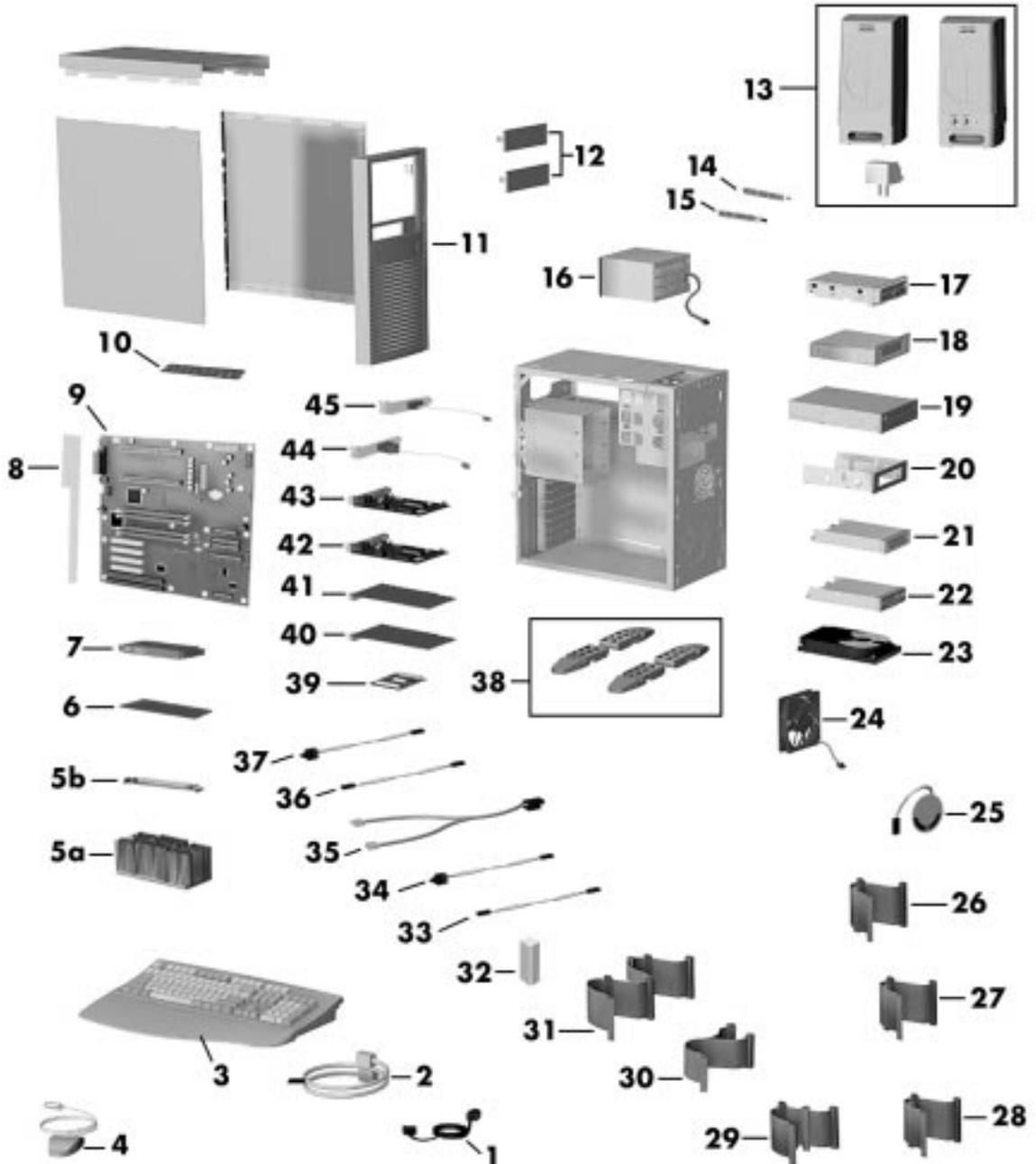
* This data was prepared September 1998. For an up-to-date listing of spare parts, call FaxFlash at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102318.

PowerMate Professional 9000E Series System Documentation and Packaging*

Description	Part Number
PowerMate Professional 9000E User's Guide	102318
User's Guide, Fax/Modem Board	451-00187
User's Guide, Accel Video Card	451-00199
User's Guide, NIC, 3C905B-TX	451-00236
User's Guide, DDS-3 AUTOLOAD	102152
MNL SWAPFTL DSKT, PCMCIA	451-00219
S/W CD HUMMINGBIRD	363-00005-000

* This data was prepared September 1998. For an up-to-date listing of spare parts, call FaxFlash at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102318.

7

Preventive Maintenance

- System Cleaning
- Keyboard Cleaning
- Mouse Cleaning

This section contains general information for cleaning and checking the system, keyboard, and monitor.

The system unit, keyboard, and monitor require cleaning and checking at least once a year, and more often if operating in a dusty environment. No other scheduled maintenance is required.

⚠ WARNING

Unplug all power cords before performing any maintenance. Voltage is present inside the system and monitor even after the power is off. All voltage is removed only when the power cord is unplugged.

System Cleaning

Use the following procedure for cleaning the system.

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

2. Wipe the outside of the system, keyboard, mouse, and monitor with a soft, clean cloth. Remove stains with a mild detergent. Do not use solvents or strong, abrasive cleaners on any part of the system.

3. Clean the monitor screen with a commercial monitor screen cleaning kit. As an alternative, use a glass cleaner, then wipe with a clean lint-free cloth.

4. Local distributors and dealers may sell diskette drive head cleaning kits. These kits contain special diskettes and cleaning solution. Do not use the abrasive head cleaning kits (kits without cleaning solution).

   Insert the diskette immediately after powering on the system, before disk bootup. Allow the diskette drive heads to clean for about 30 seconds.

Keyboard Cleaning

As necessary, inspect and clean the inside of the keyboard as follows.

1. Remove the twelve screws holding the keyboard enclosure together (see the following figure).

⚠ CAUTION

The keyboard and cable together are considered a whole-unit, field-replaceable assembly. Therefore, disassembly of the keyboard is necessary only when cleaning the inside.

A – Keyboard Enclosure Screw (one of 12)

2. Separate the two halves of the enclosure.

3. Clean the enclosure and keys with a damp cloth. A small, soft-bristle brush may be used to clean between the keys.

Do not wet or dampen the keyboard's printed circuit board. If the board gets wet, thoroughly dry it before reattaching the keyboard to the system unit.

Mouse Cleaning

The mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism under normal conditions. Periodically, however, the mouse ball must be cleaned. Use the following procedure to clean the mouse.

1. Unplug the mouse from the system.

2. Turn the mouse upside down and locate the ball cover (see the following figure).

3. Turn the ball cover counterclockwise and remove the cover.

Removing the Mouse Ball Cover
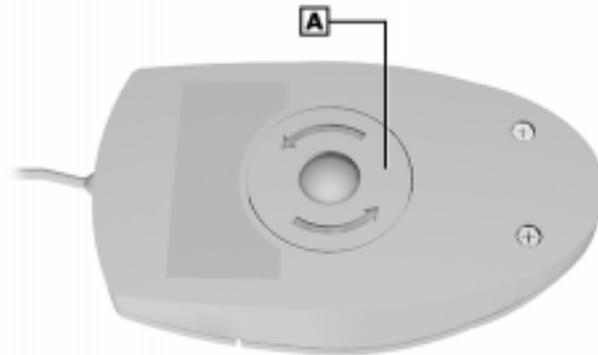
A – Mouse Ball Cover

4. Turn the mouse over and remove the ball.

5. Clean the mouse as follows:

- Clean the mouse ball with tap water and a mild detergent, then dry it with a lint-free cloth.

- Remove any dust and lint from the mouse socket.

6. Replace the mouse ball in its socket.

7. Replace the ball cover and turn it clockwise until it locks in place.

8

Troubleshooting

- Checklist
- Diagnostics

This section provides information to help isolate and repair system malfunctions at the field level. The system has a built-in program that automatically checks its components when the system is powered on. If there is a problem, the system displays an error message. If this happens, follow any instructions on the screen.

If screen messages do not help or an error message does not appear, refer to the information in this section to help determine and correct the problem. For the more common problems, refer to "Checklist" for assistance. If the information in the checklist does not help, refer to "Diagnostics " for more detailed problem solving.

If disassembly is required, see Section 3, "Disassembly and Reassembly." Connector pin assignments and jumper settings are given in Section 4, "System Board" and in Section 5, "Riser Board."

Checklist

Check the following list for a match to the system problem and see the possible cause and solution.

System Problems

- **No power and power lamp not lit.**

  Check that all power switches are on.

  Check that the power cable is plugged into the system power socket and that the other end is plugged into a live, properly grounded AC power outlet or surge protector.

  Check the outlet or surge protector by plugging in a lamp.

- **Non-System Disk error message displays when the system is started.**

  A diskette is in the diskette drive, and the diskette drive is set before the hard drive in boot order. Remove the diskette from drive A and restart the system.

- **Operating system not found error message displays when the system is started.**

  If a CD is left in the CD-ROM drive, the system may not be able to boot. Try removing the CD and rebooting.

  The hard drive might need more time to spin up before the system boots. Change the "Hard Disk Pre-Delay" to a higher setting from the BIOS Setup utility "Boot" menu.

- **System does not boot and error message displayed on screen.**

  Run the Setup utility (see Section 2, "System Configuration"). Check that the parameters are set correctly, particularly if you just installed an option.

■ **System emits continuous beeps.**

Turn the system off, wait at least five seconds, and turn the system on. If the beeps continue, call the NEC CSD Technical Support Center.

■ **System does not maintain date, time, or system configuration information.**

Change the battery (see "CMOS Battery Removal" in Section 3, "Disassembly and Reassembly").

■ **System does not boot from hard drive.**

The system usually tries to start from the diskette drive before it starts from the hard drive. Remove the diskette from the diskette drive.

Run the Setup utility (see Section 2, "System Configuration") and set the initial Boot parameter to Hard Drive instead of Removable Device.

■ **System does not boot immediately after hard drive spins up.**

The "Hard Disk Pre-Delay" in the BIOS Setup utility Boot menu can be changed to a lower setting. (If a message "operating system not found" appears after changing the setting, the delay is at too low. Set the hard disk pre-delay slightly higher.)

■ **System performance appears sluggish.**

Check that the system is set for optimal operation. See the operating system documentation.

Check the memory requirements of the software applications. If required, install additional DIMM memory (see Section 3, "Disassembly and Reassembly").

If optional DIMM memory was added, check that it is correctly installed.

■ **System password forgotten.**

Clear the password and reset it. See "Changing and Clearing the Passwords" in Section 4, "System Board."

Diskette Drive Problems

Check the following to see the possible cause and solution.

■ **Diskette won't load.**

Check that the diskette is being loaded correctly.

Check that the system and monitor power lamps are on and the power-on screen appears.

Check that the diskette is formatted. If not, format it. See the operating system documentation.

Check that the diskette size is 1.44 MB.

If the diskette drive busy lamp does not light when loading the diskette, try a different diskette. If this loads, the problem is in the software.

- **Non-System Disk or Disk Error message displayed.**

If trying to boot from the diskette drive, insert a diskette with system files into drive A.

If a bootable diskette does not boot, use the Setup utility to verify that the initial boot parameter is set to diskette drive A and not a hard drive.

Monitor Problems

Check the following problems to see the possible cause and solution.

- **Monitor screen is dark or the display is hard to read.**

Check that the monitor is on.

