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Preface

This service and reference manual contains the technical information necessary to set up, maintain, troubleshoot, and repair the NEC PowerMate VP75 series of computer systems. The manual also provides hardware and interface information for users who need an overview of the computer system design. The manual is written for NEC-trained customer engineers, system analysts, service center personnel, and dealers.

The manual is organized as follows:

Section 1, Technical Information, provides an overview of the computer features, hardware design, interface ports, and internal devices.

Section 2, Setup and Operation, takes the user from unpacking to setup and operation. Included is a description of the system configuration, system password, and the computer's jumper settings, including the factory default settings.

Section 3, Options, provides the user with installation and troubleshooting information for each specific option.

Section 4, Maintenance and Troubleshooting, includes recommended maintenance information and lists possible problem and solutions for the computer.

Section 5, Desktop Repair, includes a list of NEC service information and telephone numbers that provide access to the NEC Bulletin Board System (BBS), FastFacts™, and Technical Information Bulletins. Included are desktop disassembly and reassembly procedures along with an illustrated parts breakdown. NEC service and spare parts ordering information is also provided.

Section 6, Minitower Repair, includes a list of NEC service information and telephone numbers that provide access to the NEC Bulletin Board System (BBS), FastFacts, and Technical Information Bulletins. Included are minitower disassembly and reassembly procedures along with an illustrated parts breakdown. NEC service and spare parts ordering information is also provided.

Appendix A, Connector Pin Assignments, provides a list of the system boards' internal connector pin assignments and a list of external pin assignments for the keyboard/mouse, serial port, parallel port, and video port.

Appendix B, Specifications, provides specifications for the system unit, power supply, diskette drives, hard disk drives, CD-ROM reader, sound board, and network board.

Appendix C, CD-ROM Reader Configuration, provides connector and jumper setting information for the quad-speed reader.

Appendix D, Sound Board Configuration, provides connector and jumper setting information for the Creative Technology Ltd® 2261 sound board.

Abbreviations

A	ampere	DMAC	DMA controller
AC	alternating current	DOS	disk operating system
AT	advanced technology (IBM PC)	DRAM	dynamic RAM
BBS	Bulletin Board System	ECC	error checking and correction
BCD	binary-coded decimal	EGA	Enhanced Graphics Adapter
BCU	BIOS Customized Utility	EPROM	erasable and programmable ROM
BIOS	basic input/output system	EVGA	Enhanced Video Graphics Array
bit	binary digit	F	Fahrenheit
BUU	BIOS Upgrade Utility	FAX	facsimile transmission
bpi	bits per inch	FCC	Federal Communications Commission
bps	bits per second	FG	frame ground
C	capacitance	FM	frequency modulation
C	centigrade	FRU	field-replaceable unit
Cache	high-speed buffer storage	GB	gigabyte
CAM	constantly addressable memory	GND	ground
CAS	column address strobe	HEX	hexadecimal
CD-ROM	compact disk-ROM	HGA	Hercules Graphics Adapter
CG	character generator	Hz	hertz
CGA	Color Graphics Adapter	IC	integrated circuit
CGB	Color Graphics Board	ID	identification
CH	channel	IDE	intelligent device electronics
clk	clock	IDTR	interrupt descriptor table register
cm	centimeter	in.	inch
CMOS	complementary metal oxide semiconductor	INTA	interrupt acknowledge
COM	communication	IPB	illustrated parts breakdown
CONT	contrast	IRR	Interrupt Request register
CPGA	ceramic pin grid array	ISA	Industry Standard Architecture
CPU	central processing unit	ISR	In Service register
DAC	digital-to-analog converter	I/O	input/output
DACK	DMA acknowledge	IPC	integrated peripheral controller
DC	direct current	ips	inches per second
DIP	dual in-line package	IRQ	interrupt request
DLAB	Divisor Latch Address bit		
DMA	direct memory access		

K	kilo (1024)	QFP	quad flat pack
k	kilo (1000)	RAM	random-access memory
KB	kilobyte	RAMDAC	RAM digital-to-analog
kg	kilogram	RAS	row address strobe
kHz	kilohertz	RGB	red green blue
lb	pound	RGBI	red green blue intensity
LED	light-emitting diode	ROM	read-only memory
LSB	least-significant bit	rpm	revolutions per minute
LSI	large-scale integration	R	read
M	mega	RTC	real-time clock
mA	milliamps	R/W	read/write
max	maximum	S	slave
MB	megabyte	SCSI	Small Computer System Interface
MDA	Monochrome Display Adapter	SG	signal ground
MFM	modified frequency modulation	SIMM	single inline memory module
MHz	megahertz	SVGA	Super Video Graphics Array
mm	millimeter	SW	switch
ms	millisecond	TAC	Technical Assistance Center
MSB	most-significant bit	TSC	Technical Support Center
NASC	National Authorized Service Center	TTL	transistor/transistor logic
NC	not connected	tpi	tracks per inch
NMI	Non-maskable Interrupt	V	volt
ns	nanosecond	Vdc	volts, direct current
NSRC	National Service Response Center	VESA	video electronics standards association
PAL	programmable array logic	VGA	Video Graphics Array
PC	personal computer	VRAM	virtual RAM
PCB	printed circuit board	W	watt
PFP	plastic flat package	W	write
PIO	parallel input/output		
pixel	picture element		
PLCC	plastic lead chip carrier		
PLL	phase lock loop		
p-p	peak-to-peak		
PPI	programmable peripheral interface		
PROM	programmable ROM		

Section 1

Technical Information

The PowerMate VP75 Series includes the PowerMate VP75D (desktop) and PowerMate VP75MT (minitower) systems in several configurations. The configurations include:

- desktop and minitower diskless systems (diskette drive, no hard disk)
- desktop and minitower hard disk systems (diskette drive, hard disk)
- desktop and minitower hard disk network systems (diskette drive, hard disk, network board)
- desktop and minitower multimedia systems (diskette drive, hard disk, CD-ROM reader, multimedia components).

All configurations use the Intel 75 MHz Pentium™ processor and are Energy Star compliant.

The information in this manual applies to all configurations, except where indicated. This section provides an overview of the PowerMate VP75 Series system hardware.

Overviews of the desktop and minitower system unit styles are described in the following subsections.

DESKTOP SYSTEM UNIT

The desktop chassis provides an enclosure for the system board, power supply, four storage device slots, a five-connector PCI/ISA backboard, and four expansion slots. The expansion slots include three ISA slots and one shared PCI/ISA slot. For network configurations, one slot has a network board installed and the three remaining slots are empty. For multimedia configurations, one slot has a sound board installed and the three remaining slots are empty. All other configurations ship with the slots empty.

The storage device slots can accommodate a 3 1/2-inch diskette drive, a 3 1/2-inch hard disk (1-inch height), and two accessible 5 1/4-inch storage devices (1.6-inch height). The non-multimedia hard disk systems ship with a 3 1/2-inch diskette drive and 3 1/2-inch hard disk drive, leaving two accessible 5 1/4-inch storage device slots available for optional devices. The multimedia systems ship with a 3 1/2-inch diskette drive, 3 1/2-inch hard disk drive, and a 5 1/4-inch CD-ROM reader, leaving one accessible 5 1/4-inch storage device slot available for an optional device.

Figure Section 1-1 shows front panel features of a typical desktop system. Multimedia systems come with a quad-speed CD-ROM reader installed in the upper accessible device slot.

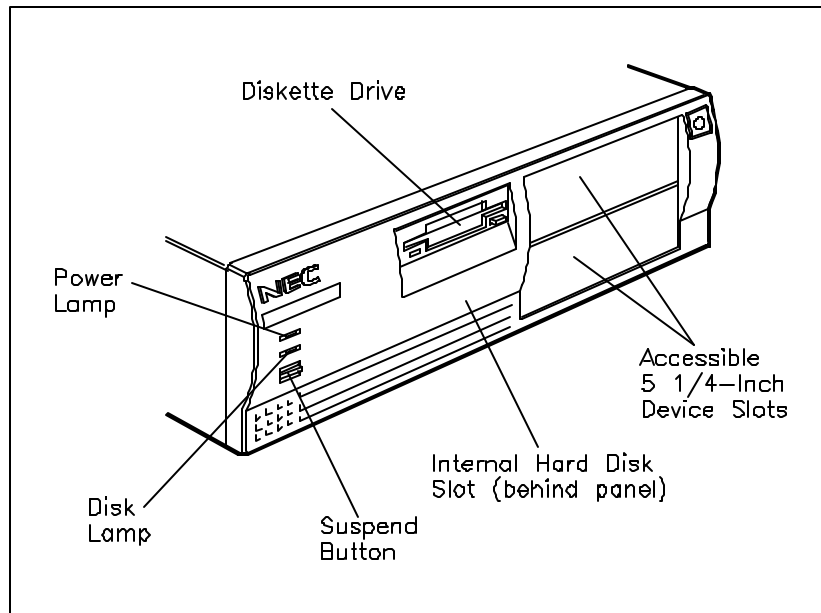


Figure Section 1-1 Desktop System Controls and Storage Slots

MINITOWER SYSTEM UNIT

The minitower chassis provides an enclosure for the system board, power supply, five storage device slots, a six-connector PCI/ISA backboard, and five expansion slots. The expansion slots include three ISA slots, one dedicated PCI slot, and one shared PCI/ISA slot. For network configurations, one slot has a network board installed and the four remaining slots are empty. For multimedia configurations, one slot has a sound board installed and the four remaining slots are empty. All other configurations ship with the slots empty.

The storage device slots can accommodate a 3 1/2-inch diskette drive, two 3 1/2-inch hard disks, and three accessible 5 1/4-inch storage devices (1.6-inch height). The non-multimedia hard disk systems ship with a 3 1/2-inch diskette and a 3 1/2-inch hard disk drive, leaving three accessible 5 1/4-inch storage device slots available for optional devices. The multimedia systems ship with a 3 1/2-inch diskette, a 3 1/2-inch hard disk drive, and a 5 1/4-inch CD-ROM reader, leaving two 5 1/4-inch storage device slots available for optional devices.

Figure Section 1-2 shows front panel features of a typical minitower system. Multimedia systems come with a quad-speed CD-ROM reader installed in the lower accessible device slot.

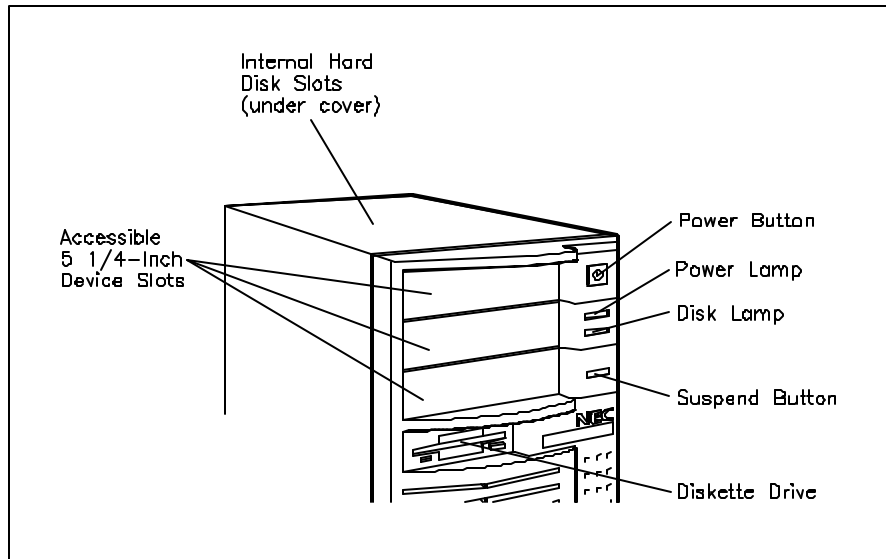


Figure Section 1-2 Minitower System Controls and Storage Slots

System Board

The system board is identical for all configurations. The system board contains a Flash ROM which is upgradeable through the BIOS Update utility (see Section 2).

Key features of the system board are as follows:

- Intel Pentium 75 MHz Pentium processor
 - 16 kilobyte (KB) internal dual write-back cache integrated on the processor
 - 256-KB write-back secondary cache memory
 - PCI local bus for fast data transfer
 - support for Intel processor upgrades
 - 8 megabytes (MB) of random access memory (RAM) (16 MB in the multimedia configurations)
 - accepts 32-bit or 36-bit, 70-nano second (ns) single-inline memory modules (SIMMs)
 - expandable to 128 MB
 - Peripheral Component Interconnect (PCI) graphics controller and 32-bit PCI bus
 - supports 640 x 480 resolution with up to 16.8 million colors, 800 x 600 with up to 16.8 million colors, 1024 x 768 with up to 64 K colors, and 1280 x 1024 with up to 256 colors
 - 1-MB (two 256K x 16) video dynamic RAM (DRAM), expandable to 2 MB
 - supports Display Data Channel (DDC) monitors.
 - two intelligent drive electronics (IDE) interface connectors
 - one fast IDE/PCI connector (primary interface) used by the hard disk drive to transfer data at the hard disk's optimum rate
 - one standard IDE connector (secondary interface) used for the CD-ROM reader
 - energy saving features: system switches to power save mode when idle for an established amount of time
 - 3 1/2-inch, 1.44-MB diskette drive
-

- PCI/ISA backboard configurations
 - desktop: three ISA expansion slots and one shared PCI/ISA slot
 - minitower: three ISA expansion slots, one dedicated PCI slot, and one shared PCI/ISA slot

- external connectors providing an interface for the following external devices:
 - VGA-compatible monitor
 - personal system/2 (PS/2[®])-style mouse
 - PS/2-style keyboard
 - Enhanced Parallel Port (ECP) and enhanced capabilities port (ECO) are supported for a parallel printer
 - two buffered serial ports
 - multimedia MIDI/joystick, speakers, microphone, and headphone connectors on the sound board (multimedia configurations only).

Table Section 1-1 lists the major chips on the system board. See Section 2, Setup and Operation, for a description of the system board's jumpers. See Appendix A, Connector Pin Assignments, for a list of the system board connectors.

Table Section 1-1 System Board Chips

Chip	Description
P54C (CPGA)	75-MHz Intel Pentium processor
28F001	128k x 8 Flash ROM
Intel Mercury PCI/ISA Chip Set	
8243LX	PCI cache and memory controller
82433LX	Local bus extension
82378ZB	System I/O bridge
Intel 82091AA	Super I/O controller
Dallas DS12887	Real-time clock
Cirrus Logic [®] CL-GD5430/34	PCI graphics controller

Processor

The PowerMate VP series of computers use the 75 MHz Pentium processor with an internal speed of 75 MHz and an external speed of 50 MHz. The processor has 16 KB of write-back internal cache, 8 KB for instructions and 8 KB for data. A math coprocessor is integrated in the processor.

The processor is an advanced 64-bit 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 complementary 256-KB burst-mode secondary cache.

The processor cache design uses 15-ns static random access memory (SRAM) that allows data to be sent or received from cache with one wait burst.

The processor is compatible with 8-, 16-, and 32-bit software written for the Intel386™, Intel486™, and Pentium processors.

To accommodate future technologies and work requirements, the Pentium processor comes in a 320-pin ZIF socket. The socket provides an upgrade path to the next generation processor.

Secondary Cache

The 16-KB primary cache is integrated in the processor. The system board contains 256 KB of secondary cache, external to the processor. Cache memory improves read performance by holding copies of code and data that are frequently requested from the system memory by the processor. Cache memory is not considered part of the expansion memory.

The cache is connected directly to the processor address bus and uses physical addresses. A bus feature known as burst enables fast cache fills. Memory areas (pages) can be designated as cacheable or non-cacheable by software. The cache can also be enabled and disabled by software.

The write strategy of the cache (primary and secondary) is write-through. If the write is a cache hit, an external bus cycle is generated and information is written to the cache. Any area of memory can be cached in the system. Non-cacheable portions of memory are defined by software. The cache can be cleared by software instructions.

Flash ROM

Machine language programs are stored in a 28F010 Flash ROM known as the system's ROM BIOS. The system BIOS and video BIOS are contained in the ROM. The Flash ROM is 128 KB. It consists of 64 KB of system BIOS and 32 KB of video BIOS.

The Flash ROM allows the BIOS to be upgraded with the BIOS Update utility without removing the ROM (see Section 2, Setup and Configuration). The BIOS can only be reprogrammed by powering on the system with the BIOS Update utility diskette in Drive A.

The BIOS programs execute the Power-On Self-Test, initialize processor controllers, and interact with the display, diskette drives, hard disks, communication devices, and peripherals. The system BIOS also contains the Setup program and provides VGA controller support. The hardware setup default copies the ROM BIOS into RAM (shadowing) for maximum performance.

System BIOS is located in the upper portion of the Flash ROM and video BIOS in the lower portion. System BIOS is located between F0000h-FFFFFh and supports shadowing and shadowed memory. System BIOS is write protected and automatically enabled.