Check that the monitor power cable is connected to the monitor and a power outlet, the monitor signal cable is connected to the system, and the brightness and contrast controls are adjusted.

Press the space bar or move the mouse to take the system out of the power management mode.

- **Distorted image appears on the monitor screen.**

Adjust the monitor's video controls. If this does not help, turn the monitor off for several seconds, then back on.

- **There is constant movement on the screen.**

A magnetic field is affecting the monitor. Move any devices (fan, motor, another monitor) that generate magnetic fields away from the monitor.

- **The screen display is fuzzy or flickering; graphics characters or garbage appears on the screen.**

Check that the monitor is set up correctly and that all connections have been made.

Check that the video refresh rate and video driver are correct.

Click the right mouse button anywhere on the Windows desktop and a menu appears. Click **Properties** and the Display Properties window appears.

Keyboard/Mouse Problems

Check the following problem to see the possible cause and solution.

- **Mouse or keyboard does not respond.**

The mouse and keyboard may have been connected after turning on the system. Turn the system off, make sure the mouse and keyboard are connected, and turn the system back on.

- **Image appears on screen but nothing happens when using the mouse or keyboard.**

  Make sure the keyboard or mouse cable is firmly connected to the rear of the system.

  If this does not help, turn off the system, wait five or more seconds, and turn on the system.

CD-ROM Drive Problems

Check the following problems to see the possible cause and solution.

- **The system does not see the CD-ROM drive.**

  The drive designation is wrong and should be changed. The drive designation for the CD-ROM drive depends upon the storage device configuration in the system. To find out what drive designation letter is assigned to the CD-ROM drive, double click **My Computer** on the Windows NT 4.0 desktop. The drive designation is below the CD-ROM drive icon.

  As an alternative, open Windows Explorer and scroll down the list of folders until you locate the CD-ROM drive icon. The drive designation is beside the icon.

- **The CD-ROM drive is not reading a disc.**

  Check that the disc is inserted in the CD tray with the printed label side up.

  Check that the disc is a data disc, not a music disc.

  Try a different CD to see if the problem is limited to one CD.

- **The CD does not eject due to a power failure or software error.**

  Turn off the system and use the CD-ROM emergency eject feature. Insert the pointed end of a paper clip into the eject hole. Press inward on the clip to open the door.

- **The CD-ROM drive plays music CDs but the sound is not heard. However, .WAV and .MIDI sounds can be heard when played.**

  Check that the cable connecting from the rear of the CD-ROM drive to the riser board CD audio connector is in place and secure.

  Check the CD Audio volume setting.

Speaker Problems

Check the following problems to see the possible cause and solution.

- **No sound from the speakers.**

  Check that the speaker power is on. Verify that all speaker cable connections are correct and secure.

■ **Speaker volume is too low.**

Adjust the volume control on the speaker. If the volume is still too low, adjust the volume through the system software. See the Windows Multimedia online help.

■ **Sound is only coming from one speaker.**

Balance the speaker output by adjusting the balance in the sound software. See the Windows Multimedia online help.

Diagnostics

One beep indicates that the system has completed its POST test. If intermittent beeping occurs, power off the system and try again. If the beeping persists, see the following table. The table summarizes problems that may develop during system operation and lists (in sequential order) suggested corrective actions.

Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel does not light.	**1**. Check that the power cord is plugged into the power socket on the computer.
		Check that the other end of the cord is plugged into a live, properly grounded AC power outlet.
		2. Check cable connections between the power supply and riser board and between the riser board and power switch.
		3. Systematically eliminate possible shorted PCBs by removing cables and expansion boards.
		4. Check the +5 and +12 power supply voltages (see Section 4 "System Board"). Measure voltages with the system board installed.
		5. Replace the power switch assembly.
		6. Replace the power supply.
		7. Replace the system board.
Power supply malfunction	Any of the following conditions could occur:	**1**. Perform steps 1 through 4 listed in this table under No Power.
	Front panel lamps out, diskette and/or hard drives do not spin, monitor blank, interface ports not working, and keyboard lamp out and/or cannot input from keyboard.	**2**. Check power supply voltages. Voltages should be measured with a load on them (system board plugged in). See Section 4 for connector pin assignments and Section 10 for power supply specifications.
		3. Replace the power supply.

Problems and Solutions

Problem	Symptom	Solution
Operating system does not boot	Intermittent beeping at power-on. Computer beeps more than once and is unable to complete boot-up.	**1**. Check system configuration (see Section 2).
		2. Check all jumper settings and verify that drives are enabled (see Section 2).
		3. Reseat DIMMs and option boards in their connectors. Inspect system board for foreign objects such as paper clips.
		4. Remove option boards and reboot.
		5. Replace system board.
	"Invalid Configuration" message displayed.	**1**. Press **F2** to run Setup and correct the parameters.
		2. Replace the CMOS battery (see Section 3) if the date and time must be set each time the computer is powered on.
	Computer halts during loading sequence.	**1**. Power the computer off. Check for proper jumper settings (see Section 2), then power-on the computer.
		2. Check condition of selected bootload device (diskette, disc, or hard disk) for bad boot track or incorrect OS files.
		3. Try booting OS from diskette or disc, or recopy OS files onto hard disk.
		4. Verify correct hard disk is selected.
Diskette drive does not work	Lamp on drive panel does not light when diskette is loaded.	**1**. Check power and signal cable connections between diskette drive, riser board, and power supply.
		2. Check diskette drive cable. Replace as necessary.
		3. Check power supply.
		4. Replace diskette drive.
		5. Replace riser board.
		6. Replace system board.
Hard drive malfunction	Hard drive lamp does not light but hard drive can be accessed.	**1**. Check cable connections between lamp and system board.
	Hard drive controller failure message displayed.	**1**. Check that the IDE channel and hard drives are enabled in Setup (see Section 2).

Problems and Solutions

Problem	Symptom	Solution
	Cannot access hard drive.	**1**. Check signal/power connections between hard disk, PCB, power supply.
		2. Check hard drive jumper settings.
		3. Check power supply.
		4. Check hard drive cable and hard drive. Replace as necessary.
		5. Replace system board (or hard drive controller PCB if the system board controller is not used).
		6. Replace riser board.
Memory malfunction	Total memory not recognized.	**1**. Reseat DIMMs.
		2. Systematically swap DIMMs.
		3. Check to see if the DIMM configuration is valid (see Section 4).
		4. Replace DIMMs.
		5. Replace system board.
Modem board malfunction	No output from board.	**1**. Check interrupts (see Section 2).
		2. Check DMA channels (see Section 4).
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data using keyboard or mouse.	**1**. Check keyboard/mouse plugged in.
		2. Check password (see Section 2).
		3. Disable password (see Section 2).
		4. Replace keyboard (or mouse).
		5. Replace system board.
Monitor malfunction	Unable to synchronize display.	**1**. Adjust the monitor's synchronization controls.
		2. Check that the monitor's resolution matches the video setting or the video driver used (see Section 2).
		3. Check that the utility is not selecting a refresh rate/resolution that is not supported by the monitor.
		4. Check that the driver used matches the capabilities of the built-in video controller and DRAM.
	Wavy display.	**1**. Check that the computer and monitor are not near motors or electric fields.

Problems and Solutions

Problem	Symptom	Solution
Monitor malfunction (cont'd)	Blank display.	**1**. Press any key or move the mouse to ensure power management has not blanked the display.
		2. Check that the monitor power ON/OFF switch is ON.
		3. Check that the monitor cable is attached to the video connector at the back of the system.
		4. Check cable connections between the AC power supply and monitor.
		5. Adjust brightness and contrast controls on the monitor.
		6. Check cable connections between the monitor connector and the graphics board.
		7. Replace graphics board.
		8. Replace monitor.
CD-ROM drive malfunction	System power not on.	**1**. Turn system power on.
	Disc tray does not open.	**1**. System power not on. Turn system power on.
		2. System power failed. Insert the tip of a straightened paper clip into the emergency eject hole, then gently press inward until the tray opens.
	No sound from CDs.	**1**. Check that speaker power is on and volume is adjusted.
		2. Check audio software settings.
		3. Check the CD.
		4. Check the CD-ROM drive audio cable connections.
		5. Check the CD-ROM drive audio cable. Replace as necessary.
		6. Replace the CD-ROM drive.
		7. Replace the optional sound board.
		8. Replace the system board.

Problems and Solutions

Problem	Symptom	Solution
CD-ROM drive malfunction (cont'd)	Cannot access CD-ROM drive.	**1**. Check that the CD-ROM driver software is loaded and not corrupted.
		2. Check signal and power connections between the CD-ROM drive, riser board, and power supply.
		3. Check the master/slave jumper settings (see Section 2).
		4. Check the IDE cable. Replace as necessary.
		5. Check the power supply. Replace as necessary.
		6. Check the system board. Replace as necessary.
		7. Check the riser or sound board. Replace as necessary
Communication error	Bad data or no data when communicating.	**1**. Check cable connections between riser board and device.
		2. Check that the interface port is selected.
		3. Test or replace the device and interface cable (see the device documentation for troubleshooting).
		4. Replace the system board.
		5. Replace the riser board.

9

NEC CSD Information Services

- Service Telephone Numbers
- Technical Support
- Product Information
- FaxFlash Service

This section contains the following NEC CSD service and support information:

- service and support telephone numbers

- technical support

- product information

- FaxFlash service.

Service Telephone Numbers

The following table lists the telephone numbers for the NEC CSD service and support functions.

NEC CSD Service and Support Telephone Numbers

Service	Telephone Numbers
To contact NEC CSD Technical Support Center (TSC):	In the U.S. and Canada, call 1 (800) 632-4525
To order spare parts (Dealers):	Call 1 (800) 632-4525
To order spare parts (Customers):	In the U.S., call 1 (800) 233-6321 In Canada, call 1 (800) 727-2787
To contact Customer Service about service and contract warranty issues:	Call 1 (888) 632-9128
To log onto the NEC CSD Electronic Bulletin Board System (BBS) to download software drivers and the latest BIOS for ROM flashing:	Call 1 (978) 635-4706
For information about NEC CSD products, call FaxFlash^{SM} (use this automated service to have the latest Technical Information Bulletins sent to your fax machine 24 hours a day):	In the U.S., 1 (888) 329-0088 1 (888) FAX-0088 Outside the U.S., call 1 (978) 635-6090
To send technical questions by email:	tech-support@neccsd.com
To fax technical questions to customer support:	In the U.S., fax 1 (978) 635-4100
To access the NEC CSD website:	www.nec-computers.com
To access the NEC CSD FTP site:	ftp.neccsdeast.com
To purchase a new system or an option kit through NEC NOW, or to obtain sales literature or option information:	Call 1 (888) 863-2669 1 (888) 8NEC-NOW

Technical Support

The following sections provide information for obtaining technical support from NEC CSD. With access to a telephone, modem, and/or fax machine, you can use these services to obtain information on a 24-hour basis.

NEC CSD Website

If you have a modem or a network board and an Internet Service account, you can access the NEC CSD website. The NEC CSD website contains service and support information, information about NEC CSD and its products, an online store, press releases, and reviews.

Look in the Service and Support area for the following:

- technical documentation, including Frequently Asked Questions, service and reference manuals, and warranty information

- BIOS updates, drivers, and Setup Disk files to download

- contact information, including telephone numbers for Technical Support and FaxFlash, and links to vendor websites

- an automated email form for your technical support questions

- a Reseller's area (password accessible).

To access the NEC CSD Home Page, enter the following Internet Uniform Resource Locator (URL) in your browser:

www.nec-computers.com

Email/Fax Technical Support Service

The NEC CSD Technical Support Center offers technical support by email over the Internet network if you have a modem. The email address is:

tech-support@neccsd.com

You can also fax technical questions to the NEC CSD Technical Support Center if you have access to a fax machine or fax/modem. The fax number is:

1 (978) 635-4100

When using the email or fax support service, please include one of the following words in the subject field for prompt response from the appropriate technical person:

- Desktop

- Monitor

- CD-ROM

- Printer

- Notebook.

Provide as much specific information in your questions as possible. Also, if sending a fax, please include your voice telephone number and your fax number with the question. You will receive a response to your questions within one business day.

Technical Support Services

NEC CSD also offers direct technical support through its Technical Support Center. (NEC CSD technical support is for U.S. and Canadian customers only; international customers should check with their sales provider.)

Direct assistance is available 24 hours a day, 7 days a week. Call the NEC CSD Technical Support Center, toll free, at **1 (800) 632-4525** (U.S. and Canada only) for the following support.

- System hardware — toll-free phone support is limited to the length of the standard warranty.

  For hardware support after the standard warranty, get system hardware support for a fee.

- Preinstalled software — toll-free phone support for 90 days from the time of your first call to the NEC CSD Technical Support Center.

  After the initial 90 days, get preinstalled software support for a fee.

Please have available your system's name, model number, serial number, and as much information as possible about your system's problem before calling.

For callers outside the U.S. and Canada, please contact your local NEC CSD sales provider.

Product Information

In addition to the NEC CSD website, you can find product information at the NEC CSD FTP site and through the NEC CSD Bulletin Board Service. With access to a telephone, modem, and/or fax machine, you can use these services to obtain information on a 24-hour basis.

NEC CSD FTP Site

You can use the Internet to access the NEC CSD FTP (file transfer protocol) site to download various files (video drivers, printer drivers, BIOS updates, and Setup Disk files). The files are essentially the same as on the NEC CSD website and the NEC CSD Bulletin Board Service.

To access the NEC CSD FTP site, enter the following Internet ftp address through your Internet Provider service:

ftp.neccsdeast.com

Once in the file menu, follow the prompts to choose and download the file(s) you want.

NEC CSD Bulletin Board Service

If you have access to a modem, you can use the NEC CSD Bulletin Board Service (BBS) to get the latest information on hardware and software. The BBS allows you to download files (video drivers, printer drivers, BIOS updates, etc.) to a diskette for system enhancements and upgrades.

⚠ **CAUTION**

NEC CSD recommends that you download files from the Bulletin Board Service to a diskette and not to your hard drive.

Log onto the BBS as follows.

1. From the Windows desktop, click **Start**.

2. Point to **Programs**. Point to **Accessories** and then click **HyperTerminal**.

3. Double click the **Hypertrm.exe** icon. The HyperTerminal program appears.

4. Follow the instructions on the screen to set up your modem. Click the **HyperTerminal** help button for information about dialing the phone number.

   If you need to check communications settings, check that the settings match the following BBS parameters.

   - **Baud rate**: select any baud rate that matches your modem

   - **Parity**: none

   - **Data bits**: 8

   - **Stop bits**: 1

   - **Flow control**: Xon/Xoff (select Hardware if using 14.4 Kbps or higher).

5. Following the HyperTerminal instructions, enter the BBS phone number (**978-635-4706**). Your business phone system and/or location might require a **9 1** or **1** prefix.

   📝**Note:** The first time that you use the BBS, you are requested to provide information for a new user questionnaire.

6. Press **Enter** twice.

7. Enter your first name, last name, and password. Press **Enter** after each.

8. Follow the screen prompts until the Main Menu is displayed.

9. At the Main Menu, select **J** to join a conference. Select **Conference 1** for the desktop conference.

10. From the Main Menu, press **F** and **Enter** for the File menu.

11. At the File menu, select **F** for a list of downloadable files. Follow the prompts to select a file for downloading.

⚠ **CAUTION**

Executable files automatically format your diskette when you download files from the BBS. Formatting destroys any data on the diskette. Before you download files from the BBS, check that you do not have information on the diskette that you need.

After you complete downloading your file, log off the BBS as follows:

1. Press **Enter** (to continue).

2. Press **G** (command for Goodbye/Hangup).

3. Press **Enter**.

FaxFlash Service

The NEC CSD FaxFlash service is a self-help, automated electronic information service for obtaining up-to-date product application notes, installation procedures, troubleshooting tips, data sheets, technical information bulletins, illustrated parts lists, part numbers, and other information about your system.

Using a fax machine, you can obtain information from FaxFlash 24 hours a day, 7 days a week. Simply call the FaxFlash number on your touch-tone telephone and order the information you want by following the voice prompts. FaxFlash automatically faxes the information to you.

If you are new to FaxFlash, first order one of the following catalogs. Each catalog lists the available documents and their document numbers. Current catalogs include:

- Catalog 1, NEC CSD Telephone Directory and Online Service Information

- Catalog 3, NEC CSD Computer Product Specifications, Warranty Policy, UltraCare^{SM} Guidelines, and Sales Information

- Catalog 5, NEC ProServa^{TM} and Express Serva Product Information

- Catalog 6, NEC Ready Consumer Desktop Systems

- Catalog 7, NEC PowerMate Commercial Desktop Systems

- Catalog 8, NEC Portable Systems (including Versa® Notebook and MobilePro™ Handheld computers).

Catalogs 5, 6, 7, and 8 contain technical support information, including Technical Information Bulletins, Illustrated Parts lists, Frequently Asked Questions (FAQs) lists, and other product support documents.

Order information from FaxFlash as follows.

1. Be sure that your fax machine or fax/modem is on. Have the document number ready for the document you want.

2. At your touch-tone telephone, enter **888-329-0088** (USA and Canada) or **978-635-6090** (international).

3. Listen to the instructions provided by the voice prompts.

   Press **1** if you do not want an introduction to FaxFlash. Follow the automated instructions for ordering your document or catalog.

   Press **2** if you want an introduction to FaxFlash. Follow the automated instructions for ordering your catalog or document.

4. When prompted, enter your fax number and name.

   For international use, first enter the international long distance access number (**011**), your country code, your area code or city code, then your fax number.

   The information you request is automatically sent to your fax machine. Please wait for the ordered document to arrive at your fax machine before calling to order more documents. If FaxFlash attempts to send the second order before the first order is completed, the order may be canceled. After three tries, FaxFlash assumes that your line is busy and terminates any further processing of the order.

10

Specifications

- System Board
- Mouse
- Keyboard
- System Unit
- Diskette Drive
- Hard Drives
- ATX260-Watt Power Supply
- Fax/Modem Board
- Graphics Boards
- 3C905-TX Network Board
- Sound Board
- CD-ROM Drives
- PC Adapter Device
- Tape Backup Unit
- Zip Drive
- Speakers
- Environmental and Safety
- Compliance

This section contains the specifications for the various components comprising the PowerMate Professional 9000E Series systems. The following table lists the specifications and the pages where the specifications can be found.

System Specifications

Specification	Go to Page
System Board	10-3
Mouse	10-4
Keyboard	10-5
System Unit	10-5
Diskette Drive	10-6
Hard Drives	10-7
ATX260-Watt Power Supply	10-11
Fax/Modem Board	10-11
Graphics Boards	10-12
3C905-TX Network Board	10-13
Sound Board	10-14
CD-ROM Drives	10-15
PC Adapter Device	10-19
Tape Backup Unit	10-20
Zip Drive	10-21
Speakers	10-22
Environmental and Safety	10-22
Compliance	10-23

System Board

The specifications for the system board are included in the following table.

System Board Specifications

Feature	Specification
System Board	Intel N440BX with LAN, SCSI
Form Factor	ATX
Processor	Pentium II 266 MHz MMX, 300 MHz MMX, 333 MHz MMX, 350 MHz MMX, 400 MHz MMX, or 450 MHz MMX
Cache Memory	32 KB of primary cache (16-KB data, 16-KB instruction) integrated in the processor
	512 KB of secondary cache built-in on processor
Flash ROM	2 Mb Flash ROM
Chip Set	Intel 440BX Chipset
I/O Controller	National 87309 Super I/O controller
System Memory	32 MB to 1 GB in four DIMM sockets on system board
Optional DIMMs	64-MB, 128-MB, and 256-MB; 168-pin, 72 bit (ECC) PC100 DIMMs
IDE Controller	PCI/ISA/IDE Accelerator, PIIX4.
SCSI Controller	Symbios Logic SYM53C876 dual-function PCI SCSI host adapter
LAN Controller	Intel 82558 Fast Ethernet PCI bus controller including 10BASE-T/100BASE-TX support.
Battery	Replaceable coin-type battery
Industry Standard Interfaces	Two PCI/IDE connectors (primary and secondary) Diskette drive connector Dual SCSI connectors (wide and narrow) 3 PCI slots 1 shared PCI/ISA slot 1 ISA slot Feature connector (supplies power and signal to front switch panel) Intrusion connector LAN connector Wake-On LAN connector Fan connector Connections to power supply for providing DC power to system components.

Mouse

The specifications for the mouse are included in the following table.

IntelliMouse Specifications

Feature	Specification
Mouse	Microsoft IntelliMouse
Features	2-button with cursor movement wheel X & Y encoder resolution: 400 PPI opto-mechanical Wheel Resolution: zoom resolution 18 counts per revolution
Operating Characteristics	Vin = 115 V or 230 V as appropriate Ta = 25° Thermal stabilization - 1 hour minimum
Physical Features	Length: 4.53 inches Width: 2.6 inches Height: 1.52 inches Weight: 170 grams +/1 20 grams
Temperature Range	Operating: 5° to 35° C / Storage: -20° to 60° C

Logitech MouseMan Mouse Specifications

Feature	Specification
Model	Logitech MouseMan
Buttons	3 light force switches (40-80 grams)
Ball	30 grams (approximately)
Cable	6 ft. (1850 mm) shielded cable, measured from connector end to mouse end
Connector	6-pin male PS/2 compatible mini-DIN (see Appendix A for pin assignments)
Resolution	400 dpi (15.8 dots per mm)/16 count/mm (both x & y direction)
Tracking Performance at maximum speed of 10 in. (25 cm.) per second), and acceleration of 100 in. (2.5 m) per second:	Accuracy: $\pm$15 Orthogonality: $\pm$10 Hystersis: $\pm$10 Backlash: $\pm$2%
Supply Voltage	4.5 VDC minimum, 5.5 VDC maximum
Power Consumption	15mA maximum
Interface	IBM PS/2 mouse port
Physical Features	Length: 4.55 inches (113 mm) Width at head: 2.48 inches (63 mm) Height: 1.34 inches (34 mm) Weight: 4.94 oz (140 g) including cable
Humidity (Operating and Storage)	10% - 90%, noncondensing
Temperature Range	Operating: 0° to 40° C Storage: -20° to 60° C

Keyboard

The specifications for the keyboard are included in the following table.

Keyboard Specifications

Feature	Specification
Keyboard	Chicony KB-8923
Dimensions	Width: 19.0 inches (48.3 cm) Depth: 8.4 inches (21.3 cm) Height: 1.6 inches (4.1 cm)
Weight	3.5 to 4.0 lb. (1.6 to 1.8 kg)

System Unit

The specifications for the system unit are included in the following table.