Video BIOS is located between C0000h and C7FFFh. If the internal video is disabled, this range is mapped to ISA. The system memory map is shown in Table Section 1-2.

Table Section 1-2 System Memory Map

Memory Space	Size	Function
000000-07FFFF	512 KB	Conventional base memory
080000-09FBFF	128 KB	Extended conventional base memory
09FC00-09FFFF	1 KB	Extended BIOS Data
0A0000-0BFFFF	128 KB	On-board video memory
0C0000-0C7FFF	32 KB	On-board BIOS
0C8000-0E7FFF	128 KB	Available high DOS memory (open to ISA and PCI bus)
0E8000-0ECFFF	20 KB	Plug-n-Play ESCD data
0ED000-0EDFFF	4 KB	Reserved for logo
0EE000-0EFFFF	8 MB	Flash boot block (available for HIMEM)
0F0000-0FFFFFFF	64 KB	System BIOS
100000- On-Board	130 MB	Extended and/or Expanded system memory

Flash ROM supports the reprogramming of the system and built-in video BIOS. A jumper on the system board enables or disables the BIOS flashing feature. The factory default for the jumper is enabled, allowing the BIOS to be flashed. See Section 2, Setup and Operation, for jumper information. If the BIOS upgrade is interrupted, see Section 4, Maintenance and Troubleshooting, for information on recovering the BIOS if there is a catastrophic failure.

Power Management

Each system incorporates power management features that lower power consumption when there is no activity detected from the keyboard, mouse, diskette drive, CD-ROM reader, or hard disk drive after a pre-defined period of time. As soon as activity is detected the system resumes where it left off.

When Power Management is enabled, the computer automatically activates power-saving features and enters a suspend mode whenever inactivity is sensed. The computer's power-saving functions are as follows.

- Reduces the CPU clock speed

The CPU, cache, and video clock speeds are reduced, putting the computer in the suspend mode.

- Blanks out the monitor

Puts the video controller into suspend mode. The vertical sync clock and blank signals to the monitor are disabled.

- Forces the IDE devices into stand-by mode

- A suspend command is sent to the IDE devices which put the devices into a stand-by mode.

I/O Addressing

The processor communicates with I/O devices by I/O mapping. The hexadecimal (hex) addresses of I/O devices are listed in Table Section 1-3.

Table Section 1-3 I/O Address Map

Address (Hex)	I/O Device Name
0000-000F	DMA controller 1 (channel 0-3)
0200-0021	Interrupt controller 1
0400-0043	Timer 1
0408-004B	Timer 2
0060	Keyboard controller byte
0061	NMI, speaker controller byte
0070, bit 7	Enable NMI
0070, bit 6:0	Real-time clock address
0071	Real-time clock data

Table Section 1-3 I/O Address Map

Address (Hex)	I/O Device Name
0073	Reserved for system board configuration
0075	Reserved for system board configuration (read only)
0078	BIOS timer
0080-008F	DMA page master
00A0-00A1	Interrupt controller 2
00C0-00DE	DMA controller 2 (channel 4-7)
00F0	Reset numeric error
0170-0177	Secondary IDE channel
01F0-01F7	Primary IDE channel
0278-027B	Parallel port 2
02F8-02FF	Asynchronous communications port 2
0376	Secondary IDE channel command port
0377	Secondary IDE channel status port
0378-037F	Parallel port 1
03BC-03BF	Parallel port 2
03C0-03CF	Video Graphics Array (VGA) compare registers
03E8-03EF	Serial port 3
03F0-03F5	Diskette channel 1
03F6	Primary IDE channel command port
03F7 (write)	Diskette channel command port
03F7, bit 7	Diskette change channel 1
03F7, bits 6:0	Primary IDE channel status port
03F8-03FF	Asynchronous communications port 1
0CF8	PCI Configuration Space Enable
0CF9	Deturbo Mode Enable
C000-C0FF	8243LX configuration registers
C200-C2FF	823781B configuration registers
C300-C3FF	Cirrus Video configuration registers

System Memory

The system comes standard with 8 MB of memory (16 MB in multimedia configurations), 640 KB of base memory and 7 MB of extended memory. System memory can be expanded up to 128 MB, using optional single in-line memory modules (SIMMs) installed in SIMM sockets.

Four SIMM sockets are integrated on the system board. Non-multimedia systems ship with two 4-MB SIMMs installed in two sockets. Multimedia configurations ship with two 8-MB SIMMs installed in two sockets.

The SIMM memory sockets accept 4-, 8-, 16-, 32-, or 64-MB SIMMs, either 32-bit (no parity) or 36-bit (parity). The factory installed high-speed RAM is 32 bits wide. SIMMs are 1 MB x 32 bit (4 MB), 2 MB x 32 bit (8 MB), 4 MB x 32 bit (16 MB), 8 MB x 32 bit (32 MB), and 16 MB x 32 bit (64 MB). When the standard SIMM(s) is removed, four 32-MB SIMMs may be installed for a total of 128 MB.

CAUTION: SIMMs must match the tin metal plating used on the system board SIMM sockets. When adding SIMMs, use tin-plated SIMMs.

SIMMs install directly on the system board. Different size SIMMs may be intermixed. Each SIMM is inserted into a socket or bank. The system board's four SIMM sockets are assigned as banks 0 through 3. For non-multimedia configurations, the standard 8 MB of memory is installed in bank 0. The multimedia configurations have two 4 MB SIMMs installed in banks 0 and 1. See Section 3, Options, for installation instructions and SIMM memory configurations.

Interrupt Controller

The interrupt controller operates as an interrupt manager for the entire AT system environment. The controller accepts requests from peripherals, issues interrupt requests to the processor, resolves interrupt priorities, and provides vectors for the processor to determine which interrupt routine to execute. The interrupt controller has priority assignment modes that can be reconfigured at any time during system operations.

The interrupt levels are described in Table Section 1-4. Interrupt-level assignments 0 through 15 are in order of decreasing priority. See Section 2, Setup and Operation, for information on changing the interrupts using Setup.

Table Section 1-4 Interrupt Level Assignments

Interrupt Priority	Interrupt Device
IRQ00	Counter/Timer
IRQ01	Keyboard

Table Section 1-4 Interrupt Level Assignments

Interrupt Priority	Interrupt Device
IRQ02	Cascade (INT output from slave)
IRQ03	COM2*
IRQ04	COM1*
IRQ05	Parallel Port 2
IRQ06	Diskette Drive Controller*
IRQ07	Parallel Port 1*
IRQ08	Real-time clock
IRQ09	Available
IRQ10	Available
IRQ11	Available
IRQ12	PS/2 mouse*
IRQ13	Coprocessor
IRQ14	Primary IDE
IRQ15	Secondary IDE

*Industry standard locations

Video Controller

The Circus Logic CLDG5434 PCI graphics controller combines powerful elements aimed at addressing the requirements of personal computer designs. State of the art techniques have been added for optimizing performance in computer graphic intensive applications and graphical user interfaces (GUI). A variety of industry standard 32-bit local bus interfaces are integrated on chip. The key is that local bus interfaces are 32-bit wide.

Included in the video controller are cost saving features such as an integrated palette DAC and clock synthesizer along with integrated support for multiple bus interfaces and flexible DRAM-based display memory configurations.

The TrueColor RAMDAC provides 24-bit true color. The integrated dual clock synthesizer allows full programmability of MCLK (memory clock) and PCLK (pixel clock). The integrated clock synthesizer supports frequencies from 390 kHz to 120 MHz. The CLDG5434 supports up to 2 MB of display memory. The video memory is 256K x 16 DRAM.

The VESA display power management signaling (DPMS) standard is supported, enabling stand-by, suspend, and off power saving modes. This includes the ability to independently stop HSYNC or VSYNC and hold them at a static level. Additionally the RAMDAC may be powered-down and the clock frequencies lowered for further power savings. Color Key and video overlay are supported for optional multimedia applications.

Video Memory

The 1 MB of on-board video DRAM is expandable to 2 MB and provides 640 x 480 resolutions with up to 16.8 million colors, 800 x 600 with up to 16.8 million colors, 1024 x 768 with up to 64 K colors, and 1280 x 1024 with up to 256 colors. Table Section 1-5 lists the resolutions available with the installed video memory.

Table Section 1-5 Video Resolutions and Frequencies

Resolution	Memory Required	Color	Video Clock (Hz)	Horiz Sync (KHz)
640 x 480	1 MB	256	60	31.5
640 x 480	1 MB	256	72	37.0
640 x 480	1 MB	256	72	44.6
640 x 480	1 MB	65K	60	31.5
640 x 480	1 MB	65K	72	37.0
640 x 480	1 MB	65K	72	44.6
640 x 480	1 MB	16.7M	60	31.5
640 x 480	1 MB	16.7M	72	37.0
640 x 480	1 MB	16.7M	72	44.6
800 x 600	1 MB	256	95(i)	33.8
800 x 600	1 MB	256	56	35.2
800 x 600	1 MB	256	60	37.9
800 x 600	1 MB	256	70	44.5
800 x 600	1 MB	256	72	48.0
800 x 600	1 MB	256	76	52.4

Table Section 1-5 Video Resolutions and Frequencies

Resolution	Memory Required	Color	Video Clock (Hz)	Horiz Sync (KHz)
800 x 600	1 MB	65K	95(i)	33.8
800 x 600	1 MB	65K	56	35.2
800 x 600	1 MB	65K	70	44.5
800 x 600	1 MB	65K	72	48.0
800 x 600	2 MB	65K	76	52.4
800 x 600	2 MB	16.7M	95(i)	33.8
800 x 600	2 MB	16.7M	56	35.2
800 x 600	2 MB	16.7M	60	37.9
800 x 600	2 MB	16.7M	70	44.5
800 x 600	2 MB	16.7M	72	48.0
1024 x 768	1 MB	256	87(i)	35.5
1024 x 768	1 MB	256	60	48.4
1024 x 768	1 MB	256	66	53.9
1024 x 768	1 MB	256	70	56.1
1024 x 768	1 MB	256	72	57.9
1024 x 768	1 MB	256	76	61.4
1024 x 768	2 MB	65K	87(i)	35.5
1024 x 768	2 MB	65K	60	48.4
1024 x 768	2 MB	65K	66	53.9
1024 x 768	2 MB	65K	70	56.1
1024 x 768	2 MB	65K	72	57.9
1024 x 768	2 MB	65K	76	61.4
1280 x 1024	1 MB	16	87(i)	50
1280 x 1024	1 MB	16	95(i)	50
1280 x 1024	2 MB	256	87(i)	50
1280 x 1024	2 MB	256	95(i)	50
1280 x 1024	2 MB	256	60	64.0
1280 x 1024	2 MB	256	70	74.6
1280 x 1024	2 MB	256	74	81.1

(I) Interlaced.

IDE/PCI-Bus Backboard

The desktop IDE/PCI-bus backboard provides three ISA expansion slots and one shared IDE/PCI expansion slot. The backboard is plugged into the bus connector on the desktop system board. The minitower PCI/IDE bus backboard provides three ISA expansion slots, one dedicated PCI expansion slot, and one shared IDE/PCI expansion slot. The backboard is plugged into the bus connector on the minitower system board.

ISA Bus

The system board uses the ISA bus for transferring data between the processor and I/O peripherals and expansion boards. The ISA bus supports 16-bit data transfers and typically operates at 8 MHz. ISA expansion slot connector pin assignments are provided in Appendix A.

PCI Local Bus

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

The high-bandwidth PCI-bus eliminates the data bottleneck found in traditional systems, maintains maximum performance at high clock speeds, and provides a clear upgrade path to future technologies. PCI expansion slot connector pin assignments are provided in Appendix A.

PCI Auto Configuration

The system comes with a PCI auto configuration utility that operates in conjunction with the system's Setup utility. The utilities automatically configure interrupts, DMA channels, I/O space, and other parameters to allow addition of PCI boards with minimal intervention.

Parallel Interface

The system has a 25-pin parallel port on the system board. Specifications for this port conform to the IBM-PC standards.

The BIOS has automatic ISA printer port sensing. If the BIOS detects an ISA printer port mapped to the same address, the built-in printer port is disabled. The BIOS also sets the first parallel interface port it finds as LPT1 and the second port it finds as LPT2. The interrupt is selected to either IRQ5 or IRQ7 via the Setup and jumper settings.

Interrupt levels for the parallel port are given in Table Section 1-6. Software selectable base addresses are 3BCh, 378h, and 278h.

Parallel interface signals are output through the system board's 25-pin, D-subconnector. The connector is located at the rear of the system unit. Pin locations for the parallel interface connector are shown in Appendix A.

NOTE: Any interrupts used for the built-in parallel port are not available for ISA parallel ports.

Table Section 1-6 Parallel Port Addressing and Interrupts

Starting I/O Address	Interrupt Level	Port
378	IRQ05	LPT1
278	IRQ05	LPT1 or LPT2
3BC	IRQ05	LPT1 or LPT2
378*	IRQ07	LPT1
278	IRQ07	LPT1 or LPT2
3BC	IRQ07	LPT1 or LPT2

*Default for parallel port

Serial Interface

The system has two standard serial ports (COM1 and COM2). The serial ports support the standard RS-232C interface (16550 compatible). I/O addresses and interrupt levels for the two channels are given in Table Section 1-7. The interrupt is selectable via Setup to either IRQ3 or IRQ4. Software selectable base addresses are 3F8h, 2F8h, 3E8h, and 2E8h. Serial interface signals are output through the system board's 9-pin, D-subconnector. The connectors are located at the rear of the system unit. Pin locations for the serial interface connector are shown in Appendix A.

NOTE: Any interrupts used for the built-in serial ports are not available for ISA parallel ports.

Table Section 1-7 Serial Port Addressing and Interrupts

Starting I/O Address	Interrupt Level	Port
3F8*	IRQ04	COM1
2F8*	IRQ03	COM2
3E8	IRQ04	COM3
2E8	IRQ03	COM4

*Default for serial port

Serial interface specifications include:

- Baud rate up to 19.2 KB per second
- Word length - 5, 6, 7, or 8 bits
- Stop bit - 1, 1.5, or 2 bits
- Start bit - 1 bit
- Parity bit - 1 bit (odd parity or even parity).

Indicator Panel

The indicator panel is attached to the front panel and contains the power lamp, hard disk drive busy lamp, and suspend button. The indicator panel electrically attaches to the system board through connector J11 (suspend connector), J14 (hard disk drive busy lamp connector), and J16 (power lamp connector).

POWER SUPPLY

The power supply is mounted inside the system unit. It supplies power to the system board, option boards, diskette drives, hard disks, keyboard, and mouse. The power supply is connected to the system board through connector J6. A fan inside the power supply provides proper ventilation for the system. The power supply in the desktop supplies 145W of power. The minitower power supply provides 200W. Power requirements and specifications for both power supplies are provided in Appendix C.

DISKETTE DRIVE

Up to two diskette drives are supported in the system. The installed drive is connected by a single ribbon cable with one drive connector. An optional cable with two drive connectors allows the connection of two drives. The system refers to the diskette drives as A and B. Drive A is for the first drive, B is for a second optional diskette drive. The diskette drive cable plugs directly into the system board (connector J5). Typically both diskette drives are terminated. See Section 3, Options, for installing an optional 5 1/4-inch diskette drive.

Specifications for the diskette drives are provided in Appendix B, Specifications.

HARD DISK DRIVE

The system provides IDE/PCI interface connectors on the system board. The system board supports up to two IDE devices on the primary connector and two IDE devices on the secondary connector. The system unit provides one storage slot for a 3 1/2-inch hard disk (1-inch height), and one available storage slot for an optional 5 1/4-inch device (1.6-inch height). See Section 3, Options, for installing an optional hard disk drive.

Specifications for the diskette drives are provided in Appendix B, Specifications.

NETWORK BOARD

Some systems are configured with a network board. The network board provides three jacks for connecting the system to the local network. The network board is a 3COM, 16-bit, Etherlink™ network interface board. Features are as follows:

- Hardware Plug and Play is supported
- Hardware configuration is software selectable (no jumpers or switches to set)
- AutoLink™ auto installation software which installs all Novell® Netware® DOS ODI client software into the operating system.
- Auto select media type capability, which enables certain drivers to automatically detect the type of media connector that connects the network board to the network
- Network management support through Transcend™ Etherlink SmartAgent™ software, which is auto-installed with the drivers.

The network interface board has connectors for thin, thick, or twisted-pair Ethernet connections. A network user's guide and drivers are shipped with network configured systems.

MULTIMEDIA COMPONENTS

Systems configured for multimedia come with a quad-speed CD-ROM reader, sound board, a pair of speakers, and microphone. The following subsections briefly describe each. Information on attaching the speakers and microphone is in Section 2, Setup and Operation.