System Unit Specifications

Feature	Specification
Dimensions	Width: 8.5 inches (21.59 cm) Depth: 18 inches (45.72 cm) Height: 17 inches (43.18 cm)
Weight	Starting at 28 lb. (11.78 kg) dependent upon options
Device Bays	Three 5 1/4-inch front accessible bays One 3 1/2-inch front accessible bay Two 3 1/2-inch internal bays
Expansion Board Slots	Five slots: one 8-/16-bit ISA slot three 32-bit PCI slots one shared PCI/ISA slot
Peripheral Interface (rear panel)	PS/2-style keyboard connector PS/2-style mouse connector Two RS-232C serial ports Parallel printer port VGA monitor port Two universal serial bus ports Three audio connectors

Diskette Drive

The specifications for the diskette drive are included in the following table.

Diskette Drive Specifications

Feature	Specification
Diskette Drive	NEC Diskette Drive FD1231H

Recording Capacity	High density mode:
	    Unformatted:
	        2.00/1.00 MB
	    Formatted:
	        1440 KB (512B 18 Sec)
	        720 KB (256B 18 Sec)
	
	Normal density mode:
	    Unformatted:
	        1.00/0.50 MB
	    Formatted:
	        640 KB (256B 16 Sec)
	        320 KB (128B 16 Sec)

Data Transfer Rate	High density mode:
	    500/250 Kbit/sec
	Normal density mode:
	    250/125 Kbit/sec

Disk Speed	300 rpm
Number of Tracks	160 (80 tracks x 2 sides)

Maximum Bit Density	High density mode:
	    17434/8717 BPI
	Normal density mode:
	    8717/4359 BPI

Seek Time	3 ms
Head Setting Time	15 ms
Tracks per Inch	135 TPI
Recording Mode	MFM/FM
Temperature	Operating: 4° to 46°
Relative Humidity	20° to 80°
Dimensions (W x H x D)	25.4 mm x 101.6 mm x 146 mm
Weight	430 grams (typical)

Hard Drive

The following specifications apply to the hard drives available with the system.

> *Note:* Hard drives in PowerMate Professional 9000E Series computers are subject to change according to availability, and as technologies evolve. The system may have a different hard drive than those listed in this section.

8.4-GB IBM Hard Drive Specifications

The specifications for the 8.4-GB IBM DHEA-38451 hard drive are included in the following table.

8.4-GB IBM DHEA Hard Drive Specifications

Feature	Specification
Hard Drive	8.4-GB IBM DHEA-38451
Formatted Capacity Nominal Rotational Speed Number of Disks Number of R/W Heads	8400 MB 5,400 rpm 4 8
Sectors	Sectors per drive: 16,514,064 Bytes per sector: 512

Recording	Recording technology: Multiple Zone
	    Density: 162.6 Kbpi (max.)
	    Track density: 10700 tpi
	    Maximum effective areal density: 1747 Mbits/in^2

Performance	Seek time: 9.5 msec (read) Media transfer rates: 76.2 to 127.4 MB per second Interface transfer rate: 33.3 MB per second (max.)
Buffer Size	472 KB
Power	+5V +/-5%; 100 mV peak-to-peak allowable ripple/noise 12V +/-10%; 150 mV peak-to-peak allowable ripple/noise
Temperature (non-condensing)	Operating: 5° to 55° C (41° to 131°F) Non-operating: -40° to 65°C (-40° to 149°F)
Humidity (non-condensing)	Operating: 5% to 85% rh, 30°C (86°F) Non-operating: 5% to 95% rh, 40°C (104°F)
Altitude	Operating: -300 m to 3,048 m (-650 to 10,000 ft.) Non-operating: -300 m to 12,000 m (-650 to 40,000 ft.)
Dimensions	Height: 1.0 inches (25.4 mm) Width: 4.0 inches (101.6 mm) Depth: 5.75 inches (146.1 mm)
Weight	1.2 lbs (0.5 Kg)

8.4-GB Maxtor Hard Drive

The specifications for the 8.4-GB Maxtor DiamondMax™ hard drive are included in the following table.

8.4-GB Maxtor DiamondMax Hard Drive Specifications

Feature	Specification
Hard Drive	8.4-GB Maxtor DiamondMax 88400D8
Formatted Capacity Nominal Rotational Speed Number of Disks Number of R/W Heads	8400 MB 5,200 rpm 4 8
Data Organization	Zones per surface: 16 Tracks per surface: 7,825
Sectors per Track	Sectors per track: 195-312 Sectors per drive: 16,481,808 Bytes per sector: 512
Recording	Recording technology: Multiple Zone Maximum linear density: 168,650 fci Encoding method: 16/17 PRML Interleave: 1:1 Track density: 7,777 tpi Maximum effective areal density: 1500 Mbits/in^2
Performance	Seek times Track-to-track: 1.0 ms typical Average: 9.7 ms max. Maximum: 18.0 ms max. Data transfer rate To/from interface (Ultra DMA Mode 2): up to 33.0 Mb/sec. To/from interface (PIO 4 MutiWord DMA Mode 2): 16.7 MB/sec. max. To/from media: 10.6 to 17.0 Mb/sec.
Buffer Size	256 KB EDO DRAM
Power	+5V +/-5%; 100 mV peak-to-peak allowable ripple/noise 12V +/-10%; 250 mV peak-to-peak allowable ripple/noise
Temperature (non-condensing)	Operating: 5° to 55° C (41° to 131°F) Non-operating: -40° to 65°C (-40° to 149°F)
Humidity (non-condensing)	Operating: 5% to 95% rh, 30°C (86°F) Non-operating: 5% to 95% rh, 40°C (104°F)
Altitude	Operating: -200 m to 3,000 m (-650 to 10,000 ft.) Non-operating: -200 m to 12,000 m (-650 to 40,000 ft.)
Dimensions	Height: 1.0 inches (25.4 mm) Width: 4.0 inches (101.6 mm) Depth: 5.75 inches (146.1 mm)
Weight	1.2 lbs (0.5 Kg)

8.4-GB Quantum Hard Drive Specifications

The specifications for the 8.4-GB Quantum Fireball SE hard drive are included in the following table.

8.4-GB Quantum Fireball Hard Drive Specifications

Feature	Specification
Hard Drive	8.4-GB Quantum Fireball SE
Formatted Capacity Nominal Rotational Speed Number of Disks Number of R/W Heads	8400 MB 5,400 rpm 4 8
Sectors	Sectors per drive: 12,594,960 Bytes per sector: 512

Recording	Recording technology: Multiple Zone
	Maximum linear density: 208,147 fci (max)
	    Encoding method: 16/17 PRML
	    Track density: 8400 tpi
	    Maximum effective areal density: 1645 Mbits/in^2

Performance	Seek times
	    Track-to-track: 2.0 ms typical
	    Average: 9.5 ms read, 11 ms write
	    Maximum: 12.0 ms read, 13 ms write
	Data transfer rate
	    Buffer to disc: 158 Mb/sec.
	    Buffer to host: 33 MB/sec. max.
	    Interleave: 1:1

Buffer Size	128 KB
Power	+5V +/-5%; 100 mV peak-to-peak allowable ripple/noise 12V +/-10%; 250 mV peak-to-peak allowable ripple/noise
Temperature (non-condensing)	Operating: 5° to 55° C (41° to 131°F) Non-operating: -40° to 65°C (-40° to 149°F)
Humidity (non-condensing)	Operating: 5% to 85% rh, 30°C (86°F) Non-operating: 5% to 95% rh, 40°C (104°F)
Altitude	Operating: -200 m to 3,000 m (-650 to 10,000 ft.) Non-operating: -200 m to 12,000 m (-650 to 40,000 ft.)
Dimensions	Height: 1.0 inches (25.4 mm) Width: 4.0 inches (101.6 mm) Depth: 5.75 inches (146.1 mm)
Weight	1.2 lbs (0.5 Kg)

14.4-GB IBM Hard Drive Specifications

The specifications for the 14.4-GB IBM DTTA 371440 hard drive are included in the following table.

14.4 IDE Hard Drive Specifications

Model	IBM Triton DTTA-371440
Interface	ATA-4
Capacity*	14.4/ 12.9/ 10.1 GB
Sector size	512 Bytes
Recording zone	8
User cylinders	13,085
Data heads	10/ 8/ 7
Disks	5/ 4/ 4
Areal density (Max)	2417 Mbits/sq.in.
Recording density	176.4 KBPI
Track density	13,700 TPI
Data buffer**	512KB
Rotational speed	7200 RPM
Latency (average)	4.17 ms
Media transfer rate (max)	174.4 Mbits/sec
Interface Transfer (max)	33.3 MB/sec
Sustained data rate	13-8 MB/sec
Seek time (read typical)	
Average	9.5 ms
Track to Track	2.2 ms
Full Track	15.5 ms
Reliability	
Error Rate (non-recoverable)	1 in 10E13
Contact Start Stop	
(below 40° C)	40,000
Power	
Requirement	+5VDC (+/-5%)
+12VDC (+/-5%)	
Dissipation (Typical)	
Start Up (max peak)	25.2 W
Idle	6.9 W

14.4 IDE Hard Drive Specifications

Model	IBM Triton DTTA-371440
Physical Size	
Height	25.4 mm
Width	101.6 mm
Depth	146 mm
Weight (max)	630 g

*1MB = 1,000,000 Bytes 1GB = 1,000,000,000
**Up to 32 KB for firmware

ATX260-Watt Power Supply

The specifications for the ATX260-watt power supply are included in the following table.

Power Supply Specifications

Feature	Specification
Power Supply	ATX260 Watt DC Power Supply
Operating Characteristics	Vin = 115 V or 230 V as appropriate Ta = 77° F (25° C)
Thermal stabilization:	1 hour minimum
Temperature Range	Operating: 50° to 122° F (10° to 50° C) Storage: -40° to 158° F (-40° to 70° C)

Fax/Modem Board

The specifications for the fax/modem board are included in the following table.

Fax/Modem Board Specifications

Feature	Specification
Model	3Com® Python 80-661749-00:
Speed	56 Kbps (receive only); 33.6 Kbps send/receive
3Com Data Standard:	x2™
ITU Data Standards:	V.34 (1996), v.32bis, v.32, V22bis, V.22, V.23, V.21, V.8, Bell 212A, Bell 103
ITU Fax Standards:	V.17, V.29, V.27ter, V.21 channel 2, Group III 14,400 and 9,600 bps, TIA/EIA 578 Class 1, TIA/EIA 592 Class 2.0.
Error Correction/Data Compression:	V.42, MNP 2-4, V.42bis, MNP 5

Graphics Board

The following specifications apply to the graphics boards available with the system.

AccelGRAPHICS AccelSTAR II 2D/3D PCI Board Specifications

The specifications for the AccelGRAPHICS AccelSTAR II (3D Labs Permedia 2A) 2D/3D PCI board are included in the following table.

AccelSTARII Specifications

Feature	Specification
Chipset	Permedia II
Video memory	8MB
Resolutions	640 x 480, 800 x 600, 1024 x 768, 1152 x 870, 1280 x 1024, 1600 x 1200
Refresh rates	60, 72, 75, 85, 100 (not all refresh rates are available at all resolutions)
Color depth:	256, 32K, 65K,16.7M/true color (varies by resolution)

AccelGRAPHICS AccelECLIPSE II PCI Board Specifications

The specifications for the AccelGRAPHICS AccelECLIPSE II PCI board are included in the following table.

AccelECLIPSE II™ Specifications

Feature	Specification
Chipset	3D Pro
Video memory	32 MB
Resolutions	640 x 480, 800 x 600, 1024 x 768, 1280 x 1024
Refresh rates	60, 72, 75, 85 (not all refresh rates are available at all resolutions)
Color depth	16.7M (true color)

3C905-TX Network Board

The specifications for the 3Com 3C905-TX network board are included in the following table.

3COM 3C905-TX Network Board Specifications

Feature	Specification
Network Board	3COM 3C905-TX
Features	10/100Base Ethernet card
	10Base-T connector
	32-bit bus master PCI design
	Single driver configuration
	Automated 10/100 NWay speed auto-negotiation in Fast EtherLink XL PCI
	AutoLink configuration software for NetWare drivers
	Support for Plug and Play
	Custom ASIC combining 10/100 bus interface and 8 KB RAM on one chip
	IEEE 802.3 and 802.3u compliant
	PCI 2.1 compliant
Dimensions	L x W, 3.375 in x 4.75 in.
Operating Ranges	Temperature 32° to 158° F (0° - 70°) Humidity 10-90% (non-condensing) Altitude to 9800 ft.
Power	Power Requirements: +5V +/- 5% at 650 mA max

Sound Board

The specifications for the sound board are included in the following table.

Sound Board Specifications

Feature	Specification
Model	Creative Labs AWE64D
Features	3-D enhanced stereo controller with analog components
	Compatible with Sound Blaster Pro™, Sound Blaster™ 2.0, Ad Lib™, MPU-401, and Microsoft® Windows Sound System™ for PC sound applications
	Plug and Play compatibility
	Stereo jacks — microphone in and line out
	Playback of 32 audio channels each at an arbitrary sample rate
	Each audio channel can play back either 8-bit or 16-bit data from host memory
	48 kHz recording from AC97 sample rate converted to 8 common rates to host memory
	Stereo analog-to-digital and digital-to-analog converters
	Analog mixing, anti-aliasing, and reconstruction filters
	Full digital control of all mixer and volume control functions
	MIDI Synthesizer
	Playback sources: CD Audio, Line-In, Microphone, Auxiliary, TAD-In, MIDI, I^2S-In, and Wave
	Modem Blaster Pro (MB_PRO) Interface
	Joystick interface
	8-bit ADPCM compression, A-Law and u-Law compression/decompression
	EMU8008 WaveTable music synthesis.
Ports	Line in
	Line Out
	Microphone In

CD-ROM Drive

The following specifications apply to the CD-ROM drives available with the system.

Lite-ON 32X CD-ROM Drive Specifications

The specifications for the Lite-ON 32X CD-ROM drive are included in the following table.

Lite-On 32X CD-ROM Drive Specifications

Feature		Specification
Model		Lite-ON 32X LTN-301
Applicable Formats		CD-DA, CD ROM Mode 1, CD-ROM/XA Mode-2 Form-1 and Form-2, CD-I Ready, Video-CD (MPEG-1), Karaoke CD, Photo-CD, Enhanced CD, CD extra, I-Trax CD, and CD-RW
Disc Diameter		12 cm and 8 cm
Capacity	Mode-1	2,048 bytes/block
	Mode-2 Form-1	2,048 bytes/block
	Mode-2	2,336 bytes/block
	Mode-2 Form-2	2,324 bytes/block
Data Buffer		128 KB
Burst Data Transfer Rate		
	Ultra DMA	33.3 MB/sec
	DMA mode 2	16.6 MB/sec
	PIO mode 4	16.6 MB/sec
Sustained Data Transfer Rate		
	CD-ROM outside	4,700 KB/sec (min.) 4,800 KB/sec (typical)
	CD-ROM inside	2,150 KB/sec (min.) 2,350 KB/sec (typical)
Access Time	Random Access	100 ms (typical) 140 ms (max.)
	1/3 Stroke	90 ms (typical) 140 ms (max.)
	Full Stroke	160 ms (typical) 260 ms (max.)

Lite-On 32X CD-ROM Drive Specifications

Feature		Specification
Host CPU Utilization		
	90% of Max. Transfer Rate	38% (typical) 50% (max.)
	1.2 MB/sec	18% (typical) 30% (max.)
	600 KB/sec	8% (typical) 20% (max.)
Spindle/Tray	Spin Up Time	3.5 sec.
	Spin Down Time	6.5 sec.
	Tray In Time	3.5 sec.
	Tray Out Time	4.5 sec.
Temperature	Operating	5° to 45° C
	Non-Operating	-20° to 60° C
Humidity	Operating	20% to 80% RH
	Non-Operating	20% to 900% RH
Dimensions	Height	41.3 mm
	Width	145.8 mm
	Depth	192.9 mm
	Weight	1.2 Kg

Lucky Goldstar 32X CD-ROM Drive Specifications

The specifications for the Lucky Goldstar 32X CD-ROM drive are included in the following table.

Lucky Goldstar 32X CD-ROM Drive Specifications

Feature	Specification
32X CD-ROM Drive	LG Electronics CD-ROM drive CRD-8240B
Applicable Disc Format	Mixed Mode (Audio and Data Combined) CD-DA, Mode 1 (basic format), Mode 2 form 1 and form 2 Photo-CD (Multisession), CD-SA Ready CD-I Ready, CD-Plus
Data Capacity (Yellow Book) User Data/Block	2,048 bytes/block (mode 1 and mode 2 format) 2,340, 2,336 bytes/block (mode 2) 2,328 bytes/block (mode 2 form 2) 2,352 bytes/block (CD-DA)
Rotational Speed 1X (CLV) 10X ~ 32X (CAV)	 Approximately 200 to 530 rpm Approximately 6486 rpm
Data Transfer Rate/Sustained Data Transfer Rate 1X 32X (max)	 150 Kbytes/sec 4920 Kbytes/sec
Data Transfer Rate/Burst (ATAPI)	16.67 Mbytes/sec (PIO mode 4) 16.67 Mbytes/sec (MULTI-DMA mode 2)
Average Access Time 1/3 Stroke Full Stroke	85 ms typical (max 32X) 85 ms typical (max 32X): including latency 140 ms typical (max 32X): including latency
Random Access	85 ms typical (max 32X) 110 ms typical (max 32X): including latency
Data Buffer Capacity	128 Kbytes
Spin up, spin down, eject time Spin up time Spin down time Eject time	 4 sec 4 sec 2.0 sec typical
Load time	1.5 sec typical.
Voltage tolerance	+5V DC +/-5%; +12V DC +/-5%
Temperature	operating: 5° to 45° non-operating: -20° to 60°
Humidity	operating: 10% to 80% (non-condensing) non-operating: 5% to 90% (non-condensing)
Physical Dimensions	H x W x L: 41.5 x 146 x 201 mm max
Weight	0.958 Kg

NEC 32X CD-ROM Drive Specifications

The specifications for the NEC 32X CD-ROM drive are included in the following table.

NEC 32X CD-ROM Drive Specifications

Feature	Specification
32X CD-ROM Drive	NEC CDR-1900A/PBM

Data Transfer Rate
Blocks/second
    12X - 32X
    1X
Mode 1 and Mode 2 Form 1
    12X - 32X
    1X
Mode 2, Mode 2 Form 2
    8X
    1X
	
	900 - 2460
	75
	
	1800 - 4920 KB/sec
	150 KB/sec
	
	1400 KB/sec
	175 KB/sec

Supported Modes	CD-Audio CD-ROM (Mode 1 and Mode 2) CD-XA (Mode 2, form 1 and form 2) CD-I (FMV) Video CD CD Extra Multisession Photo CD™ Single Session Photo CD™

Rotation Speed
    12X - 32X
    1X
	
	~6486 rpm; constant
	~539 to 198 rpm; variable

Access Time
    Full Stroke
    Random Stroke
	
	140 msec (typical, average 400 seeks)
	85 msec (typical, average 500 random access)

Spin Up Time	4 sec. (max.)
Spin Down Time	4 sec. (max.)
Capacity	656 MB (Mode 1) 748 MB (Mode 2)
User Data/Block	2048 Bytes, Mode 1 and Mode 2 Form 1 2336 Bytes, Mode 2 2328 Bytes, Mode 2 Form 2
Physical Format	Standards: Red, Yellow, and Orange (part 2) book.
Weight	.91 Kg
Temperature	5°C to 45°C (Operating) -20°C to +60°C (Non-operating)
Humidity	30% to 70% relative humidity (Operating) 30% to 90% relative humidity (Non-operating)

PC Adapter Device

The specifications for the PC adapter device are included in the following table.

PC Adapter Device Specifications

Feature	Specification
PCMCIA device	SCM SwapBox™ PC Card Host SBI-D2P
Hardware	PnP 16-bit PC-AT interface card connecting to a 3.5-inch drive bay with twin PC Card sockets
Card Sockets	2
Card Configurations	Two Type I/II cards *or* One Type I/II card and one Type III
Controller	ExCA-compatible PCMCIA VG469 controller; Intel register, step B compatible
Software	SwapFit Flash Filing system driver enabling full floppy disk or hard drive emulation on flash cards; compatible with all compression and PC-utilities software
	Single drive letter designator for all memory cards
	Graphical installation and formatting utilities
Functionality	Supports ISA Plug and Play
	Supports mixed voltage (3V) cards
	Vcc and Vpp Matrix: Micrel MTC2563

Tape Backup Unit

The specifications for the tape backup unit are included in the following table.

Tape Backup Unit Specifications

Feature	Specification
Tape Backup Unit	Seagate CTT8000 IDE Minicartridge Drive
Capacity	4.0 GB (900 Oe 740' Travan cartridge, uncompressed) 8.0 GB (900 Oe 740' Travan cartridge, compressed)
Effective Backup Rate	30 MB/min typical native 45 MB/min typical compressed
Data Transfer Rate	300/450/600 KB/second Fast Sense

Tape Speed
    Read/Write
    Search/Rewind
	
	33, 51, or 77 ips
	90 ips max

Recording Method	Serpentine
Recording Format	QIC-3095-MC
Recording Code	1,7 RLL
Error Recovery	Reed Solomon ECC
Head Configuration	Wide write/narrow read
Recording Media	900 Oe 740' Travan TR-4
Cartridge Size	3.2 in. x 2.4 in. x 0.4 in. (81 mm x 61 mm)
Data Density	67,733 bpi
Tracks	72 data tracks, one directory track
Synchronous Transfer Rate (Burst)	5 MBytes/sec maximum
Asynchronous Transfer Rate (Burst)	5 MBytes/sec maximum
Voltage Tolerance	+5V +/-5%; +12V +/-10%
Temperature	Operating: 5° to 45° Non-operating: -40° to 65°
Humidity	Operating: 20% to 80% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: -1,000 to 15,000 feet Non-operating: -1,000 to 50,000 feet

Zip Drive

The specifications for the Zip drive are included in the following table.

Zip Drive Specifications

Feature	Specification
Zip Drive	Iomega Zip 100 ATA Drive
Sustained Data Transfer Rate	Up to 11.2 Mbits/sec
Burst Transfer Rate	Up to 26.7 Mbits/sec
Minimum Seek	4.0 ms
Average Seek	29.0 ms
Maximum Seek	55.0 ms
Average Latency	10.2 ms
Spindle Speed	2941 rpm
Track-to-Track Access Time	5.0 ms
Average Head Switch Time	8.0 ms
Head Reload Time	200.0 ms
Average Start/Stop Time	3/2 seconds
Removable Zip Cartridge Capacity	100 MB formatted
Error Correction	Reed-Solomon
Height	1.00 in. (25.4 mm)
Width	3.99 in. (101.4 mm)
Depth	6.44 in. (163.6 mm)
Weight	13.2 ounces (374.22 grams)
Relative Humidity (Noncondensing)	10% to 80% (operating)
Operating Temperature	10°C to 32°C

Speakers

The specifications for the speakers are included in the following table.