Quad-Speed CD-ROM

The IDE quad-speed CD-ROM reader is pre-installed as drive E on multimedia configurations. Operation of the reader is described in Section 2, Setup and Configuration. The CD-ROM reader can be used to load programs from a CD or it can be used to play audio CDs. The CD-ROM reader is connected to the secondary IDE/PCI port on the system board.

Sound Board

The sound board is a Creative Labs Sound Blaster™ Audio Card. The sound board is installed in the ISA/PCI backboard. System settings for the sound board can be found in a sound board directory on the computer's hard disk drive. For information on changing the sound board settings, see Appendix D in this manual and the *Creative Labs Multimedia Audio Card User's Guide* that comes with the computer.

The sound board uses 16-bit DMA data transfer and has software addressable IRQs and DMAs for versatility. External connectors accept speakers or headphones, a microphone, stereo input, and a musical instrument digital interface (MIDI) or joystick attachment. The speaker jack offers a four-watt (RMS)/channel amplifier. The joystick port allows a full duplex MIDI.

The advanced frequency modulation (FM) stereo synthesizers use a 16-bit digital-to-analog-converter (DAC) with four operator FM sounds and twenty stereo voices. The sound board provides digital sampling up to 44 kHz and playback with dynamic filtering from 2 to 44 kHz. The sound board is fully compatible with the ADLib™ software library.

Connectors for the board are shown in Section 2, Setup and Operation. See Appendix A for connector pin assignments.

Speakers

The multimedia systems come with a pair of high-quality speakers, AC adapter, and connecting wires. The speaker set features a volume control, treble boost, bass boost, and a power-on button. The speakers connect to the speaker jacks on the back of the system unit. Speaker features are as follows.

- 3-inch magnetically shielded full-range speakers for monitor, drive, and disc protection
 - Bass (DXBB) boost switch
-

- Treble boost switch
- Built-in power booster
- Power source: 6 volt (V) AC power adapter or four “C” batteries (not included)
- Speaker impedance: 8 ohms
- Power output: 3.6 watts
- Frequency response: 60 – 15000 Hz
- 3.5 mm stereo plug

Microphone

The microphone that comes with the multimedia systems record voice and sound into computer data files. The microphone jack is located on the back of the system.

KEYBOARD

The PS/2-style keyboard is standard equipment for the system. The keyboard provides a numeric keypad, separate cursor control keys, and 12 function keys, capable of up to 48 functions. Status lamps on the keyboard indicate: Num (Numeric) Lock, Caps (Capital) Lock, and Scroll Lock key status. The keyboard's six-pin connector is plugged into the rear of the base unit. The PS/2-style keyboard connector pin assignments are given in Appendix A, Connector Pin Assignments.

MOUSE

A PS/2-compatible mouse is standard equipment for the system. The mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism. Periodically the mouse ball must be cleaned. See Section 4, Maintenance and Troubleshooting, for information on cleaning the mouse.

POWER MANAGEMENT

Each computer system is Energy Star compliant and incorporates power management features that lowers power consumption when there is no activity detected from the keyboard, mouse, diskette drive, or hard disk drive after a predefined period of time. As soon as activity is detected, the system resumes where it left off. To enable Power Management, see Section 2, Setup.

If the computer is put into suspend mode by pressing the suspend button, the suspend button must be pressed again to exit the suspend mode. System activity will not resume from suspend mode.

When Power Management is enabled, the computer automatically activates power-saving features and enters a suspend mode whenever inactivity is sensed. The computer's power-saving functions shuts down all installed devices, video signals to the monitor, and processor.

PLUG AND PLAY

The system comes with Plug and Play system support installed, and requires only the Plug and Play operating system. When the Plug and Play operating system is installed, the system will automatically configure newly added Plug and Play boards.

Plug and Play boards are ISA boards with the new configuration capability. Most currently available ISA boards do not have the new capability. However, Plug and Play boards can be added to the system.

To work in a system, boards often use a variety of dedicated resources. If two boards try to use the same resource, one board might not work or the system might not function in the way you expect.

NOTE: Generally, a resource can be used by only one board or device. However, some boards can share the same DMA or IRQ resources. The board manufacturer's documentation tells you whether a board supports shared resources.

If an ISA board does not support shared resources and a Plug and Play board is not aware that the ISA board is using the same resource it has selected, an ISA Configuration Utility (ICU) is needed. The ICU is used to eliminate the guess work from the configuration procedure. Although most Plug and Play boards come with an ICU, an ICU can be obtained from the NEC Bulletin Board Service (see Section 4, Troubleshooting and Maintenance).

Plug and Play boards are dynamic in nature — the system allocates resources to these boards upon system boot. Some device drivers support this dynamic board configuration, but some do not.

Device drivers that do not support the dynamic board configuration are also known as static device drivers. If you are using a static device driver, you need to permanently associate resources with a Plug and Play board, instead of relying on the default Plug and Play behavior. Otherwise, the device driver might not be able to find the board the next time the system boots.

DESKTOP MANAGEMENT INTERFACE

The Desktop Management Interface (DMI) is a new standard for managing computer systems. DMI is an interface between management applications and managed components such as systems, network boards, and printers used with or without networked computers.

DMI allows a computer running a network management application to retrieve system tracking information such as memory capacity, disk capacity, expansion board settings, or applications. It is easy to get the status of each system via DMI even if the network consists of computers from different manufacturers. DMI also supplies Plug and Play capability. DMI is not a protocol but an interface. It complements network protocols like the Simple Network Management Protocol (SNMP).

The DMI provides support for attributes such as system serial number, product model number, and BIOS revision number.

DMI Components

The DMI consists of two major functional components, the Component Interface (CI) module and the Windows Management Information Format (MIF) Browser. The CI module provides the instrumentation and interface between the BIOS, NEC Services, and the DMI Service Layer. The MIF Browser displays and manages existing attributes in the MIF database.

Manageable Products

Manageable products are hardware, software, or peripherals that occupy or are attached to a desktop computer or network server. These can be hard disks, word processors, CD-ROMs, printers, operating systems, graphics boards, modems, etc. Manageable products or components can come with the system or be added later. Each component supplies information to the MIF database by means of a MIF file that contains the product's pertinent management information.

CI Module

The CI module is a Windows Direct Interface application provided by NEC Technologies. The module uses the CI to communicate with the SL and provides management for a set of components defined in the PC system group standard MIF. The NEC implementation of this MIF provides management for a variety of attributes. Windows starts the CI module which must be running in the background. The module is added to the Windows StartUp program group during DMI setup.

MIF Browser

The MIF Browser is a Windows application provided by NEC Technologies. The Browser uses the MI to provide access to MIF attributes and their respective values and to provide the ability to set attributes and manage DMI components.

The Browser is a local application; it only accesses the local MIF database. The Browser lets you access MIF attributes according to the structure defined by the DMTF. It is not intended to be a general PC management application. If a more comprehensive management application is desired, use a product such as Intel's LanDesk Manager.

The MIF Browser has a graphical user interface. It displays components in a hierarchical tree structure. Use it to install or remove MIF files to and from the database.

NOTE: The user is not expected to install or remove MIF components.

By pointing and clicking, components can be expanded and collapsed. To obtain specific attributes, simply double click on an attribute and retrieve the associated value.

The toolbar can also be used to manipulate or obtain information on the MIF file.

The buttons are defined as follows (starting at the left):

- Install — to install a new MIF file. Use to add a component, such as a printer that supports DMI, to the MIF database.
- Remove — to remove a MIF file. Use to remove a component from the MIF database. Only remove the system component when it needs to be replaced.
- Expand — to expand a component.
- Collapse — to collapse a component.
- View Component Detail —to review the selected component's details.
- View Group Detail — to review the selected group's details.
- View Attribute Detail — to review the selected attribute's details.

Upon exiting the Browser, the program saves the current viewing configuration. The next time you use the Browser, it restores all the viewing screens to the last known position.

Usage

To start the Browser, double click on the MIF Browser icon in the NEC DMI Interface group. The Browser is easy to use. For example, to obtain the serial number, first position the cursor over the NEC system component and double click to expand it. Position the cursor over the Component ID group and double click to expand it. Position the cursor over the Serial Number attribute and click once; the serial number is given in the value field.

Troubleshooting

If trouble is experienced in using the MIF Browser, here are a few suggestions on how to clear up the problem.

If the product name, serial number, system boot time, or other NEC attribute returns a not available value, check the following:

- Look at the autoexec.bat file to see if the line DIR%\WIN16\BIN\NECDML.EXE is present.
 - Make sure the file NECDML.DAT is located in the \WIN16\BIN subdirectory.
 - Check that NECCI.EXE is running.
-

Section 2

Setup and Operation

This section provides information on hardware setup for the PowerMate VP series computers. Setup includes unpacking, cabling, and powering up the system. It also includes configuring the system with the system setup programs. Section 3 provides information for installing options.

UNPACKING AND REPACKING

Find an area away from devices that generate magnetic fields (electric motors, transformers, etc.). Place the carton on a sturdy surface, and carefully unpack the system. The carton contents for non-multimedia configurations include the system unit, keyboard, mouse, power cord, user documentation, and system recovery diskette. The carton contents for multimedia configurations include the system unit with a quad-speed CD-ROM player, keyboard, mouse, speakers, power cord, user documentation, CD-ROM disc with hotload backup, and system recovery diskette.

Repack the system using the original shipping carton and packing material. Part numbers for replacement shipping cartons and packing material are included in Section 5 and Section 6.

SETUP

Connect the system components according to the following two subsections.

- Desktop Configuration – for setting up desktop system units.
- Minitower Configuration – for setting up minitower system units.



Desktop Setup

Set up the desktop systems by making the following connections. (See the following subsection, Minitower Setup, if setting up a minitower system).

1. At the rear of the system, set the voltage selector switch to 115V or 230V and plug the power cord into the system power socket (see Figure Section 2-1).

CAUTION: The correct AC input voltage must be properly set. Select the appropriate voltage with the voltage selector switch located at the rear of the system.

Figure Section 2-1 Desktop Voltage Selector Switch

2. Connect the keyboard and mouse cables to the back of the system unit (see Figure Section 2-2).
3. Connect the monitor and any other peripheral cables to the rear panel (see Figure Section 2-2).

Figure Section 2-2 Desktop Peripherals Connections

4. Connect the network cables (network configurations only) to the rear panel (see Figure Section 2-3).

Figure Section 2-3 Desktop Network Board Connections

5. If installing a multimedia system, connect multimedia components to the sound board as shown in Figure Section 2-4.

Figure Section 2-4 Desktop Multimedia Connections

6. Press the power button to power-on the system. The power lamp lights.
7. Press the suspend button (see Figure Section 2-5) to place the unit in the power management mode.

Figure Section 2-5 Desktop Power Button, Lamps, and Suspend Button

The system has a built-in checking program that automatically tests the components at power-on. One beep indicates that the system has successfully completed its power-on test.

If there is a problem, a series of beeps may occur. If this happens repeatedly after powering on the system, power off the system and see Section 4 for troubleshooting.

NOTE: If the system displays a message indicating that system settings have changed, run Setup (see “System Configuration” later in this section).

If a problem occurs, and is not indicated by beeps, check the following items, then turn to Section 4 for troubleshooting. Check that:

- the power switch for the system unit and monitor are on.
 - all cables and power cords are tightly connected.
 - the electrical outlet is working.
 - the monitor’s brightness and contrast are adjusted properly.
-

- all options are properly installed (see Section 3 for option installation).

Minitower Setup

Set up the minitower systems by making the following connections. (See the preceding subsection, Desktop Setup, if setting up a desktop computer.)

1. At the rear of the system, set the voltage selector switch to 115V or 230V and plug the power cord into the power socket (see Figure Section 2-6).

CAUTION: The correct AC input voltage must be properly set. Select the appropriate voltage with the voltage selector switch located at the rear of the system.

Figure Section 2-6 Minitower Voltage Selector Switch

2. Connect the keyboard and mouse cables to the back of the system unit (see Figure Section 2-7).
3. Connect the monitor and any other peripheral cables to the rear panel (see Figure Section 2-7).

Figure Section 2-7 Minitower Peripherals Connections

4. Connect the network cables (network configurations only) to the rear panel (see Figure Section 2-9).

Figure Section 2-8 Minitower Network Board Connections

5. If installing a multimedia system, connect multimedia components to the sound board (Figure Section 2-9).

Figure Section 2-9 Minitower Sound/Fax/Modem Board Connectors

6. Press the power button to power-on the system (see Figure Section 2-10). The power lamp lights.
7. Press the suspend button to place the unit in the power management mode.

Figure Section 2-10 Minitower Power Button, Indicators, and Suspend Button

The system has a built-in checking program that automatically tests the components at power-on. One beep indicates that the system has successfully completed its power-on test.

If there is a problem, a series of beeps may occur. If this happens repeatedly after powering on the system, power off the system and see Section 4 for troubleshooting.

NOTE: If the system displays a message indicating that system settings have changed, run Setup (see “System Configuration” later in this section).

If a problem occurs, and is not indicated by beeps, check the following items, then turn to Section 4 for troubleshooting. Check that:

- the power switch for the system unit and monitor are on.
 - all cables and power cords are tightly connected.
 - the electrical outlet is working.
 - the monitor’s brightness and contrast are adjusted properly.
 - all options are properly installed (see Section 3 for option installation).
-

CD-ROM READER

A quad-speed CD-ROM reader (see Figure Section 2-11) comes pre-installed as drive E in the multimedia configurations. The reader is set as a master device, and is connected to the secondary IDE/PCI port on the system board.

Use the CD-ROM reader to load and start programs from a CD. The CD-ROM reader can also be used to play audio CDs. The CD-ROM reader has the following controls and indicators:

- jack for connecting headphones with a stereo mini-jack plug
- volume control for adjusting the headphone volume
- busy lamp that lights during read operations
- eject/reject button for opening or closing the CD tray when the power is on
- CD tray that opens and closes when the eject/retract button is pressed
- emergency eject hole in the front panel for manually opening the CD tray if power is lost. Insert a jewelers screwdriver into the hole. Turn the screw counterclockwise to open the tray and clockwise to close the tray.

Figure Section 2-11 CD-ROM Reader Controls and Indicators

To load a disc in the quad-speed CD-ROM reader, follow these steps.

1. Press the stop/eject button. The CD tray opens.
 2. Put the CD, printed side up, into the tray.
 3. Press the stop/eject button. The tray closes.
 4. To remove the disc, press the stop/eject button. The tray opens, allowing removal of the disc.
-

EXTERNAL MULTIMEDIA CONNECTIONS

This subsection explains how to connect multimedia components to the system's multimedia connectors (multimedia configurations only). The connectors are located on the sound board at the rear of the system and on the CD-ROM reader at the front of the system.

The sound board has a 15-pin connector and three jacks that attach multimedia components to the back of the system.

The external connectors for the sound board are on the rear of the system unit. Figure Section 2-4 shows the desktop sound board connectors. Figure Section 2-9 shows the minitower connectors. Each connector is briefly described below.

- A line in jack allows connecting such devices as a cassette, DAT, or Minidisc player for playback or recording.
- A microphone in jack allows connecting a microphone for voice input.
- A line out jack allows bypassing of the sound board's internal amplifier so that the speakers included with the system, powered speakers, or an external amplifier can be connected.
- A speaker jack allows connection of unamplified speakers for audio output from the sound board's built-in power amplifier. Maximum output power is four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers.
- A MIDI/Joystick connector allows connection of a MIDI synthesizer kit or a joystick with a 15-pin D-subconnector.

Connecting the Speakers

The speakers operate once they are connected to the sound board. To use the built-in amplifier for treble and bass control and additional volume, install the AC adapter. Connect the speakers to the system unit as follows.

1. Open the covers at the rear of the speakers. Pull out the speaker cables.

CAUTION: Do not install batteries in the speakers if using the AC adapter.

2. Connect the left speaker cable (with the dual plug) to the right speaker connector labeled TO LEFT SPEAKER (see Figure Section 2-12).
3. Connect the right speaker cable (with the single plug) to the SPK OUT jack on the sound board at the rear of the system unit.

Figure Section 2-12 Ready 9520 Speaker Connections

Connect the 6-volt AC adapter as follows.

1. Remove any installed batteries from the speakers.
 2. Plug the AC adapter into the DC 6V jack on the back of the left speaker (see Figure Section 2-12).
 3. Plug the other end of the AC adapter into a properly grounded wall outlet.
-

SYSTEM CONFIGURATION

This section describes the Setup utility program that allows the system configuration information to be viewed and changed.

NOTE: The system ships from the factory with the correct system parameters for the configuration. Unless setting the time and date, customizing the system, or adding optional hardware, Setup does not need to be run.

System configuration information is stored in nonvolatile memory. Nonvolatile memory in the system is a complementary metal-oxide semiconductor (CMOS) chip backed by a real time clock (RTC)/battery module on the system board. The module supplies continuous power to the CMOS memory and maintains configuration information when system power is off.