Speaker Specifications

Feature	Specification
Speakers	Altec-Lansing 9-watt (ASC-90)
Features	Magnetically shielded 10-watt stereo speakers Power on/off switch and power lamp Volume and treble controls Subwoofer output jack 15-volt AC power adapter
Performance	Frequency response, 90-20 kHz, 2 dB Sensitivity, 300 mV Output power, 4.5 watts

Environmental and Safety

The system environmental and safety specifications are included in the following table.

Environmental and Safety Specifications

Feature	Specification
Recommended Operating Environment	Temperature: 50°F to 95°F (10°C to 35°C)
Relative Humidity:	20% to 80%
Administrative Compliance	UL 1950 – safety CSA C22.2 No. 950-m89 TUV EN60950: 1988 FCC part 15, Subpart J, Class B - emissions FCC part 68 IEC 950 – safety VDE 0871/6.78, Class B - emissions

Compliance

The system meets the compliance standards listed in the following table.

Compliance

Usage	Standard
Domestic:	FCC CFR 47 Part 15, Subpart B UL 1950 3rd edition
Canadian:	C-UL C22.2 No.950-95 ICES-003 Issue 2, Revision 1
European:	EN55022:1993 Class B EN50082-1:1997
	EN60950

The system meets all requirements in the European Waste Regulation Ordinance for packaging and scrap.

A
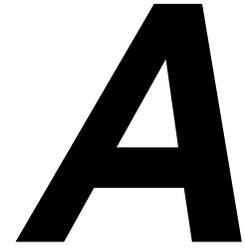
Release Notes

- General Notes
- Windows NT Issues

The *PowerMate Professional 9000E Series Release Notes* provide up-to-date information on installing the applications that come with your computer. These notes also provide additional valuable information about your computer that was not included in the printed or online user's guide.

Please read these notes in their entirety.

General Notes

The following notes describe general system behaviors and recommended operating procedures not documented in other PowerMate Professional 9000E Series documentation.

Installing Applications and Online Documentation

The system comes with the operating system preloaded. All other applications and the online documentation are installed from the NEC Select Install CD. Follow the guidelines in this section when installing applications, the online NEC PowerMate Professional 9000E User's Guide, and the online Healthy Environment brochure.

Choosing the Correct Installation Method

Most applications and the online documentation are installed from the NEC Select Install CD using the Selective Application Restore program.

Installing Applications in the Correct Order

Microsoft® Internet Explorer® must be installed first and alone in a separate Select Install session. Use the following steps to install applications and online documentation.

1. Install Microsoft Internet Explorer *first* and alone, *before* installing any other application on the NEC Select Install CD.

2. Install the online NEC PowerMate Professional 9000E User's Guide *after* installing Microsoft Internet Explorer 4.01 on the system. The online user's guide cannot run without Microsoft Internet Explorer 4.01 and it cannot be installed from the NEC Select Install CD unless Internet Explorer 4.01 has already been installed.

Correcting Video Corruption

Video corruption may occur in some PowerMate Professional 9000E systems. See the following sections for guidelines on correcting the display in systems running the Windows NT® operating system.

Correcting Video Corruption in a Windows NT System

In a system running the Windows NT operating system, the desktop color palette may shift after the Display Properties window has been opened.

To correct the desktop color palette, change the background wallpaper *from* NEC3D or Winnt256 *to* None, Wallpapr, or Winnt.

1. Right click anywhere on the desktop and click **Properties** in the popup menu.

2. Click the **Background** tab in the Display Properties window.

3. Highlight a different wallpaper pattern. Click **OK**.

Configuring the System for Microsoft Internet Explorer

TCP/IP must be enabled before Microsoft Internet Explorer 4.01 can be used. See "Changing Network Settings" below for instructions on enabling TCP/IP. (Internet Explorer is installed from the NEC Select Install CD.)

Changing Network Settings

All systems are configured with the NetBEUI and NWLink protocols enabled. However, before you connect a system to your network you might need to:

- enable a different network protocol

- disable unneeded protocols for enhanced system performance

- add or change network, domain, and gateway information.

The following paragraphs describe how to disable the NetBEUI and NWLink protocols, enable TCP/IP, and provide network, domain, and gateway information. (If a different protocol is enabled, the menu choices may differ from those described below.)

1. From the Windows desktop, click **Start** on the taskbar, point to **Settings**, and click **Control Panel**.

2. Double click the **Network** icon in the Control Panel window.

3. Click the **Protocols** tab. In the Protocols display, the following protocols are loaded:

    NetBEUI Protocol
    NWLink IPXSPX-Compatible Transport
    NWLink NetBIOS

4. Highlight **NWLink IPXSPX-Compatible Transport** and click **Remove**. A warning window appears asking for confirmation to continue.

5. Click **Yes**. The NWLink IPXSPX-Compatible Transport and NWLink NetBIOS lines disappear from the Protocols display.

6. Repeat steps 4 and 5 to remove the **NetBEUI** Protocol.

7. Click **Add**. The Select Network Protocol window appears.

8. Highlight **TCP/IP** and click **OK**. The TCP/IP Setup window appears. If there is a DHCP server on the network, click **Yes**; otherwise click **No**.

9. Change the path in the window to **C:\I386**. Click **Continue**. The Network window appears. If Yes was clicked in step 8, skip to step 16. If No was clicked in step 8, the Windows Setup window appears.

10. Click **Close**. The Microsoft TCP/IP Properties Box appears.

11. Fill in the **IP Address**, the **Subnet Mask**, and the **Default Gateway** in the "Specify an IP address" area.

12. Click the **DNS** tab and enter the host and domain name in the DNS display.

13. Click the **Identification** tab and change the Computer Name if appropriate.

14. Click the **WINS** tab and enter the WINS address if appropriate.

15. Click the **Routing** tab and enable IP forwarding if appropriate.

16. Click **OK**. When prompted to restart the system, click **Yes**.

Using Cheyenne Backup

The following notes describe conditions and procedures specific to systems running the Cheyenne Backup.

Backing Up Large Drives

When Cheyenne Backup is set to automatically back up a drive to a network drive, and the system drive being backed up is greater than 2.1 GB, multiple instances of the Copy program may be launched, according to how many drive letters are assigned to the hard drive. The first instances end with an indication that no data was transferred. The last instance completes the backup successfully.

Windows NT Issues

The following information is specific to systems running the Microsoft Windows NT 4.0 operating system.

Rebooting the System After Installing Internet Explorer 4.0

After Internet Explorer 4.0 has been installed from the NEC Select Install CD, do not remove the CD until the reboot sequence has begun (anytime following the screen clear, but *before* the system begins to boot from the CD).

Glossary

A

access time

The time period between the supply of an access signal and the output or acceptance of the data by the addressed system. Examples are the access times for DRAMs, SRAMs, hard drives, and CD-ROM drives. Hard drive access time is the time it takes for a computer to get data from the drive. A hard drive with an 11 ms access time is fast. A CD-ROM drive with a 280-ms access time is fast.

ACPI

Advanced Configuration and Power Interface. A power management specification developed by Intel, Microsoft, and Toshiba. When installed on the system, ACPI enables the operating system to control the amount of power given to each device attached to the computer. With ACPI, the operating system can turn off peripheral devices (such as CD-ROM drives) when they are not in use. As another example, ACPI enables manufacturers to produce computers that automatically power up as soon as you touch the keyboard.

adapter

An expansion board or component on the system board that communicates with peripherals (such as the display monitor or network devices).

address

A hexadecimal number that represents a location in storage or memory. Also used to identify communication ports. To communicate with a storage device.

AGP

Accelerated Graphics Port. A high-speed, high-performance video standard supported by a dedicated connector on the system board. The connector allows the connection of an AGP board to the system board's AGP bus. AGP boards feature 64- or 128-bit graphics acceleration with an integrated digital video engine and accelerated 3-D graphics, texture mapping, and shading functions. Fast refresh rates, high resolution, and color depth allow for incredible graphics suitable for multimedia and graphic intensive applications.

algorithm

Any set of instructions to be followed in order.

anti-aliasing

Making jagged edges look smoother by filling in the jags with an intermediate color. Usually used in reference to the edges of shapes, especially letters, on a computer screen.

API

Application Programming Interface. An API is a series of functions that programs can use to make the operating system do routine or repetitive tasks. Using Windows APIs, for example, a program can open windows, files, and message boxes (as well as perform more complicated tasks) by passing a single instruction. Windows has several classes of APIs that deal with telephony, messaging, and other issues.

APM

Advanced Power Management. An API developed by Intel and Microsoft that allows developers to include power management in the BIOS. APM defines a layer between the hardware and the operating system that effectively shields the programmer from hardware details.

application programs

Software designed to perform specific functions or a group of functions, like solving business or mathematical problems. Examples of applications include word processing, communications, or database management.

architecture

A general term for the design and construction of computer systems, particularly hardware, but also operating systems and networks. The circuitry within a chip is called its architecture; for example, Intel architecture can refer to a computer based on the Intel Celsior or other Pentium II chips.

archive

Copying one or more files to a different location for long-term data storage, especially for backup and security purposes. Files can then be added to or deleted from the archive. Also refers to the location where data is stored.

ASIC

Application Specific Integrated Circuit. A chip designed for use on a particular circuit board, or for a very narrow range of use. The digital signal processor chip on a modem is an ASIC.

asynchronous

Refers to operations that do not require the clocks of communicating devices to be coordinated. Instead, the devices send signals to each other indicating readiness to receive or send. Compare synchronous.

asynchronous cache

The slowest, most inexpensive type of secondary SRAM cache, running at speeds of 15 to 20 ns.

ATA

AT Attachment. A standard for connecting hard drives or other devices to an AT bus; synonymous with IDE.

AT bus

The AT bus system with support chips (DMA, PIC, etc) and a 16-bit bus slot. The AT bus is strictly defined by ISA.

audio

Relating to or capable of producing sound. Multimedia computers make extensive use of audio.

AVI

A digital movie format created by Microsoft. AVI is short for "audio/video interleave," a method of including a digital movie and its accompanying sound in the same file. Files in the AVI format have the .AVI extension.

B

bad sector

Part of a hard drive or diskette drive storage medium that doesn't hold data. Formatting generally detects and marks these areas so they won't be used. Certain utility programs do, too, and it is a good idea to run this type of utility occasionally to prevent data loss if the condition of the drive changes.

bandwidth

A measure of how much information something can carry. Specifically, data path times frequency. For example, the ISA bus has a data path of 16 bits (it can send 16 bits at a time) and typically operates at 8.33 MHz, so it has a bandwidth of 133.28 megabits per second (Mbps).

base RAM

Area of system memory between 0 and 640 kilobytes available to the user for operating system and application programs.

batch file

A file that contains a series of DOS commands. Batch files have the extension .bat. If you execute a batch file, DOS attempts to carry out all the commands in the file, in order.

baud

A unit of measure for modem speed. Literally, the number of voltage transitions per second. Phone line limitations limit the actual baud rate of modems to 2400 baud, although the data transmission rate (bps) may be higher because of data compression.

BBS

Short for Bulletin Board Service. Software that serves as a communication and information source for computers that communicate by modem.