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

- set the time and date.
 - update or check system 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 a prompt appears 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 system operating parameters, such as boot device sequence or keyboard parameters.
 - configure system connections for peripherals such as the diskette drive, hard drives, and devices connected to the printer 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 if the system board requires replacing.
-

How to Start Setup

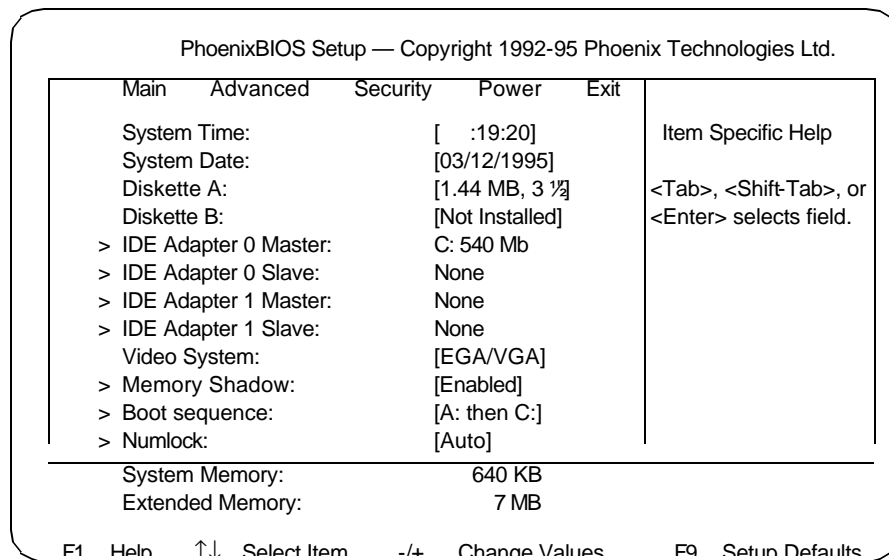
To start the Setup utility, follow these steps:

1. Turn on or reboot the system. Setup displays the following message:

Press <F2> to enter SETUP

2. Press **F2**. Setup's Main Menu window appears similar to the following screen.

NOTE: The screen shown is typical of the system. The actual items on the Main Menu depend upon the hardware installed in the system.



How to Use Setup

The Setup utility has a Main Menu window and five top-level menus with submenus. The Main Menu window contains the following areas:

- A title line — the top line of the Main Menu. This line displays the Setup utility name and copyright message.
- The menu bar — the line under the Setup title line. The menu bar contains five top-level menus for setting system parameters.
- A Main Menu summary window — the center area on the left side of the screen. This area provides a summary of Main Menu Setup parameters. Main Menu parameters can be set directly from this window or from the Main menu option in the legend bar.

- The Field Help window or Item Specific Help — the area on the right side of the screen. This help area provides help information for the Setup option currently selected.
- The legend bar — the area at the bottom of the screen. The legend bar provides a summary of command keys for using Setup.
- The General Help window — a window that appears any time during Setup after pressing **F1** or **Alt H**. This help window provides two pages of general information about using Setup.

The following subsections describe how to use the Main Menu window to set system parameters.

Menu Bar

The menu bar at the top of the Main Menu window lists these menus:

- Main — Use this menu for basic system configuration. For example, select “Main” to set the system time, system date, diskette drives, and video parameters. Use this menu to check memory parameters.
- Advanced — Use this menu to set serial port and printer port addresses and interrupts, and to enable/disable the system’s diskette drive controller and dual-IDE controllers.

The Advanced menu also provides menu items for setting parity and for setting parameters for large disks (for example, to use large disks with Windows NT™).

Some of the Advanced features are accessible only with a Supervisor password.

- Security — Use this menu to set User and Supervisor Passwords and the Backup and Virus-check reminders.
- Power — Use this menu to configure Power Management features.
- Exit — Exits the current menu.

To select an option from the menu bar, use the left and right → Ⓜ arrow keys.

See “Exiting Setup” in this section for a description on exiting the Main Menu.

Legend Bar

Use the keys listed in the legend bar on the bottom of the Setup menu to make the selections or exit the current menu. Table Section 2-1 describes the legend keys and their alternates.

Table Section 2-1 Setup Key Functions

Key	Function
F1 or Alt-H	Displays General Help window (described later in this section).
Esc	Exits the menu.
← or → arrow keys	Selects a different menu.
↑ or ↓ arrow keys	Moves cursor up and down.
Tab or Shift-Tab	Cycles cursor up and down.
Home or End	Moves cursor to top or bottom of window.
Page Up or Page Down	Moves cursor to next or previous page.
F5 or -	Selects the Previous Value for the field.
F6 or + or Space	Selects the Next Value for the field.
F9	Loads the Default Configuration values for this menu.
F10	Loads the Previous Configuration values for this menu.
Enter	Executes a command or selects submenu.
Alt-R	Refreshes screen.

- **Selecting a Menu Item**

To select a menu item, use the arrow keys to move the cursor to the desired field. Then use the value keys (F5, -, F6, +, or space bar) to cycle through the value for that field. The Save Values command in the Exit Menu saves the values currently displayed in all the menus.

- **Displaying a Submenu**

To display a submenu, use the arrow keys to move the cursor to the desired submenu. Press **Enter**. A pointer (a right-pointing triangle) marks all selectable submenus.

Field Help Window

The Field Help window or Item Specific Help window on the right side of each menu displays the help text for the currently selected Setup option. It updates as the cursor is moved to each new field.

General Help Window

Pressing **F1** or **Alt H** on any menu brings up the General Help window that describes the legend keys and their alternates.

The scroll bar on the right of any window indicates that there is more than one page of information in the window. Use **Page Up** and **Page Down** to display all the pages. Pressing **Home** and **End** displays the first and last page.

Press **Esc** to exit the current window.

Main Menu Options

Table Section 2-2 lists and describes the available parameters when the Main Menu is selected in the legend bar. Other Main Menu parameters are available by selecting submenus.

Parameters available directly from the Main Menu summary window have a right-pointing triangle next to the parameter. Use the arrow keys to move the cursor to parameter and press **Enter** to select a submenu.

See the sections following Table Section 2-2 for a description of Main Menu parameters from the summary window.

Table Section 2-2 Legend Bar Main Menu Parameters

Parameter	Options	Description
System Time	HH:MM:SS	Sets the system time.
System Date	MM/DD/YYYY	Sets the system date.
Diskette A: Diskette B:	360KB, 5 1/4" 1.2MB, 5 1/4" 720KB, 3 1/2" 1.44MB, 3 1/2" 2.88MB, 3 1/2" Not Installed	Selects the type of diskette drive in the system.
IDE Adapter	User (default)	Described in the following subsections.
Video System	Monochrome EGA/VGA, (default) CGA 80x25	Selects the default video device.
Memory Options	Enabled (default)	Described in the following subsections.
Boot Sequence	A: then C: (default)	Described in the following subsections.
NumLock	Auto (default)	Described in the following subsections.
System Memory	Automatically detected by the system	Displays the amount of conventional memory detected at power-on.
Extended Memory	Automatically detected by the system	Displays the amount of extended memory detected at power-on.

Table Section 2-2 Legend Bar Main Menu Parameters

Parameter	Options	Description
	by the system	at power-on.

IDE Adapters

IDE adapters control the IDE devices, such as IDE hard disk drives and IDE CD-ROM readers, in the system. The system uses two IDE controllers integrated on the system board.

Setup supports up to four IDE devices, with an IDE adapter for each of the following configurations:

- 1 Master
- 1 Master, 1 Slave
- 2 Masters
- 2 Masters, 1 Slave
- 2 Masters, 2 Slaves

The factory installed master/slave combination for configurations with an IDE hard disk connected to the primary IDE/PCI port is “1 Master.” If a second hard disk is added to the primary IDE/PCI port, the combination becomes “1 Master, 1 Slave.” Jumper settings on the IDE device set the device to master or slave (see the documentation that comes with the device).

The factory installed master/slave combination for multimedia configurations with an IDE hard disk and a CD-ROM reader is “2 Masters.” The hard disk is connected to the primary IDE/PCI port and the CD-ROM reader is connected to the secondary IDE/PCI port as a master. If an IDE hard disk is added to the primary IDE/PCI port, the combination becomes “2 Masters, 1 Slave.”

NOTE: If the CD-ROM reader settings in the multimedia configurations are changed, the CONFIG.SYS and AUTOEXEC.BAT require changing.

Select the IDE Adapter option configuration directly from the Main Menu summary window. Available options include:

- IDE Adapter 0 Master
- IDE Adapter 0 Slave
- IDE Adapter 1 Master
- IDE Adapter 1 Slave.

IDE Adapter 0 configures the primary IDE/PCI port (primary channel), IDE Adapter 1 configures the secondary IDE port.

Each IDE Adapter parameter has a right-pointing arrow to the left of it. Selecting the option displays IDE hard disk parameters. Select an IDE Adapter option and set parameters for each hard disk separately.

Use Table Section 2-3 to configure the hard disk. If the IDE hard disk features auto IDE type detection, select the Autotype Fixed Disk parameter. The system then automatically detects the hard disk type and sets the remaining parameters.

CAUTION: Use Table Section 2-3 only when the system can not auto detect any installed optional drive. An incorrect setting can cause the system to malfunction and not be able to read the drive.

Table Section 2-3 IDE Hard Disk Parameters

Parameter	Options	Description
Type	1 to 39 User Auto	Selecting 1 to 39 fills in all remaining fields with values for predefined disk type. "User" prompts user to fill in remaining fields. When Auto is selected, the BIOS will automatically set the drive type.
Cylinders	1 to 65534	Specifies number of cylinders.
Heads	1 to 16	Specifies number of read/write heads.
Sectors/Track	1 to 63	Specifies number of sectors per track.
Write Precomp*	0 to 65534 None	Specifies number of the cylinder at which to change the write timing.
Multi-Sector Transfers	2, 4, 8, 16 Sectors disabled	Specifies number of sectors in multisector transfers.
LBA Mode Control	Enabled (default) Disabled	Sets OBA mode Control on or off.
32-Bit I/O	Enabled (default) Disabled	Sets 32 bit I/O to on or off.
Transfer Mode	Standard Fast PIO1 Fast PIO2 Fast PIO3	Specifies the transfer mode for moving data to and from the hard drive. Standard is the slowest mode but the most compatible. Fast PIO (programmed input/output) is the slowest of the three enhanced modes. Fast PIO3 is the fastest of the enhanced modes.

Memory Shadow

For memory shadowing parameters, select “Memory Shadow” directly from the Main Menu summary window. See Table Section 2-4 for a description of Memory Shadow parameters.

CAUTION: Incorrect settings can cause the system to malfunction.

Table Section 2-4 Memory Shadow Parameters

Parameter	Options	Description
System shadow	Not user-selectable	Always enabled. Shadows video BIOS and improves performance.
Video shadow	Not user-selectable	Always enabled. Shadows video BIOS and improves performance.
Shadow Memory Regions	Enabled Disabled	Default is disabled. Shadows optional ROM located in specified segments of memory and can improve performance. CAUTION: Some add-in boards, particularly with on-board firmware, do not work properly when shadowed.

Boot Sequence

The system might require a Supervisor password to set Boot Sequence parameters. Select “Boot Sequence” directly from the Main Menu summary window to display the “Boot Options” menu.

Use the legend keys to make the selections and exit to the Main Menu. Use Table Section 2-5 to select the boot options.

Table Section 2-5 Boot Parameters

Parameters	Options	Description
Boot sequence	A: then C: (default) C: then A: C: only	The BIOS attempts to load the operating system from the disk drives in the sequence selected here. “C: only” (under Supervisor password control) provides virus protection.
Setup prompt	Enabled (default) Disabled	Displays “Press<F2> for Setup” during bootup.
POST errors	Enabled (default) Disabled	At boot error, pauses and displays “Press <F1> to resume, <F2> for Setup”.

Table Section 2-5 Boot Parameters

Parameters	Options	Description
Floppy check	Enabled (default) Disabled	Seeks diskette drives during bootup. Disabling speeds boot time.
Summary screen	Enabled (default) Disabled	Describes system configuration at the end of bootup.

Last Boot Fail	3 (default) User selectable settings Disabled	<p>Sets number of times the system can attempt to boot the system. If the system fails to boot on the set number of tries, the "Previous Boot Incomplete" message appears and the system boots with default settings.</p> <p>The default setting, 3, allows three tries to boot the system. On the fourth try, the "Previous Boot Incomplete " message appears.</p>
----------------	---	---

Numlock

Select "Numlock" directly from the Main Menu summary window to display the Keyboard Features menu.

Use the legend keys to make the selections and exit to the Main Menu. Use Table Section 2-6 to configure the keyboard parameters. Select "NumLock" directly from the Main Menu summary window to display the Keyboard Features menu.

Table Section 2-6 Numlock Parameters

Parameters	Options	Description
Numlock	Auto (default) On Off	On or Off turns NumLock on or off at bootup. Auto turns NumLock on if it finds a numeric key pad.
Keyboard auto-repeat rate	Fast (default) Medium Slow	Sets the delay time after the key is held down and before it begins to repeat the keystroke.
Keyboard auto-repeat delay	1/4 sec 1/2 sec (default) 3/4 sec 1 sec	Sets the delay time after the key is held down and before it begins to repeat the keystroke.
Key Click	Enabled Disabled (default)	Turns audible key click on or off.

Advanced Menu

Accessing the Advanced menu might require a Supervisor password. Selecting “Advanced” from the menu bar on the Main Menu displays a menu with the following options:

- Integrated Peripherals
- Parity
- Large Disk Access Mode.

The following sections describe Advanced menu options.

CAUTION: Setting items in this menu to incorrect values can cause the system to malfunction.

Integrated Peripherals Menu

Select “Integrated Peripherals” menu on the Advanced Menu to configure the connections between the system processor and the I/O ports (serial port 1, serial port 2, and the printer port), the diskette drives, and hard disk controllers.

CAUTION: If the system conditions require changing COM1, COM2, and LPT port settings, be sure that these settings match the corresponding system board jumper settings (see Section 2).

NOTE: A Supervisor password might be required to select parameters from the Integrated Peripherals menu.

Use the legend keys to make the selections and exit to the Main Menu. Use Table Section 2-7 to configure the peripherals.

Table Section 2-7 Integrated Peripherals Parameters

Feature	Options	Description
COM1 port COM2 port	Disabled User-selectable settings Auto	For multimedia systems, COM2 is shipped disabled.
LPT port	Disabled 378, IRQ 5 (default) User-selectable settings Auto	Selects a unique address and interrupt request for the LPT port. Auto selects the next available combination.
Diskette Controller	Enabled (default) Disabled	Enables the on-board diskette drive controller.
Local Bus IDE Controller	Both (default) Disabled	Enables the on-board IDE controllers. Both enables the primary and secondary channels.

Parity

The Parity option in the Advanced menu controls system memory parity checking. The system ships with non-parity SIMMs. The default setting for the parity option is "Disabled." This parameter might require a Supervisor password.

Large Disk Access Mode

Select the Large Disk Access Mode parameter when configuring a large disk (see Table Section 2-8). Use the legend keys to make the selections and exit to the Main Menu.

Table Section 2-8 Large Disk Parameters

Parameter	Options	Description
Large Disk Mode	DOS Other	Select DOS when using DOS. Select other when using another operating system such as UNIX. A large disk is one that has more than 1024 cylinders, more than 16 heads, or more than 63 tracks per sector.

Security Menu

Selecting “Security” from the Main Menu displays a menu with system security options.

NOTE: Enter the Setup program with either a User or Supervisor password. However, more Setup choices are available with the Supervisor password.

CAUTION: The features set in the Security menu affect the features that appear on the Security menu as well as on other Setup menus.

Enabling “Supervisor Password” requires a password for entering Setup. Passwords are not case sensitive.

Pressing **Enter** at either Set Supervisor Password or Set User Password on the menu displays a Set Password dialog box with the following prompts:

Enter new password: []
 Re-enter new password: []

To set a password, type the password and press **Enter**. Reenter the password and press **Enter**.

See Table Section 2-9 for a description of the security features. Use the legend keys to make the selections and exit to the Main Menu.

Table Section 2-9 System Security Options

Feature	Options	Description
Supervisor Password	Disabled (default) Enabled	Must set to Enabled to set a Supervisor password.
Set Supervisor Password	Up to seven alphanumeric characters	Pressing Enter displays dialog box for entering the supervisor password. This password gives FULL access to Setup menus.
User Password	Disabled (default) Enabled	Must be set to Enabled to set a User password.

Table Section 2-9 System Security Options

Feature	Options	Description
Set User Password	Up to seven alphanumeric characters	Pressing Enter displays the dialog box for entering the user password. This password gives RESTRICTED access to Setup menus. Requires prior setting of Supervisor password.
Password on boot	Disabled (default) Enabled	<p>Enabled requires a password on boot (cold boot only, no password required for warm boot). Requires the prior setting of the Supervisor and/or User password.</p> <p>If disabled, password(s) are required for entering Setup but are not required for booting.</p> <p>If Supervisor password is set and this option is disabled, the BIOS boots without asking for a password.</p>
Diskette access	User (default) Supervisor	Supervisor setting restricts use of diskette drives to supervisor. Requires setting the Supervisor password.
Fixed disk boot sector	Normal (default) Write Protected	Write protected helps prevent viruses. When write protected, operating systems (and viruses and application programs) which attempt to modify the boot sector will not be able to do so.
System backup reminder	Disabled (default) Daily Weekly	When a schedule is specified, displays a message during bootup asking (Y/N) if the system has been backed up or scanned for viruses.
Virus check reminder	Monthly	<p>Message returns on each boot until "Y" is responded.</p> <p>Daily displays the message on the first boot of the day, weekly on the first boot after Sunday, and monthly on the first boot of the month.</p>

Power Menu

Selecting "Power" from the menu bar displays a screen with the power management parameters. Use the Power menu to specify the settings for Power Management. The parameters are described in the following table.

A power-management system reduces the amount of energy used after specified periods of inactivity. The Power menu supports a Full On state, a Standby state with partial power reduction, and a Suspend state with full power reduction.

Use the legend keys to make the selections and exit to the Main Menu. Use Table Section 2-10 in making the selections.

Table Section 2-10 Power Management Parameters

Feature	Options	Description
APM	Enabled (default)	Advanced power management (APM) allows APM-aware software to better manage power savings.
Power Management Mode	Customize (default) Disabled Maximum Medium Minimum	Maximum, Medium, and Minimum set power-management options with predefined values. Select Customize to make the selections from the following fields. Disabled turns off all power management.
Standby Timeout	15 min (default) Disabled User Selectable	Specifies inactivity period before partial power shutdown.
Standby CPU Speed	Max (default) High Medium Low	Sets processor speed during Standby.
Suspend Button	Suspend (default) Standby Disabled	Suspend allows the system to enter Suspend mode when the suspend button is pressed. Standby enables the system to enter Standby mode when the suspend button is pressed.
Parallel Port Activity	Enabled (default) Disabled	Enables parallel port activity by resetting the timer and bringing the system to full power when it is in a low power management mode.
Serial Port Activity	Enabled (default) Disabled	Enables serial port activity by resetting the timer and bringing the system to full power when it is in a low power management mode.
IRQ1...IRQ15	Disabled Enabled	During Suspend, enabled IRQ turns on processor clock.

Exit Menu

Selecting “Exit” from the menu bar displays the following exit options:

- Save Changes & Exit
- Discard Changes & Exit
- Get Default Values
- Load Previous Values

- Save Changes.

The following sections describe each of the options on the Exit Menu. Note that **Esc** does not exit this menu. Select one of the items from the menu or menu bar to exit.

Save Changes & Exit

After making the selections on the Setup menus, always select Save Changes to Non-Volatile RAM (NVRAM) to make them operative.

Unlike standard RAM memory, NVRAM is sustained by the RTC/battery module and stays on when the system is turned off.

After saving the selections, the program displays this message:

```
Values have been saved to CMOS
Press <space> to continue
```

If an attempt is made to exit without saving, Setup asks if the changes should be saved before exiting.

During bootup, Setup attempts to load the values saved in NVRAM. If the values saved in NVRAM cause the system boot to fail, reboot and press **F2** to enter Setup. In Setup, the ROM default values (as described below) can be loaded or the values can be changed that caused the boot to fail.

Discard Changes & Exit

Use this option to exit Setup without recording any changes.

Get Default Values

To load all the default Setup values in the Setup menus, select Load ROM Default Values from the Main Menu. The program displays this message:

```
ROM default values have been loaded!
Press <space> to continue
```

If, during bootup, the BIOS program detects a problem in the integrity of values stored in NVRAM, it displays these messages:

```
System CMOS checksum bad - run SETUP
Press <F1> to resume, <F2> to Setup
```

The CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.

Press **F1** to resume the boot or **F2** to run Setup with the ROM default values already loaded into the menus. Other changes can be made before saving the values to NVRAM.

Load Previous Values

During a Setup session, if a mistake has been made and has not yet been saved to NVRAM, the previously saved NVRAM values can be restored.

Selecting Load Previous Values on the Exit menu updates all the selections and displays this message:

CMOS values have been loaded!
Press <space> to continue

Save Changes

Save Changes saves all the selections without exiting Setup. Other menu selections can be reviewed or changed.

BIOS UPDATE UTILITY

The NEC Bulletin Board Service (BBS) provides information about system software and hardware. Use the NEC BBS to obtain the latest version of the BIOS Update utility (BUU) and for VGA video drivers.

To log onto the NEC BBS, follow these steps:

NOTE: First time users must answer a new user questionnaire.

1. From the Windows Program Manager, select Accessories and double click on Terminal.
 2. From the Settings menu, select Communications and check that the settings match the following BBS parameters:
 - Baud rate: 2400 bps
 - Parity: none
 - Data bits: 8
 - Stop bits: 1
-

3. Log onto the BBS:
 - Click on the Phone menu item.
 - Enter the BBS phone number 508 635-4706.
 - Click on “OK.”
4. Press **Enter** twice.
5. Enter your first name, last name, and password. Press **Enter** after each.
6. Follow the screen prompts until the NECTECH Main Menu is displayed. The prompts require that you do the following:
 - Press **S** and then **Enter**
 - Press **S** and then **Enter**
 - Press **Enter** three times.
7. At the NECTECH Main Menu, press **F** and **Enter** for the file menu.

To hang up and log off, follow these steps at the NEC Technologies Bulletin Board:

1. Press **Enter** (to continue).
2. Press **G** (command for Goodbye/Hangup).
3. Press **Enter**.

SYSTEM BOARD JUMPERS

This subsection provides jumper setting information for configuring the system for a particular system requirement. Situations that require changing the jumper settings include the following:

- Changing bank 0 SIMMs from single- to double-sided SIMMs or vice versa.
- Upgrading the processor and clock speed.

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

Jumper Locations

Figure Section 2-13 shows the location of the system board's jumpers.

Figure Section 2-13 Locating system configuration jumpers

The factory settings of the jumpers are in the following figures. Functions of each position are also provided. If the jumpers need to be changed, use the procedure that follows the figures.

Jumper Settings

In the 8-MB configurations, two 4-MB single-sided SIMMs are installed in bank 0 (SIMM 1 on the system board). (Memory bank locations and valid SIMM configurations are provided in Chapter 6 under “Checking the Memory in Your System.”) The default setting for JP1 in the 8-MB configuration is pins 2 and 3 shorted. Pins 2 and 3 must be shorted when the following SIMMs are installed in bank 0.

- 1-MB SIMMs
 - 4-MB SIMMs
 - 16-MB SIMMs
 - 64-MB SIMMs
-

In the 16-MB configuration (multimedia), two 8-MB double-sided SIMMs are installed in bank 0. The default setting in the 16-MB configuration has pins 1 and 2 shorted. Pins 1 and 2 must be shorted when the following SIMMs are installed in bank 0.

- 2-MB SIMMs
- 8-MB SIMMs
- 32-MB SIMMs

Figure Section 2-14 SIMM Type Jumper JP1

The following jumpers set the processor frequency.

Figure Section 2-15 Processor Speed Jumpers JP5, JP6, and JP7

Jumper J10 is used to set the bus frequency. This jumper is not installed in all configurations.

Figure Section 2-16 Bus speed jumper JP10

Jumper JP12 is used to set the voltage used by the processor. This is set at the factory and should not be changed.

CAUTION: Changing the processor voltage jumper (JP12) could damage the system board processor.

Figure Section 2-17 Processor voltage jumper JP12

Changing Jumper Settings

To change system board jumper settings, use the following procedure. A label showing the jumper information is inside the system unit cover. The label provides a quick reference for the settings.

1. Turn off and unplug the system and any external options.

WARNING: The system power must be off before changing a jumper setting.

2. Remove the system unit cover (see Section 5).
3. Locate the jumper(s) on the system board (see the figure under “Jumper Locations” earlier in this section).

Some installed expansion boards may have to be removed to access the jumper (see expansion board removal procedures in Section 6).

4. If you removed any expansion boards, replace them.
5. Replace the system unit cover (see Section 5).
6. Plug in system and peripheral cables and turn on the system.
7. Run Setup (see the Setup subsection earlier in this section).

CMOS Jumper

When clearing CMOS (JP8), use the following procedure.

1. Perform steps 1 through 3 in the preceding procedure, “Changing Jumper Settings.”
 2. Install a jumper on jumper JP8.
 3. Power on the system for 5 seconds. The monitor will be blank.
 4. Power off the system.
 5. Remove the jumper from jumper JP8.
 6. Replace the system unit cover (see Section 5).
 7. Power on the system and run Setup.
-

Section 3

Options

This section provides instructions for installing an optional processor, SIMM memory, video DRAM module, 5 1/4-inch storage devices, and an internal 3 1/2-inch hard disk drive. All options require that the system unit top cover be removed.

INTERNAL OPTIONS

When disassembling the system unit for option installation, follow these general rules.

- Disconnect all peripherals.
- When handling boards or chips, touch the system unit frame to discharge static.
- Do not disassemble parts other than those specified in the procedure.
- All screws are Phillips-head, unless otherwise specified.
- Label any removed connectors. Note where the connector goes and in what position it was installed.

WARNING: Unplug the power cord before disassembling the system unit. Voltage is present inside the system unit even after the power switch is turned off. All voltage is removed only when the power cord is unplugged.

Desktop Cover Removal

Remove the desktop cover as follows.

1. Power off and unplug the keyboard, mouse, power, and all other peripheral cables attached to the system unit.
2. Remove the two cover screws shown in Figure Section 3-1.

Figure Section 3-1 Desktop Cover Screws

3. Slide the top cover toward the rear about one inch (see Figure Section 3-2).
4. Lift the top cover up and off.

Figure Section 3-2 Removing the Desktop Cover

Minitower Top Cover Removal

Remove the minitower top cover as follows.

1. Power off and unplug the keyboard, mouse, power cord and all other peripheral cables attached to the system unit.
2. Remove the four cover screws shown in Figure Section 3-3.

Figure Section 3-3 Minitower Cover Screws

3. Slide the top cover toward the rear about one inch (see Figure Section 3-4).
4. Lift the top cover up and off the system unit.

Figure Section 3-4 Removing the Minitower Cover

Expansion Board(s)

The desktop system has four 8/16/32-bit expansion slots on the rear of the system and five expansion board connectors on the ISA/PCI backboard. Three slots are for ISA boards and one slot is for either a PCI or ISA board. On multimedia configurations, one ISA slot contains a sound board. On network configurations, one ISA slot contains the network board. All other slots are empty, ready for installing expansion boards.

The minitower system has five 8/16/32-bit expansion slots on the rear of the system and six expansion board connectors on the ISA/PCI backboard. Three slots are for ISA boards, one is a dedicated PCI slot, and the remaining slot is a shared ISA/PCI slot. On multimedia configurations, one ISA slot contains a sound board. On network configurations, one ISA slot contains the network board. All other slots are empty, ready for installing expansion boards.

Expansion boards plug into the edge connector on the backboard. See Appendix A for connector pin assignments.

Desktop Expansion Board Installation

Install expansion boards into the desktop system as follows.

1. Remove the top cover as previously described.
2. Locate the expansion slot for board insertion (see Figure Section 3-5). Remove the slot screw and cover. Save the slot cover for use if the board is removed in the future.

To remove the inside expansion slot cover for access to the connector on the backboard, remove the backside expansion slot screws shown in Figure Section 3-6.

Figure Section 3-5 Desktop Expansion Slots

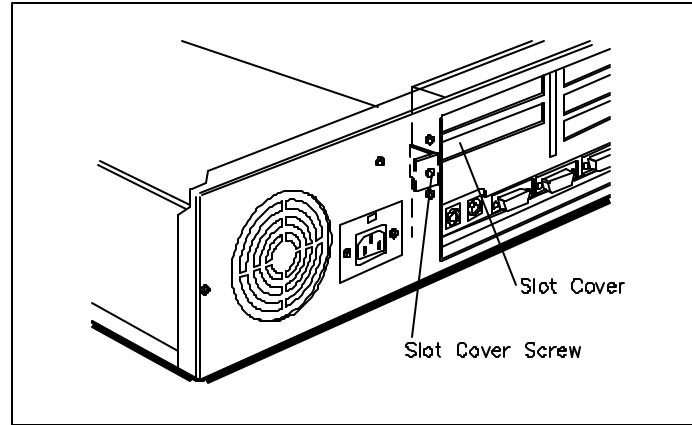


Figure Section 3-6 Inside Expansion Slot Screw

3. When removing an expansion slot cover from the inside, separate the inside expansion slot L-bracket from the expansion slot cover by removing the screw shown in Figure Section 3-7.

Reattach the L-bracket to the expansion board being installed.

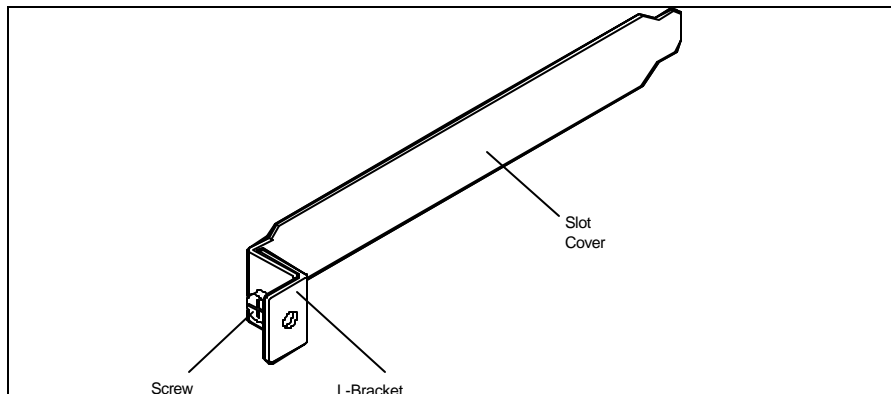


Figure Section 3-7 Removing the Inside Expansion Slot Bracket

4. Install the expansion board into an expansion slot connector (and guide rail if installing a full-size board). If installing a PCI board in the shared slot, install the board component side down in the top PCI connector. If installing an ISA board in the shared slot, install the board component side up in the ISA connector under the PCI connector.

NOTE: A full-size expansion board cannot be installed into the inside expansion slot.

5. Reinstall the expansion slot screw to secure the expansion board.
6. Connect any expansion board cables.
7. Reinstall the top cover.

Minitower Expansion Board Installation

Install expansion boards in the minitower system as follows.

1. Remove the top cover (previously described) and the bottom access cover (see Section 6).
2. Locate the expansion slot for board insertion (see Figure Section 3-8). Remove the slot screw and cover. Save the slot cover for use if the board is removed in the future.

Figure Section 3-8 Minitower Expansion Slots

3. Install the expansion board into an expansion slot connector (and the guide rail if installing a full-size expansion board).

If installing a PCI board in the shared slot, install the board component side down in the top PCI connector.

If installing an ISA board in the shared slot, install the board component side up in the ISA connector under the PCI connector.

4. Reinstall the expansion slot screw to secure the expansion board.
5. Connect any expansion board cables.
6. Replace the top cover and bottom access cover.

Expansion Board Troubleshooting

If a fault occurs at power-on, verify that the expansion board installation was performed correctly. One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, turn off the computer and try again. If the beeping persists, see “Troubleshooting” in Section 4. Table Section 3-1 summarizes problems that may develop after installing an expansion board and lists in sequential order suggested corrective actions.

Table Section 3-1 Expansion Board Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel will not light.	<ol style="list-style-type: none"> 1. Check that the power cord is plugged into the AC connector on the computer. Check that the other end of the cord is plugged into a live properly grounded AC power outlet. 2. Systematically eliminate possible shorted PCBs by removing cables and expansion boards.
Operating system does not boot	An invalid configuration message is displayed.	<ol style="list-style-type: none"> 1. Press F2 to run Setup and view parameters.
Expansion board malfunction	Expansion board is not recognized.	<ol style="list-style-type: none"> 1. Reseat expansion board and cables. 2. Check that pin one on cables and connectors match up. 3. Install the expansion board in a different slot. 4. Check the troubleshooting information that came with the expansion board. 5. Check any switches or jumpers that are on the expansion board. 6. Disable built-in controllers when installing optional video, diskette and hard drive expansion boards (see Section 2). 7. Check that IRQs and the address do not clash with those already assigned by the system board (see Section 2). 8. Replace expansion board. 9. Replace ISA backboard.
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	<ol style="list-style-type: none"> 1. Check that the keyboard is plugged in. 2. Check that the mouse is plugged in.

System Board Options

The following system board options are available for all desktop and minitower systems.