BIOS

Basic Input/Output System. A program or set of programs permanently stored in ROM chips installed on the system board. The BIOS contains functions that control the real-time clock, keyboard, disk drives, video display, and other peripheral devices. For example, the BIOS Setup utility program is contained in the BIOS, and when you change the drive type, you change the BIOS.

bit

Binary digit. The smallest unit of computer data. A single digital piece of information, generally represented by the numeral 0 or 1. Usually the transition between the states of +5V and -5V within a computer, the charge of a transistor in an integrated circuit, or the change in polarity of a magnetic region on a disk. See byte. Data compression schemes can enable the transmission of more than one bit per voltage transition.

bit block transfer

Moving part of a screen image as a single block rather than moving a pixel at a time. Bit block transfers are much faster than moving the same pixels individually, and it is common in accelerated video cards.

bitBLT

Bit Block Transfer.

bitmap

Any occurrence where a single location in memory and a single pixel correspond. Usually applies to screen or printer output. .BMP files are bitmapped graphics files.

bits per second

(bps) A unit of transmission. Also called baud rate.

block

A contiguous section of bits considered as a whole, especially in memory. On a disk, the data in one sector; in modem data transfer, the bits between checksums.

board

Printed circuit board. Board onto which computer components are soldered and thin wires are printed to connect the components.

boot

To start up a computer. The computer is generally booted in one of three ways: by turning on the power switch (cold boot), by pressing the reset switch, or by simultaneously pressing the Ctrl, Alt, and Del keys (warm boot). Booting the system after it has already been powered up and booted is referred to as rebooting. Also the process of booting itself. Boot is from "bootstrap," a reference to a computer's ability to set itself up, or pull itself up by its own 'bootstraps.' See cold boot and warm boot.

bootable device

Any type of hardware that carries the information (software) required by the computer to start properly. This device must also have the capacity to be recognized by the computer in the first stages of the boot process.

boot block

The part of a disk that contains the software (such as the operating system loader) that enables the computer to start.

boot sector

The part of the boot block that contains the operating system loader, a program that starts by itself and loads the operating system.

bps

Bits per second. The number of bits of data that can be transmitted in one second. Because data compression schemes enable more than one bit per voltage transition, bps is equivalent to baud only if no compression is used.

buffer

A place, especially in RAM, for the temporary storage of data for the purpose of speeding up an operation such as printing or drive access. Data from a buffer is available more quickly than data from where the buffer got it. Typically buffers get data before it is needed so it is ready quickly when needed. Similar to cache.

burst mode

When a device seizes control of the bus, sends data, then relinquishes control of the bus. Any time a device sends data without interruption instead of taking turns with other devices.

bus

A parallel electrical pathway on the system board, connecting and shared by the parts of a computer system (especially the CPU, its support circuitry, memory, and expansion cards), used for transmitting data or electrical power from one device to another. Typically the lines in a bus are dedicated to specific functions, such as control lines, address lines, and data lines. Different bus architectures have different numbers and arrangements of these lines, and different names (for example, ISA, PCI). The most useful way of distinguishing bus architectures is by the number of simultaneous data bits they can carry. The ISA is a 16-bit bus, while PCI is a 32-bit bus.

bus master

The ability of an expansion card to control the bus without needing intervention from the CPU.

byte

Group of eight contiguous bits. Frequently written as an eight-digit binary number or a two-digit hexadecimal number. One letter of the alphabet in ASCII code takes one byte.

C

cache

A special block of fast memory used for temporary storage of frequently used data for quick retrieval. A memory cache, sometimes called a cache store or RAM cache, is a portion of memory made of high-speed static RAM (SRAM) instead of the slower and cheaper dynamic RAM (DRAM) used for system memory. Memory caching is effective because most programs access the same data or instructions over and over. By keeping as much of this information as possible in SRAM, the computer avoids accessing the slower DRAM See "write-back" and "write-through."

chassis

The metal frame to which the electronic components of the computer (such as the system board, power supply, and drive bays) are attached The chassis goes inside the system unit cover.

checksum

A number, calculated from a block of data, used to verify the integrity of that data. For example, a modem could send a block of data and include the number of 1's that occur in the block. The receiving modem could count the number of 1's it receives and compare its own number with the transmitted number. If the numbers are the same, the transmission was probably OK.

clock

Electronic timer (oscillator) used to synchronize computer operations. The oscillator generates the timing pulses that coordinate and enable the flow of data within a digital device. Also a circuit powered by battery that keeps track of the date and time for human and various system requirements.

clock speed

The frequency at which a clock oscillates. In microcomputers, measured in MHz. The faster the clock, the faster the computer can compute.

CMOS

Complementary Metal Oxide Semiconductor. A chip on the system board that contains nonvolatile memory. CMOS is backed up by an internal lithium battery that preserves clock/calendar data and system configuration parameters stored in CMOS.

codec

Coder-decoder. Used primarily with Internet phone and video conferencing products, this software compresses digitized data and decompresses it at the other end, allowing for faster data transfer and less delays

cold boot

Process of starting up the computer by turning on the power. If power is already on, the process means to turn off the computer and turn it on again. A cold boot reinitializes all devices.

compression

Any scheme for recording data with fewer bits. For example, stating how many times something occurs can be shorter than stating each occurrence. It is shorter to say "print a million white pixels" than to say "print white pixel number one, print white pixel number two . . ."

D

default

The system's factory setting for a specific device feature or system function. A setting that a computer uses if it has not been modified by a user.

DIMM

Dual Inline Memory Module. Circuit board with pins connecting to different memory chips on both sides of the board, which allows for wider and faster data transfer (128-bit). See SIMMs.

DMA

Direct Memory Access. A method for transferring data, usually between memory and a disk drive, without going through the CPU.

DMI

Desktop Management Interface. A standard for PCs that allows manipulation of PC components over a network from a centralized location.

DRAM

Dynamic Random Access Memory. Memory used to store data in most computers. DRAM is temporary and must be continually refreshed. It is only active when the computer is turned on.

driver

A software program that enables peripheral devices (for example, printer, monitor, mouse, CD-ROM drive) to work with computers.

DVD

Digital versatile disc or digital video disc. A type of CD-ROM that holds a minimum of 4.7 GB, enough for a full-length movie. The DVD specification supports disks with capacities of from 4.7 GB to 17 GB and access rates of 600 Kbps to 1.3 Mbps. One of the features of DVD drives is that they are backward-compatible with CD-ROM disks. This means that DVD players can play old CD-ROMs, CD-I disks, and video CDs, as well as new DVD-ROMs. Newer DVD players can also read CD-R disks. DVD uses MPEG-2 to compress video data. See MPEG.

E

ECC memory

Error Checking and Correcting memory. Advanced type of memory that can find and correct certain types of single-bit memory errors, providing greater data integrity. Advanced ECC can correct some double-bit errors.

ECP

Extended Capabilities Port. A parallel-port standard for PCs that supports bidirectional communication between the PC and attached devices (such as a printer). ECP is about 10 times faster than the older Centronics standard. Another modern parallel port for PCs that offers similar performance is the EPP (Enhanced Parallel Port).

EDO memory

Extended Data Out memory. A faster type of asynchronous computer memory that holds its last-requested data in a cache after releasing it. EDO memory is designed for use with the Intel Pentium and Pentium II processors.

EIDE

Extended Integrated Drive Electronics. The EIDE specification is an enhanced version of IDE that allows for faster transfer rates and supports larger hard drive sizes

enhanced VGA

A video interface that offers more colors or higher resolution than VGA.

EPP

Enhanced Parallel Port, a parallel port standard for PCs that supports bidirectional communication between the PC and attached device (such as a printer). EPP is about 10 times faster than the older Centronics standard. Another modern parallel port for PCs that offers similar performance is the ECP (Extended Capabilities Port).

extended RAM

The area of RAM above the first megabyte of memory in the system available for enhancing system performance.

F

FAT

File Allocation Table. A table near the beginning of a drive that identifies the location of everything on the drive.

flash ROM

Method in which a computer's BIOS ROM can be upgraded without replacing the ROM BIOS chip.

FTP

File Transfer Protocol. A method of transferring files between two computers on a TCP/IP network (such as the Internet). "Anonymous FTP" (the most common usage on the Internet) allows a user to download files without having an account at the remote computer.

function key

The set of keys on the keyboard (usually F1 through F12) that let you get help and error message information or quickly select frequently used commands.

G

graphics accelerator

A term referring to a higher end video controller that handles high-speed graphics and usually contains several megabytes of onboard video memory.

GUI

Graphical User Interface. Method of presenting information on a computer screen utilizing icons, pull-down menus, and a mouse.

H

hertz

(Hz) A unit of frequency equal to one cycle per second.

hexadecimal

A number system that uses 16 as the base. (Place value indicates powers of 16.) It uses the digits 0-9 and A-F. Used around computers because a byte (eight binary digits) easily converts to a two digit hexadecimal number. Hexadecimal numbers are often indicated with the letter H, a dollar sign, or a subscripted 16 after the number. Compare binary, decimal.

host adapter

An expansion board that serves as a controller for SCSI devices.

hot key

Combination of two or three keys (such as **Ctrl-Alt-D**) that you press simultaneously for a particular function.

hot plugging

The ability to add and remove devices to a computer while the computer is running and have the operating system automatically recognize the change. The Universal Serial Bus (see USB) external bus standard supports hot plugging. This is also a feature of PCMCIA. Hot plugging is also called hot swapping.

I

IDE

Intelligent Drive Electronics. A hard drive type that has controller electronics built into the drive and delivers high throughput.

interface

A connection that enables two devices to communicate.

interrupt

A signal from part of a system, such as an I/O device, asking to use the CPU. Interrupts are hierarchical, which prevents interrupts from interrupting each other. (Whichever interrupt has higher priority makes the other interrupt wait.) When the CPU receives an interrupt signal, it saves what it is doing, processes the routine associated with the interrupt, then returns to what it was doing.

I/O address

Input-Output address. How the CPU sees an I/O port. It puts data into this address or reads the data in it. The device at the other end of the I/O port gets the data from that address or puts the data there, respectively.

IRQ

Interrupt Request. A signal that, when received by the CPU, makes it stop what it is going to do something else. An interrupt is a way in which a particular device in a computer communicates with the CPU. PCs have 16 IRQ lines that can be assigned to different devices (for example, printers, scanners, modems). No two devices can have the same IRQ address. See interrupt.

ISA

Industry Standard Architecture. The bus architecture used in the IBM PC/XT and PC/AT. The AT version of the bus is called the AT bus and has become an industry standard. The apparent successor is the PCI local bus architecture found in most of today's computers. Most modern computers include both an AT bus for slower devices and a PCI local bus for devices that need better bus performance. In 1993, Intel and Microsoft introduced a new version of the ISA specification called Plug and Play ISA. Plug and Play ISA enables the operating system to configure expansion boards automatically so that users do not need to fiddle with DIP switches and jumpers. See plug and play.

isochronous

A form of data transmission in which individual characters are only separated by a whole number of bit-length intervals.

K

kilobyte

(KB) 1024 bytes.

L

L2 cache

Refers to "level 2" or "secondary" cache. A type of cache that resides on the motherboard except when referring to a Pentium II machine, where it resides on the CPU module.

LAN

Local Area Network.

LPT1

Name assigned to the parallel port by the Windows operating system. A second parallel device is assigned LPT2 (if there is another parallel port). Also called the printer port.

M

master

Part of a two-sided communication that initiates commands (to a "slave" that carries out the commands).

megabyte

(MB) 1,048,576 bytes.

memory

Electronic storage area in a computer that retains information and programs. A computer has two types of memory: read-only memory (ROM) and random access memory (RAM).

microprocessor

A semiconductor central processing unit that is the principal component of a microcomputer. Usually contained on a single chip that includes an arithmetic logic unit, control logic, and control-memory unit.