- OverDrive processor
- SIMM memory
- Video DRAM module

The following subsections include the procedures for installing each option on the system board.

OverDrive Processor Installation

The zero-insertion force (ZIF) pin-grid arrays (PGA) processor socket accepts optional processors. Once the currently installed processor is removed from the socket, the next generation processor can be installed.

CAUTION: Heat sinks are required for processors installed in the system. Heat sinks are available through NEC.

Install an OverDrive processor into the system board as follows.

1. Remove the top cover and any expansion boards obstructing access to the processor socket.
2. Remove the installed processor and heat sink as follows.
 - Locate the processor socket on the system board (see Figure Section 3-9).
 - Release the heat sink clips from the tabs on the socket and remove the heat sink.
 - Release the socket lever by slightly pulling it away from the socket, then swing the lever up (see Figure Section 3-10).
 - Carefully lift the processor out of the socket.

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

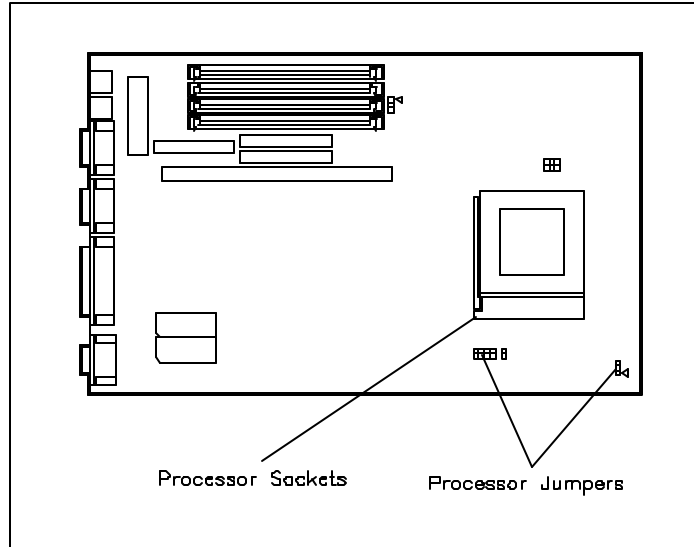


Figure Section 3-9 Locating the Processor Socket

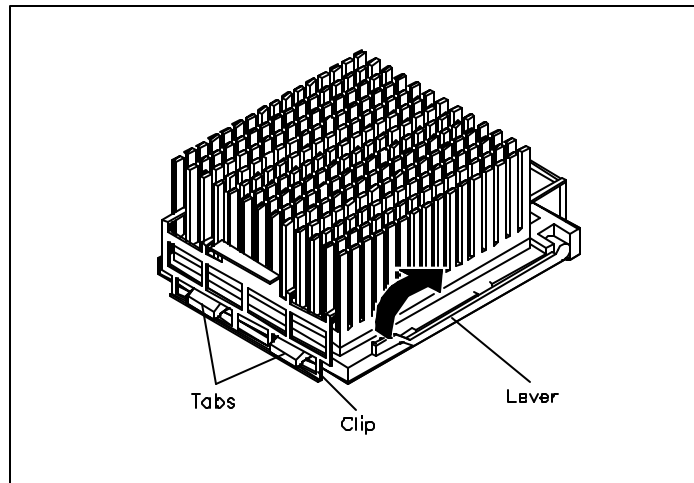


Figure Section 3-10 Removing the Heat Sink and Processor

3. Install the processor in the socket as follows.

- Align the processor with the socket (see Figure Section 3-11).

CAUTION: Incorrect alignment of the processor in the socket can damage the processor and system board.

After installing the processor, check that the processor's speed and voltage jumpers on the system board are set correctly for the processor (see Section 2, Setup and Operation).

- Insert the processor in the socket, and swing the lever down to lock the processor in place.
- Insert the heat sink clips over the tabs on the socket, and press the heat sink down until it locks in place.

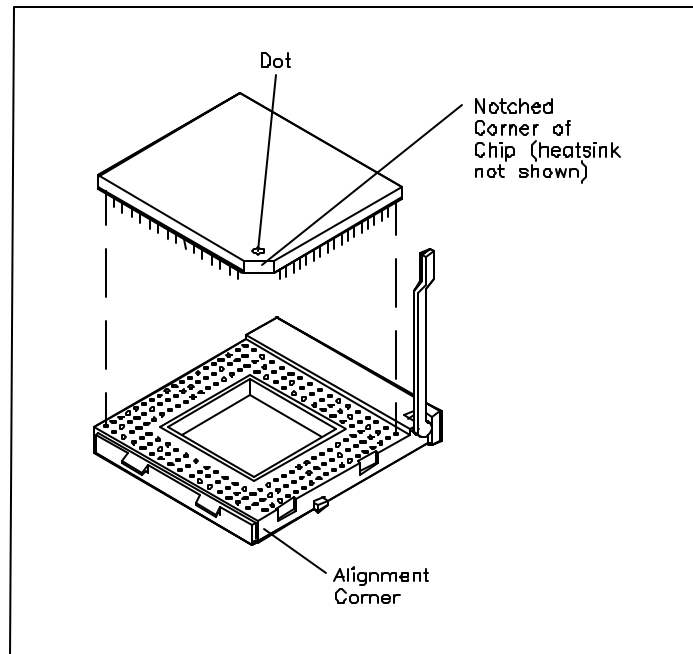


Figure Section 3-11 Processor Alignment

4. Set the processor's speed and voltage jumpers on the system board for the installed processor (see Section 2, Setup and Operation).

5. Replace any removed expansion boards, reconnect any cables, and reinstall the system top cover.

OverDrive Processor Troubleshooting

If a fault occurs at power-on, verify that the installation was performed correctly. One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, turn off the computer and try again. If the beeping persists, see Section 4, Maintenance and Troubleshooting.

Table Section 3-2 summarizes problems that may develop after installing an OverDrive processor and lists in sequential order suggested corrective actions.

Table Section 3-2 OverDrive Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel does not light.	<ol style="list-style-type: none"> 1. Check that the power cord is plugged into the AC connector on the computer. Check that the other end of the cord is plugged into a live properly grounded AC power outlet.
Operating system does not boot	An invalid configuration message is displayed.	<ol style="list-style-type: none"> 1. Press F2 to run Setup and view parameters.
OverDrive Processor malfunction	Software does not see OverDrive Processor.	<ol style="list-style-type: none"> 1. Reseat the OverDrive Processor. 2. Check the Setup parameters. 3. Check the jumper settings (see Section 2). 4. Replace OverDrive Processor. 5. Replace system board.
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	<ol style="list-style-type: none"> 1. Check that the keyboard is plugged in. 2. Check that the mouse is plugged in.

SIMM Memory Installation

The system board comes standard with 8 MB of 32-bit (non-parity) memory for non-multimedia configurations and 16 MB of 32-bit memory for multimedia configurations. Memory can be expanded up to 128 MB. The system board also supports 36-bit (parity) SIMMs. SIMM kits are 70-ns SIMMs.

NOTE: The metal plating on the SIMM stick connectors must match the metal plating in the SIMM sockets in the computer. Use tin-plated SIMM sticks with tin-plated SIMM sockets.

Memory expansion option kits include the following:

- 4-MB SIMM kit (1 MB x 32-bit SIMM stick).
- 8-MB SIMM kit (2 MB x 32-bit SIMM stick).
- 16-MB SIMM kit (4 MB x 32-bit SIMM stick).
- 32-MB SIMM kit (8 MB x 32-bit SIMM stick).
- 64-MB SIMM kit (16 MB x 32-bit SIMM stick).

NOTE: The 32-bit SIMM kits are used in the U.S. and Canada only. The 36-bit SIMMs are used elsewhere.

SIMM Upgrade Path

The SIMMs come in two different types, single-sided or double-sided. In the 8-MB non-multimedia configurations, two 4-MB single-sided SIMMs are installed in SIMM sockets 1 and 2 (bank 0). In the 16-MB multimedia configurations, two 8-MB double-sided SIMMs are installed in SIMM sockets 1 and 2. Figure Section 3-12 shows the location of the sockets and banks. Table Section 3-3 and Table Section 3-4 provide valid SIMM configurations.

Setting the system for use with single-sided or double-sided SIMMs is done by jumper JP1 on the system board, next to the SIMM sockets. For systems with the 8-MB configuration, pins 2 and 3 on JP1 are shorted. Also, pins 2 and 3 must be shorted if installing the following SIMMs in sockets 1 and 2 (bank 0):

- 1 MB SIMMs
 - 4 MB SIMMs
 - 16 MB SIMMs
-

- 64 MB SIMMs

For multimedia systems with the 16-MB configuration, pins 1 and 2 on JP1 are shorted. Also, pins 1 and 2 must be shorted if installing the following SIMMs in sockets 1 and 2 (bank 0):

- 2 MB SIMMs
- 8 MB SIMMs
- 32 MB SIMMs

Table Section 3-3 Single-Sided SIMM Upgrade Path

Total Memory	Bank 0	Bank 1
8 MB *	8 MB (two 4-MB SIMMs)	Empty
16 MB	8 MB (two 4-MB SIMMs)	8 MB (two 4-MB SIMMs)
24 MB	8 MB (two 4-MB SIMMs)	16 MB (two 8-MB SIMMs)
32 MB	32 MB (two 16-MB SIMMs)	Empty
40 MB	8 MB (two 4-MB SIMMs)	32 MB (two 16-MB SIMMs)
48 MB	32 MB (two 16-MB SIMMs)	16 MB (two 8-MB SIMMs)
64 MB	32 MB (two 16-MB SIMMs)	32 MB (two 16-MB SIMMs)
80 MB	64 MB (two 32-MB SIMMs)	16 MB (two 8-MB SIMMs)
128 MB	128 MB (two 64-MB SIMMs)	Empty

* Standard on 8-MB configurations (non-multimedia)

Table Section 3-4 Double-Sided SIMM Upgrade Path

Total Memory	Bank 0	Bank 1
16 MB *	16 MB (two 8-MB SIMMs)	Empty
24 MB	16 MB (two 8-MB SIMMs)	8 MB (two 4-MB SIMMs)
32 MB	16 MB (two 8-MB SIMMs)	16 MB (two 8-MB SIMMs)
64 MB	64 MB (two 32-MB SIMMs)	Empty
72 MB	64 MB (two 32-MB SIMMs)	8 MB (two 4-MB SIMMs)
80 MB	64 MB (two 32-MB SIMMs)	16 MB (two 8-MB SIMMs)
96 MB	64 MB (two 32-MB SIMMs)	32 MB (two 16-MB SIMMs)
128 MB	64 MB (two 32-MB SIMMs)	64 MB (two 32-MB SIMMs)

Table Section 3-4 Double-Sided SIMM Upgrade Path

Total Memory	Bank 0	Bank 1
--------------	--------	--------

* Standard on 16-MB configurations (multimedia)

SIMM Installation

Install SIMM sticks into the system board as follows.

1. Remove the top cover and any expansion boards covering the socket.
2. Locate the SIMM sockets on the system board (see Figure Section 3-12).

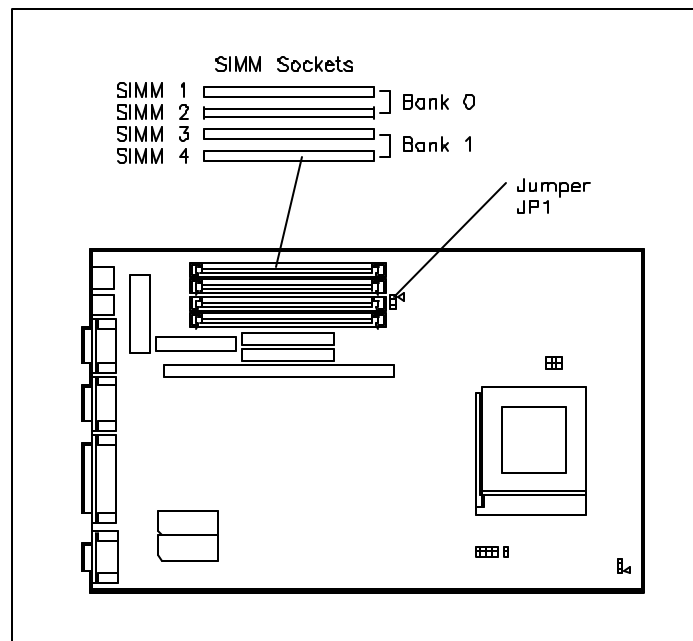


Figure Section 3-12 SIMM Socket Location

3. Insert the SIMM into the SIMM socket at an angle, then push the SIMM upright so that the clips hold the SIMM in place (see Figure Section 3-13).

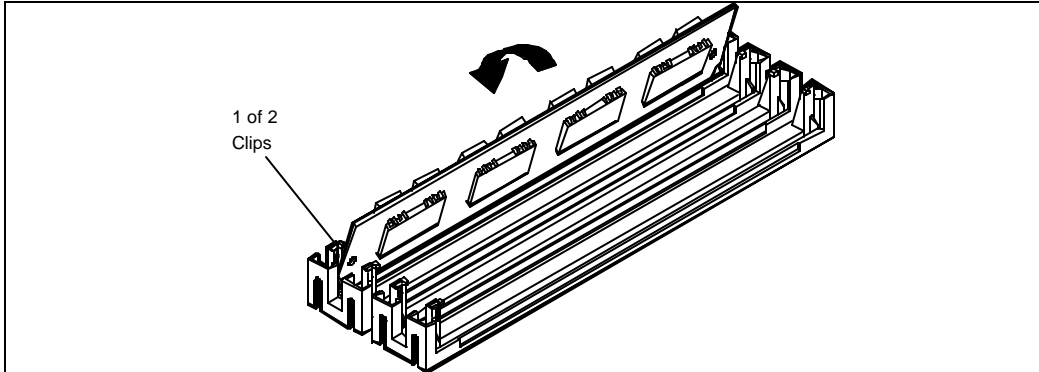


Figure Section 3-13 SIMM Installation

4. Repeat step 3 for each SIMM to be installed.
5. Replace any removed expansion boards.
6. Replace the top cover and run Setup to check that the system accepted the SIMM upgrade (see Section 2, Setup and Operation).

SIMM Upgrade Kit Troubleshooting

If a fault occurs at power-on, verify that the reassembly was performed correctly. One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, turn off the computer and try again. If the beeping persists, see Section 4, Maintenance and Troubleshooting.

Table Section 3-5 summarizes problems that may develop after installing SIMM upgrade kits and lists in sequential order suggested corrective actions.

Table Section 3-5 SIMM Upgrade Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel will not light.	<ol style="list-style-type: none"> 1. Check that the power cord is plugged into the AC connector on the computer. Check that the other end of the cord is plugged into a live properly grounded AC power outlet.
Operating system does not boot	An invalid configuration message is displayed.	<ol style="list-style-type: none"> 1. Press F2 to run setup and view parameters.
Memory malfunction	Total memory is not recognized.	<ol style="list-style-type: none"> 1. Reseat SIMMs. SIMM sticks must be in specified banks. 2. Systematically swap SIMMs. 3. Replace SIMMs. 4. Replace system board.
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	<ol style="list-style-type: none"> 1. Check that the keyboard is plugged in. 2. Check that the mouse is plugged in.

Video DRAM Module Installation

The system board comes standard with 1 MB of video DRAM integrated into the system board. The optional 1 MB video DRAM kit consists of two 256K x 16-bit (512 KB) modules. The optional video DRAM is installed into the video DRAM sockets on the system board (see Figure Section 3-14).

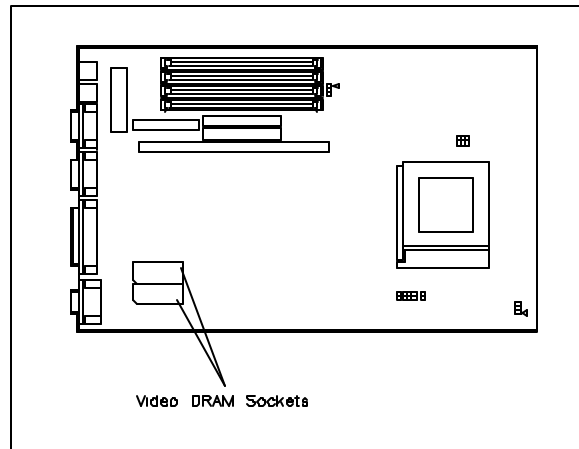


Figure Section 3-14 Video DRAM Socket Location

Install the video DRAM modules into the system board as follows.

1. Remove the system unit cover and bottom access cover.
2. Locate the two video DRAM sockets on the system board (see Figure Section 3-14).

If there are expansion boards obstructing the sockets, remove the boards.

3. Align the alignment dot end of the video DRAM module with the notched end of the socket (see Figure Section 3-15) and insert the module into the socket.
4. Repeat step 3 to insert the second module.