MIDI

Musical Instrument Digital Interface. An interface for connecting suitably equipped musical instruments to suitably equipped computers.

MIF

Management Information File. A file stored on a PC that holds system data such as a model ID and serial number that can be manipulated over a network from a centralized location.

MMX

A processor architecture that enhances multimedia and communications. This technology processes multiple data elements in parallel, speeding up such things as image processing, motion video, speech synthesis, telephony, and 3-D graphics.

modem

MOdulator-DEModulator. A device that links computers over a telephone line.

MPC

Multimedia Personal Computer, a software and hardware standard developed by a consortium of computer firms led by Microsoft. There are three MPC standards, called MPC, MPC2, and MPC3, respectively. Each specifies a minimum hardware configuration for running multimedia software.

MPEG

Motion Pictures Expert Group. Audio/Video technology that allows for better than VHS quality video and almost CD quality audio by using advanced compression techniques. MPEG files allow for more realistic motion with a smaller file size than earlier formats, making it a popular format for digital full-length movies. Files in the MPEG format have an .MPG extension.

N

nonvolatile memory

Storage media that retains its data when system power is turned off. Nonvolatile memory is a complementary metal oxide semiconductor (CMOS) chip that is backed up by an internal battery. The backup battery preserves the clock/calendar data and system configuration parameters stored in CMOS. See volatile memory.

O

operating system

Set of programs that manage the overall operation of the computer.

overwrite
Storing information at a location where information is already stored, thus destroying the original information.

P

page
A type of message transmission in which a message is sent or received via modem to a paging device from a computer (with paging communications software) or telephone.

parallel interface
Interface that communicates eight bits at a time.

parallel printer
A printer with a parallel interface.

parameter
A characteristic of a device or system determined by a command or setting whose purpose is to define or limit the characteristic.

password
A string of characters that the user must enter before the system allows access or system privileges.

PCI
Peripheral Component Interface/Interconnect. A self-configuring personal computer local bus designed by Intel. Most modern PCs include a PCI bus in addition to a more general ISA expansion bus. PCI is a 32-bit bus, but supports a 64-bit extension for new processors, such as the Pentium II. It can run at clock speeds of 33 or 66 MHz. At 32 bits and 33 MHz, it yields a throughput rate of 133 megabits per second. 64-bit implementations running at 66 MHz provide 524 Mbps. See ISA.

peripheral
Input or output device not under direct computer control. A printer is a peripheral device.

pixels
Picture elements. Tiny dots that make up a screen image. A pixel is the smallest spot on the screen that a computer can address.

plug and play
Refers to the ability of a computer system to automatically configure expansion boards and other devices. This enables a user to plug in a device and use it, without worrying about setting DIP switches, jumpers, and other configuration elements.

port

Any connection by which data can enter or leave a computer or peripheral. You Cables are plug into ports. Provides the means for an interface between the microprocessor and external devices. A cable connector is usually plugged into the port to attach the device to the computer.

processor

In a computer, a functional unit that interprets and executes instructions.

prompt

A special symbol indicating the beginning of an input line. Also a message that appears on the screen indicating that the user must take a certain action.

R

RAM

Random Access Memory. A storage device into which data is entered and from which data is retrieved in a nonsequential manner. On the system board, RAM is semiconductor-based memory that can be read and written to by the microprocessor or other hardware devices. In RAM, data can be directly and randomly read or written (with any choice for the address). It's the storage location for data that needs to be immediately available for every application in use on your computer.

read

To extract data from a storage device such as a diskette.

ROM

Read-Only Memory. Memory in which stored data cannot be modified by the user except under special conditions.

reset

The process of returning a device to zero or to an initial or arbitrarily selected condition.

resolution

The degree of screen image clarity. Video display resolution is determined by the number of pixels on the screen. Resolution is usually specified in pixels by scan lines, for example, 640 by 480. See pixels.

RS-232C

Standard interface for serial devices.

S

SEC

Single-Edge Contact. The SEC cartridge containing the Pentium II processor. See Slot 1.

serial interface

An interface that communicates information one bit at a time.

serial printer

A printer with a serial interface.

SGRAM

Synchronous Graphic Random Access Memory. A type of DRAM used increasingly on video adapters and graphics accelerators. Like SDRAM, SGRAM can synchronize itself with the CPU bus clock at speeds of up to 100 MHz. In addition, SGRAM uses several other techniques, such as masked writes and block writes, to increase bandwidth for graphics-intensive functions. Unlike VRAM and WRAM, SGRAM is single-ported (it can only be accessed by one device at a time). However, it can open two memory pages at once, which simulates the dual-port nature of other video RAM technologies (access by two different devices simultaneously). See VRAM and WRAM.

SIMM

Single Inline Memory Module. A small circuit board holding a group of memory chips. Typically, SIMMs hold up to nine RAM chips. On PCs, the ninth chip is for parity error checking. Unlike memory chips, SIMMs are measured in bytes rather than bits. In today's SIMMs, each chip holds 2 MB, so a single SIMM holds 16 MB. SIMMs are easier to install than individual memory chips. The bus from a SIMM to the actual memory chips is 32 bits wide. A newer technology, called dual in-line memory module (DIMM), provides a 64-bit bus. To take advantage of the 64-bit bus on Pentium II processors, use either DIMMs or pairs of SIMMs. See DIMMs.

Slot 1

The form factor for Intel Pentium II processors. The Slot 1 package replaces the Socket 7 and Socket 8 form factors used by previous Pentium processors. Slot 1 is a 242-pin daughter card slot that accepts a microprocessor packaged as a Single Edge Contact (SEC) cartridge. A system board can have one or two Slot 1s. See SEC.

SMART

Self-Monitoring Analysis and Reporting Technology. A hard drive feature that works in conjunction with system software (for example, LANDesk Client Manager, NEC Auto Backup) for identifying a potential problem on the hard drive and automatically backing up system files to a user-specified device, such as a tape or Zip drive.

sound card

An expansion card designed for sound input and output. Sound cards can record and play back digital audio. Most also have a MIDI synthesizer, which means they can play MIDI files; some also have MIDI inputs and outputs.

super video graphics array (SVGA)

A color bit-mapped graphics display standard that provides a resolution of 1024x 768 with up to 256 colors displayed simultaneously.

synchronous

Refers to protocols that require the clocks of the communicating machines to be coordinated.

system board
The main printed circuit board inside the system unit into which other boards and major chip components, such as the system microprocessor, are connected.

T

tpi
Tracks per inch.

track
Any of many concentric circular regions on a disk for storing data. Tracks are divided into sectors. One measure of storage density of a disk is tpi.

U

Ultra DMA
A protocol developed by Quantum Corporation and Intel that supports burst mode data transfer rates of 33.3 MBps. This is twice as fast as the previous disk drive standard for PCs, and is necessary to take advantage of new, faster Ultra ATA disk drives. The official name for the protocol is Ultra DMA/33.

USB
Universal Serial Bus. An external bus standard that supports data transfer rates of 12 Mbps (12 million bits per second). A single USB port can be used to connect up to 127 peripheral devices, such as mice, modems, and keyboards. USB also supports Plug-and-Play installation and hot plugging. It is expected to eventually replace serial and parallel ports.

V

VESA
Video Electronics Standards Association. The source of a SuperVGA standard used on many video boards.

virus
Software that copies itself onto hard drives and diskettes without user intervention, usually when a diskette is placed into the drive of a computer. Viruses usually trigger a harmless or destructive occurrence on the system, activated by some preset condition. Viruses are frequently written with antisocial intent.

VGA
Video Graphics Array. Graphics technology that supports up to 256 K colors and a graphics resolution of 640 by 480 pixels.

volatile memory
Storage media that loses its data when system power is turned off. Standard memory and memory added to the system are volatile memory. See nonvolatile memory.

VRAM

Video RAM. VRAM is special-purpose memory used by video adapters. Unlike conventional RAM, VRAM can be accessed by two different devices simultaneously. This enables a video adapter to access the VRAM for screen updates at the same time that the CPU provides new data. VRAM yields better graphics performance but is more expensive than normal RAM. A special type of VRAM, called Windows RAM (WRAM), yields even better performance than conventional VRAM. See SGRAM and WRAM.

W

warm boot

Process of resetting the computer without turning off the power through keyboard input (pressing **Ctrl**, **Alt**, and **Del** keys simultaneously) or the reset button. The system returns to an initial or arbitrarily selected condition.

WRAM

Windows RAM. A type of RAM that supports two ports. This enables a video adapter to fetch the contents of memory for display at the same time that new bytes are being pumped into memory. This results in much faster display than is possible with conventional single-port RAM. WRAM is similar to VRAM, but achieves even faster performance at less cost because it supports addressing of large blocks (windows) of video memory. See VRAM and SGRAM.

write

To record or store information to a storage device.

write-back

Also called copy back. A cache strategy where write operations to data stored in the internal microprocessor L1 cache aren't copied to system memory until absolutely necessary. In contrast, a write-through cache performs all write operations in parallel; data is written to system memory and the L1 cache simultaneously. Write-back caching yields somewhat better performance than write-through caching because it reduces the number of write operations to main memory. See cache and write-through.

write-through

Also write-thru. Write-through characterizes a cache strategy where data is always written into system memory when data is written by the CPU. See cache and write back.

X

X2 technology

A technology developed by U.S. Robotics (now 3Com) for delivering data rates up to 56 Kbps over plain old telephone service (POTS). It was long believed that the maximum data transmission rate over copper telephone wires was 33.6 Kbps, but X2 achieves higher rates by taking advantage of the fact that most phone switching stations are connected by high-speed digital lines. X2 bypasses the normal digital-to-analog conversion and sends the digital data over the telephone wires directly to a modem where it is decoded.

Index

U

Upgrading
  BIOS, 2-19
  DIMMs, 3-16
  hard drive, 3-14
  memory, 3-16
  processor, 3-17
USB
  connector, 1-6, 4-5
  connector pin assignments, 4-5
  interface, 4-28
Utilities
  BIOS Setup, 2-6
  driver installation, 2-32
  flash ROM, 2-19
  OS Restore, 2-23
  Select Install, 2-29
  Symbios Configuration, 2-19

V

VGA connector, 1-7
  pin assignments, 5-4
Voltage selection, 1-12

W

Website, 9-3
Windows
  installing, 2-23
  network security, 1-9

Z

Zip drive, 1-15
  specifications, 10-21

(For United States Use Only)

Federal Communications Commission
Radio Frequency Interference Statement

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment to an outlet on a circuit different from the one to which the receiver is connected.

Use shielded and properly grounded I/O cables and power cable to ensure compliance of this unit to the specified limits of the rules.

(For Canadian Use Only)

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B repecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Battery Replacement

A lithium battery in some computers maintains system configuration information. In the event that the battery fails to maintain system configuration information, NEC recommends that you replace the battery. For battery replacement information, see "CMOS Battery Removal" in Section 3 of this manual or call your NEC CSD dealer or the NEC CSD Technical Support Center.

WARNING: There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

ATTENTION: Il y a danger d'explosion s'il y a replacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

Battery Disposal

Do not place used batteries in your regular trash.

The nickel-cadmium or nickel metal-hydride batteries must be collected, recycled, or disposed of in an environmentally-approved manner.

The incineration, landfilling, or mixing of batteries with the municipal solid waste stream is **prohibited by law** in most areas.

Return batteries to a federal or state approved battery recycler. This may be where you purchased the battery or a local seller of automotive batteries.

Contact your local waste management officials for other information regarding the environmentally sound collection, recycling, and disposal of the batteries.