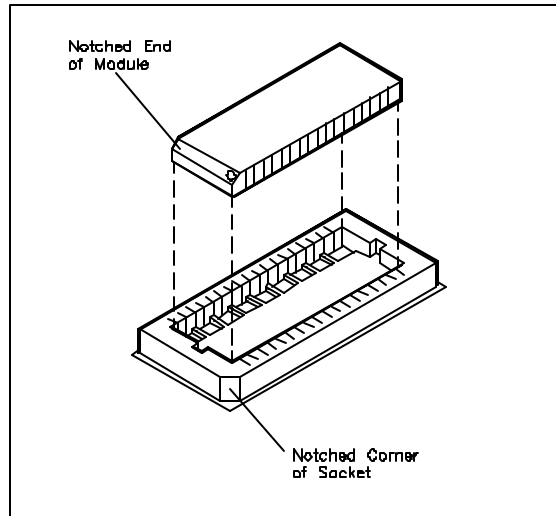


Figure Section 3-15 Video DRAM Module Installation

5. Replace any removed expansion boards.
6. Reinstall the top cover and bottom access cover.
7. Connect any external peripherals and power cables.

Verify that the system recognizes the additional video DRAM by performing the following:

1. Power up the system.
 2. Exit Windows and return to the C:\ prompt.
 3. At the C:\ prompt, type **cd\windows\vgautl** and press **Enter**. Type **clmode** and press **Enter**.
 4. At the CLMODE main screen, check that the display memory is 2048k, indicating that the system has 2 MB of video memory.
 5. Press **ESC** to exit the CLMODE utility.
 6. Press **Enter** to select No to the update AUTOEXEC.BAT question, and return to the C:\ prompt. Type **WIN** and press **Enter** to return to Windows.
-

Video DRAM Module Troubleshooting

If a fault occurs at power-on, verify that the reassembly was performed correctly. One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, turn off the computer and try again. If the beeping persists, see Section 4, Maintenance and Troubleshooting.

Table Section 3-6 summarizes problems that may develop after installing a video DRAM module and lists in sequential order suggested corrective actions.

Table Section 3-6 Video DRAM Module Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel will not light.	1. Check that the power cord is plugged into the AC connector on the computer. Check that the other end of the cord is plugged into a live properly grounded AC power outlet.
Operating system does not boot	An invalid configuration message is displayed.	1. Press F2 to run setup and view parameters.
Video DRAM malfunction	Cache memory is not recognized.	1. Reseat the video DRAM module, checking for bent pins and correct orientation. 2. Replace the video DRAM module. 3. Replace the system board.
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	1. Check that the keyboard is plugged in. 2. Check that the mouse is plugged in.

OPTIONAL STORAGE DEVICES

This subsection includes procedures for installing optional 5 1/4-inch and 3 1/2-inch storage devices in the system unit. The optional NEC diskette and hard disk drives are described first, then procedures for installing the devices follow.

5 1/4-Inch Diskette Drive

A 3 1/2-inch diskette drive comes standard in all systems. The drive is connected by a single ribbon cable with one drive connector. A second 5 1/4-inch diskette drive can be added but requires an optional cable with two drive connectors. The first diskette drive (3 1/2-inch) is drive A, the second diskette drive is drive B. The diskette drive cable plugs directly into the system board.

The diskette drive controller is incorporated on the system board. The controller contains the circuits and control functions needed to support up to two diskette drives.

5 1/4-Inch Diskette Drive Settings

Specifications for the 5 1/4-inch, 1.2-MB diskette drive are listed in Appendix B, Specifications. The standard .44-MB diskette drive settings are shown in Figure Section 3-16. The settings for the optional 1.2-MB diskette drive are shown in Figure Section 3-17.

When installing two diskette drives, both diskette drives are addressed to drive 1. The terminating resistor jumper should not be removed from the 5 1/4-inch drive. Both diskette drives (standard and optional) are normally terminated.

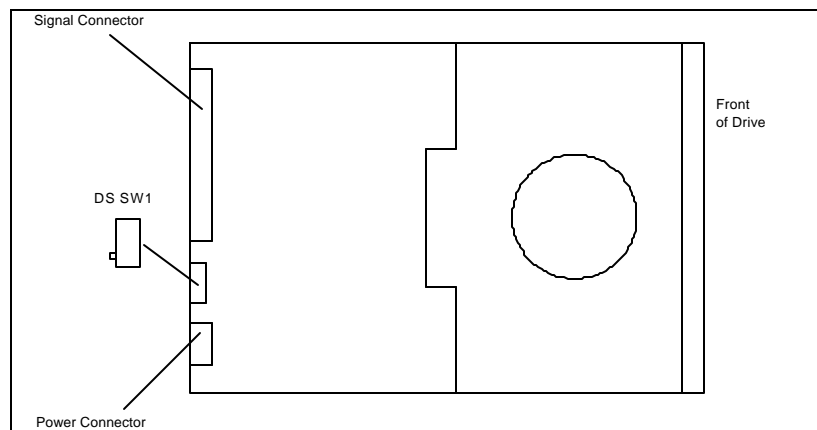


Figure Section 3-16 OSDA-90C, 1.44-MB Diskette Drive

Figure Section 3-17 FD-55GFR, 1.2-MB Diskette Drive

Hard Disk Drives

All hard disk systems ship with an IDE interface cable connected to the primary IDE/PCI connector on the system board and to the hard disk drive. The cable has two connectors for connecting up to two devices (standard hard disk and an optional device).

In addition, all multimedia configurations ship with an IDE interface cable connected to the secondary IDE/PCI connector on the system board and to the CD-ROM reader. The cable has a single device connector. If installing two devices to the secondary IDE/PCI connector, an optional two-device cable must be used.

When installing a second hard disk drive, use the open connector on the cable coming from the primary IDE/PCI connector. A hard disk controller board is not required. The IDE drives described in this section are thin-height (1-inch x 3 1/2-inch) drives.

Hard Disk Drive Settings

The following IDE hard disk drives are available for installation in the system. Hard disk systems come with a hard disk drive preinstalled in the computer. Specifications for the IDE hard drives are given in Appendix B, Specifications. Jumpers for the drives are set for single drive configurations. Jumper settings and their locations are shown in Figure Section 3-18 and Figure Section 3-19.

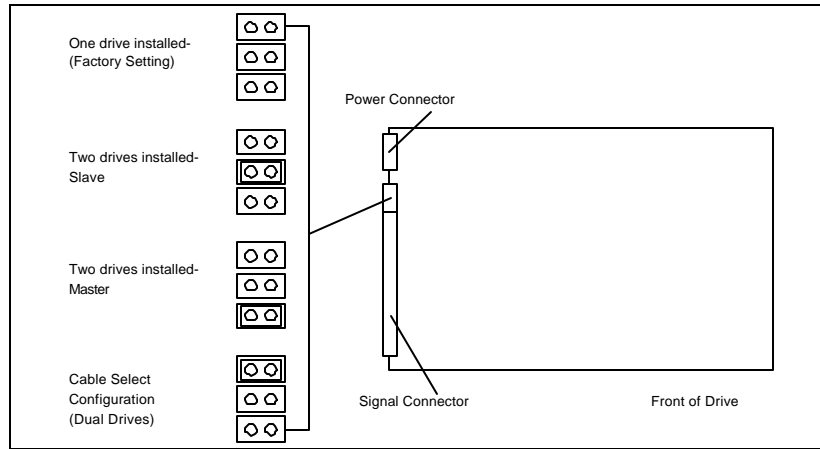


Figure Section 3-18 WDAC2540 540-MB Hard Disk Drive

NOTE: All NEC hard disk drives are shipped with the jumpers set for master, one drive installed.

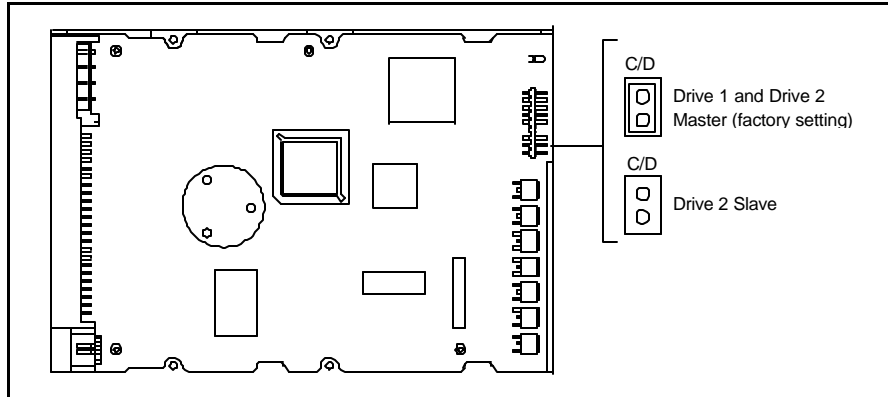


Figure Section 3-19 CFA1275 1.275-GB Hard Disk Drive

DESKTOP OPTIONAL STORAGE DEVICE INSTALLATION

To install a 5 1/4-inch device or a 3 1/2-inch device (5 1/4-inch form factor) in the desktop system, the top cover, 3 1/2-inch drive bracket, and blank front panel must first be removed. If the device comes with attached rails, they must be removed and the screws reused to secure the drives to the drive bracket.

NOTE: Do not remove the 5 1/4-inch blank panel when installing a hard disk drive.

The 3 1/2-inch hard disk drives must be mounted in a 5 1/4-inch bracket.

Desktop 3 1/2-inch Drive Bracket Removal

Remove the 3 1/2-inch drive bracket from the desktop system unit as follows.

1. Remove the top cover as previously described.
2. Remove the four 3 1/2-inch drive bracket screws (see Figure Section 3-20).
3. Without removing the power and signal cables, place the 3 1/2-inch bracket with the diskette drive and hard disk drive attached on the power supply.

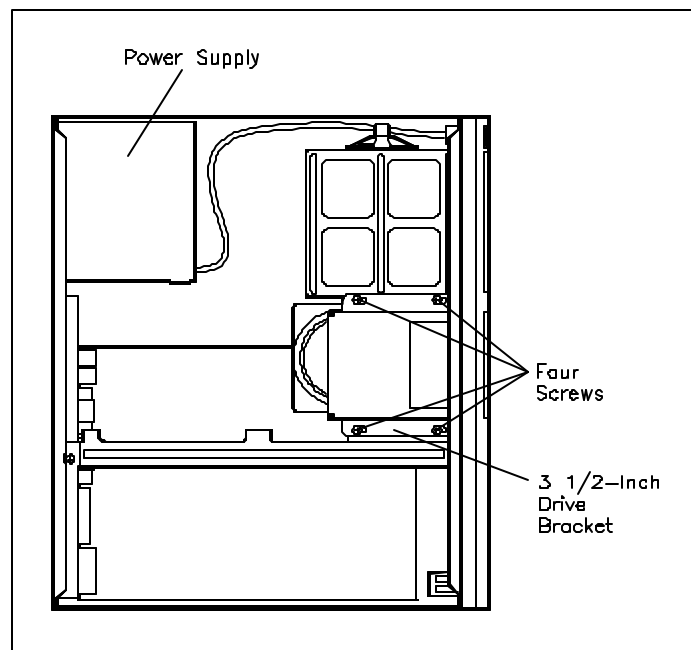


Figure Section 3-20 3 1/2-Inch Drive Bracket Screws

Desktop Blank Panel Removal

Remove the blank panel from the desktop chassis as follows.

1. Remove the desktop cover and 3 1/2-inch diskette drive bracket as previously described.
2. Unplug the following cables from their connectors.
 - Power lamp
 - Hard disk drive busy lamp
 - Suspend button
3. Remove the five front panel screws (see Figure Section 3-21).
4. Pull the lamp and suspend cables through the hole in the front of the system unit chassis when removing the front panel assembly.

Figure Section 3-21 Desktop Front Panel Removal

5. From the inside of the front panel, release the blank panel tabs and remove the blank panel from the front panel (see Figure Section 3-22).

Figure Section 3-22 Blank Panel Removal

NOTE: The system unit chassis may also require a slot cover punch-out to be removed.

6. Reinstall the front panel once the blank panel is removed.

Desktop Device Installation

Install a device into the 5 1/4-inch device slot as follows.

1. Remove the top cover, front panel, and 3 1/2-inch drive bracket as previously described.

NOTE: When installing 3 1/2-inch hard disk drives, a 5 1/4-inch hard disk bracket must first be attached to the 3 1/2-inch hard disk drives.

2. Slide the rear of the device into the 5 1/4-inch slot.
 - Align the holes on the 5 1/4-inch device with the holes in the device cage.
-

3. Install the four device screws that were removed with the rails or that come with the kit, two on each side of the device cage (see Figure Section 3-23).

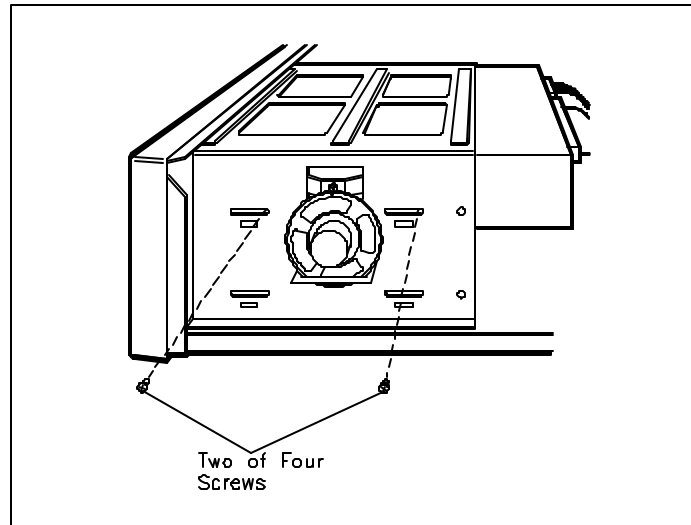


Figure Section 3-23 Desktop 5 1/4-Inch Device Screws

4. Cable the desktop 5 1/4-inch device as described next.

Desktop 5 1/4-Inch Diskette Drive Cabling

Cable an optional 5 1/4-inch diskette drive as follows. Adding a second diskette drive requires an optional three-connector signal cable (part number 158-050561-000).

1. Unplug and remove the two-connector signal cable from the installed diskette drive and the diskette connector on the system board.
2. Plug the optional three-connector cable into the system board and into the two diskette drives (see Figure Section 3-24). The middle connector plugs into the 5 1/4-inch diskette drive and the end connector plugs into the 3 1/2-inch drive.

NOTE: When cabling the 5 1/4-inch device, note that all power cables are keyed to fit only in the correct position. The red edge of the diskette drive signal cable is positioned as shown.

3. Locate the power connector coming from the power supply and plug the correct fitting power cable into the device power connector (see Figure Section 3-24).

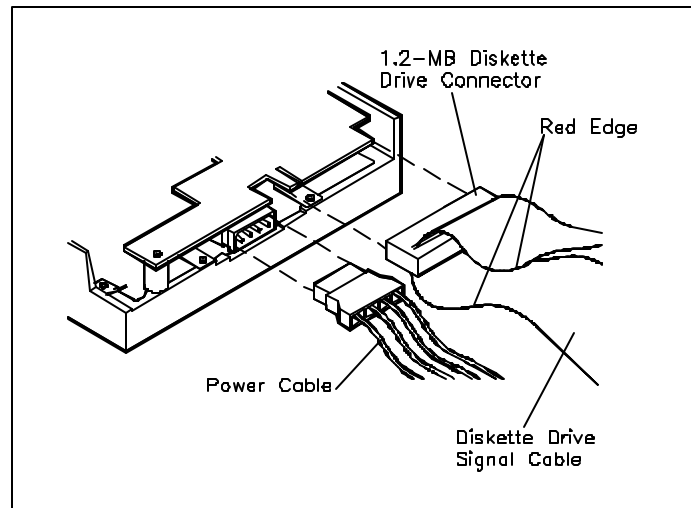


Figure Section 3-24 Desktop 5 1/4-Inch Diskette Drive Cables

Desktop 5 1/4-Inch Hard Disk Drive Cabling

Cable the hard disk drive per the following steps.

1. Locate the IDE hard disk signal cable (connected to the 3 1/2-inch hard disk drive) and plug the middle connector into the signal connector on the hard disk drive in the 5 1/4-inch slot (see Figure Section 3-25).

NOTE: When installing the drives, note that all power and hard disk signal cables are keyed to fit only in the correct position.

Either of the hard disk drive signal cable connectors may be used for the hard disk drives. The hard disk drives are configured by jumpers as master (drive C) and slave (drive D).

2. Locate one of the larger power connectors coming from the power supply and plug it into the hard disk drive power connector (see Figure Section 3-25).

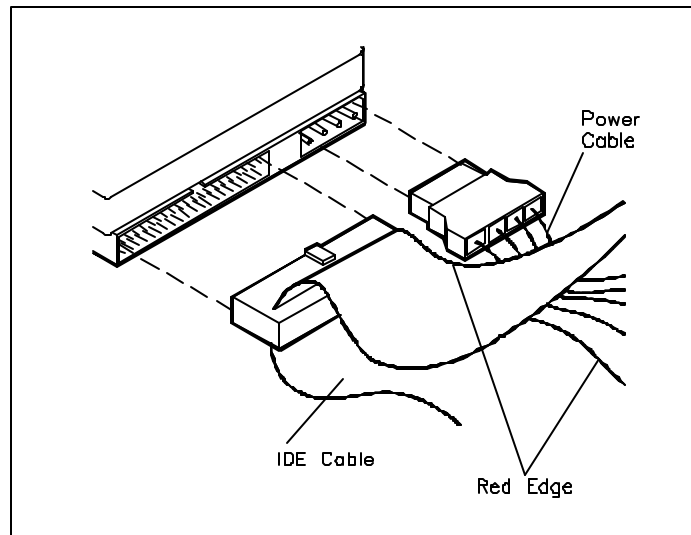


Figure Section 3-25 Desktop 5 1/4-Inch Hard Disk Drive Cables

Completing Desktop Device Installation

Replace the assemblies removed earlier and reconfigure the system as follows.

1. Reinstall the 3 1/2-inch drive bracket by reversing the steps of the “Desktop 3 1/2-inch Drive Bracket Removal” procedure given earlier.
2. Replace the top cover and run Setup to reconfigure the computer for the hard disk drive (see Section 2, Setup and Operation). If a fault occurs at power-on, verify that the reassembly was performed correctly.

Reconfigure the computer for the hard disk drive by selecting hard disk drive “Installed” in Setup. Setup will automatically detect the hard disk type. When installing a hard disk drive that cannot be detected, use the “Define Hard Disk Type” to determine the hard disk drive type.

MINITOWER 5 1/4-INCH OPTIONAL DEVICE INSTALLATION

To install a 5 1/4-inch device into the minitower system, the top cover, front panel, and 5 1/4-inch blank panel must first be removed. When device option kits come with rails preattached, remove the drive rails and reuse the screws to secure the drives to the drive bracket.

NOTE: Do not remove the 5 1/4-inch blank panel when installing a hard disk drive.

The 3 1/2-inch hard disk drives must be mounted in a 5 1/4-inch bracket.

Minitower Front Panel, Blank Panel, and Device Cage Removal

Remove the front panel, blank panel, and device cage from the minitower chassis as follows.

1. Remove the minitower cover as previously described.
2. Remove the four screws (two to a side) holding the front panel to the system (see Figure Section 3-26).

Figure Section 3-26 Front Panel Removal

3. Remove the blank panel from the metal cover plate by pressing in on the panel tabs (see Figure Section 3-27).
4. Remove the two screws holding each metal plate cover plate to the device bracket. Remove the plates.

Figure Section 3-27 Minitower Blank Panel Removal

5. Remove the five screws holding the 5 1/4-inch device cage to the chassis (see Figure Section 3-28).

Figure Section 3-28 Device Cage Removal

Minitower 5 1/4-Inch Optional Device Installation

Install the device into the 5 1/4-inch device slot as follows.

1. Remove the top cover, front panel, blank panel, and device cage as previously described.

NOTE: When installing 3 1/2-inch hard disk drives, a 5 1/4-inch hard disk bracket must first be attached to the 3 1/2-inch hard disk drives.

2. Slide the rear of the device into the 5 1/4-inch device cage.
3. Align the holes on the 5 1/4-inch device with the holes in the device cage.
4. Install the four device screws that come with the kit, two on each side of the drive cage (see Figure Section 3-29).

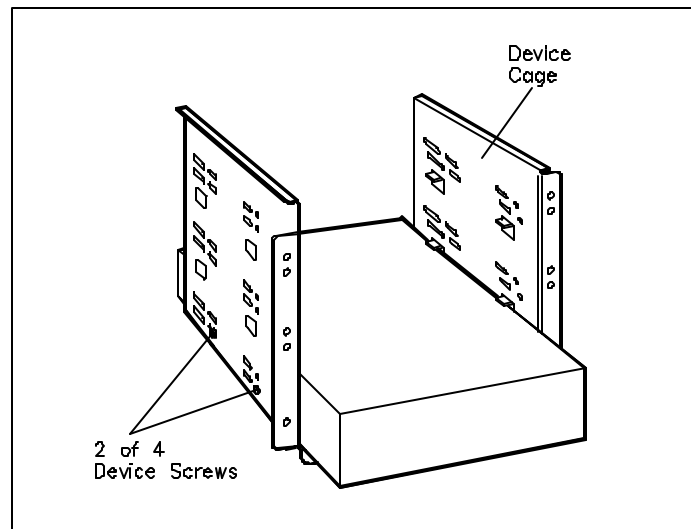


Figure Section 3-29 Minitower 5 1/4-Inch Device Screws

Minitower 5 1/4-Inch Diskette Drive Cabling

Cable an optional 5 1/4-inch diskette drive as follows. Adding a second diskette drive requires an optional three-connector signal cable (part number 158-050561-000).

1. Unplug and remove the two-connector signal cable from the installed diskette drive and the diskette connector on the system board.
2. Plug the optional three-connector cable into the system board and into the two diskette drives (see Figure Section 3-30). The middle connector plugs into the 5 1/4-inch diskette drive and the end connector plugs into the 3 1/2-inch drive.

NOTE: When cabling the 5 1/4-inch device, note that all power cables are keyed to fit only in the correct position. The red edge of the diskette drive signal cable is positioned as shown.

3. Locate the power connector coming from the power supply and plug the correct fitting power cable into the device power connector (see Figure Section 3-30).

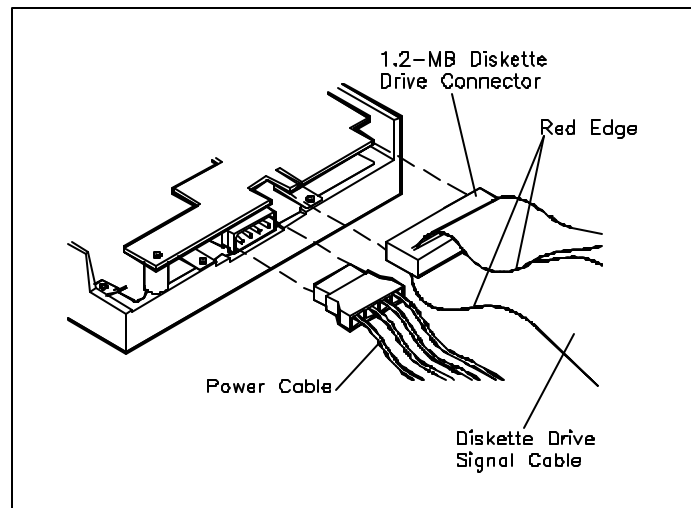


Figure Section 3-30 *Minitower 5 1/4-Inch Diskette Drive Cables*

Minitower 5 1/4-Inch Hard Disk Drive Cabling

Cable the hard disk drive per the following steps.

1. Locate the IDE hard disk signal cable (connected to the 3 1/2-inch hard disk drive) and plug the middle connector into the signal connector on the hard disk drive in the 5 1/4-inch slot (see Figure Section 3-31).

NOTE: When installing the drives, note that all power and hard disk signal cables are keyed to fit only in the correct position.

Either of the hard disk drive signal cable connectors may be used for the hard disk drives. The hard disk drives are configured by jumpers as master (drive C) and slave (drive D).

2. Locate one of the larger power connectors coming from the power supply and plug it into the hard disk drive power connector (see Figure Section 3-31).

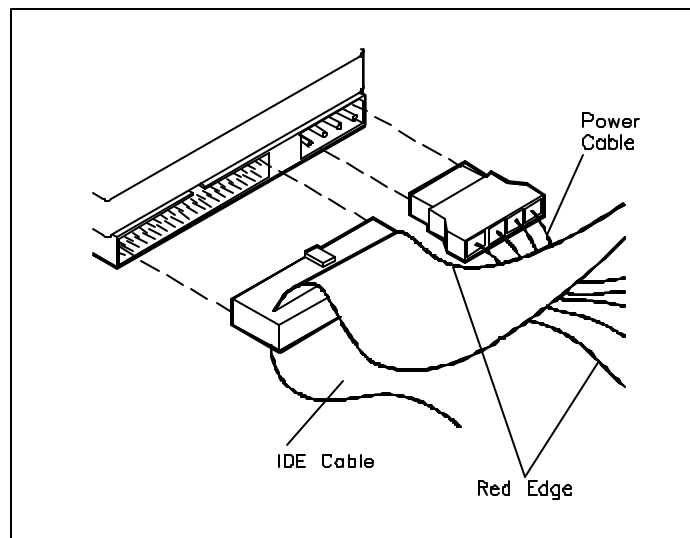


Figure Section 3-31 *Minitower 5 1/4-Inch Hard Disk Drive Cables*

Completing Minitower 5 1/4-Inch Device Installation

Replace the assemblies removed earlier and reconfigure the system as follows.

1. Reinstall the 5 1/4-inch drive cage by reversing the steps of the “3 1/2-inch Drive Bracket Removal” procedure given earlier.
2. Replace the top cover and run Setup to reconfigure the computer for the hard disk drive (see Section 2, Setup and Operation). If a fault occurs at power-on, verify that the reassembly was performed correctly.
3. Reconfigure the computer for the hard disk drive by selecting hard disk drive “Installed” in Setup. Setup will automatically detect the hard disk type. When installing a hard disk drive that cannot be detected, use the “Define Hard Disk Type” to determine the hard disk drive type.

MINITOWER OPTIONAL 3 1/2-INCH HARD DRIVE INSTALLATION

Install an optional internal 3 1/2-inch hard disk drive in the minitower system as follows.

1. Follow any preinstallation instructions that come with the hard drive, such as setting jumpers.
2. Turn off power, unplug power cables, and disconnect any external peripherals.

WARNING: Be sure that system power is off and the system and its peripherals are unplugged before beginning the installation procedure.

3. Remove the minitower system top cover as previously described in this section.
-

4. Locate the area at the top of the chassis where the hard disk is to be installed (see Figure Section 3-32).

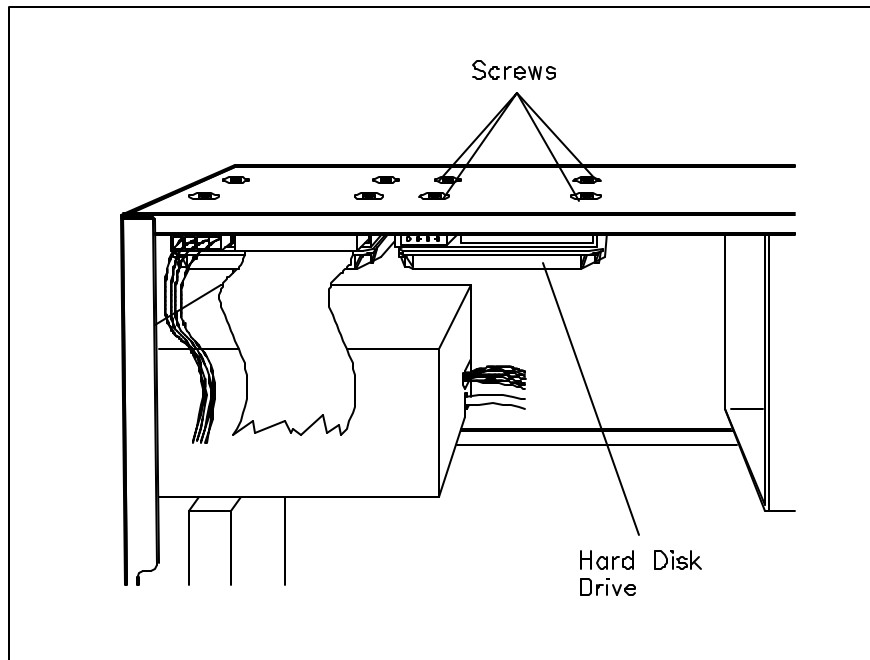


Figure Section 3-32 *Installing Optional 3 1/2-Inch Hard Disk Drive*

5. Hold the hard drive up against the chassis and align the mounting holes in the top of the hard drive with the mounting holes in the chassis.
 6. Secure the hard drive to the chassis with the four screws provided with the hard drive kit.
 7. Connect a connector on the power cable and a connector on the signal cable to the connectors on the hard drive. (See the preceding subsection “Minitower 5 1/4-Inch Hard Disk Drive Cabling” for cabling instructions.)
 8. Install the minitower system cover.
 9. Connect any external peripherals and cables.
 10. Run the Setup program to set the new configuration (see Section 2).
-

HARD DISK DRIVE TROUBLESHOOTING

One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, turn off the computer and try again. If the beeping persists, see Section 4 “Maintenance and Troubleshooting.”

Table Section 3-7 summarizes problems that may develop after installing a hard disk drive and lists in sequential order suggested corrective actions.

Table Section 3-7 Optional 5 1/4-Inch Device Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel does not light.	<ol style="list-style-type: none"> 1. Check that the power cord is plugged into the AC connector on the computer. Check that the other end of the cord is plugged into a live properly grounded AC power outlet.
Operating system does not boot	An invalid configuration message is displayed.	<ol style="list-style-type: none"> 1. Press F2 to run Setup and view parameters. 2. Check installation of the operating system on the hard disk. 3. Check to see if the system will boot from a diskette drive.
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	<ol style="list-style-type: none"> 1. Check that the keyboard is plugged in. 2. Check that the mouse is plugged in.
Diskette drive does not work	Lamp on drive panel does not light when diskette is loaded.	<ol style="list-style-type: none"> 1. Check power and signal cable connections between diskette drive, system board, and power supply. 2. Check that system configuration matches diskette drive signal connectors (end connector is A, middle connector is B). 3. Check diskette drive jumpers or switches, and setup configuration. 4. Swap the diskette signal and power cables between drives. 5. Replace diskette drive. 6. Replace system board.

Table Section 3-7 Optional 5 1/4-Inch Device Problems and Solutions

Problem	Symptom	Solution
Hard disk malfunction	Hard disk drive lamp does not light but hard disk drive can be accessed.	<ol style="list-style-type: none">1. Check cable connections between the indicator panel and system board.
	Hard disk controller failure message displayed.	<ol style="list-style-type: none">1. Check that the IDE port and hard disk drives are enabled.
	Cannot access hard disk.	<ol style="list-style-type: none">1. Check signal and power connections between the hard disk, PCB, and power supply.2. Check drive switch or jumper settings.3. Verify the hard disk parameters selected are correct for the drive.4. Check the power supply and replace the hard disk cable.5. Replace hard disk.6. Replace system board.

Section 4

Maintenance and Troubleshooting

This section provides information on maintaining and troubleshooting PowerMate VP series computers. NEC service and information telephone numbers are listed in Table Section 4-1.

Table Section 4-1 NEC Service and Information Telephone Numbers

Service	Call
To order NEC spare parts	In the U.S., call 1(800) 632-4525
To order options in the U.S.	Local Sales Office
To access the NEC Electronic Bulletin Board System (BBS)	1(508) 635-4706 (see "BIOS Update Utility" in Section 2)
To download software drivers and the latest ROM BIOS files for flash ROM computer systems	1(508) 635-4706 (see "BIOS Update Utility" in Section 2)
NEC Service	In the U.S., call 1(800)632-4525
Listen to the automated attendant and select the appropriate menu to reach one of the following departments.	
Information Center - literature, dealer locations, sales leads, response to ads	
NASC (National Authorized Service Centers)	
Administration - new dealer service authorization/warranty claims	
NSRC (National Service Response Center) - questions other than products, spare parts or technical support	
Service Contracts	
TAC (Technical Assistance Center) - technical support for NASC and NEC sales representatives only	
TSC (Technical Support Center) - technical support for everyone else	
Laptops/Notebooks (Versa/ProSpeed/UltraLite)	
Desktop/Tower Computers (Ready/Image/PowerMate/BusinessMate/Express)	
Printers (Silentwriter/Colormate/Pinwriter)	
FastFacts™, an automated service that sends the latest information about NEC products to a fax machine 24 hours a day.	In the U.S., call 1(800) 366-0476. Outside the U.S., call 1(708) 860-9500, Ext. 2621.
Use FastFacts to obtain Technical Information Bulletins.	
Canadian Inquires	1(416) 795-3554

MAINTENANCE

This subsection contains general information for cleaning and checking the computer's system unit, 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 or lubrication is required.

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

System Unit

Use the following procedure for cleaning the system.

1. Power off the system and unplug all power cables.
2. Periodically wipe the outside of the system unit, 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 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 the disk boot-up. Allow the diskette drive heads to clean for about 30 seconds.

Keyboard

When necessary, inspect and clean the inside of the keyboard. Proceed as follows:

1. Remove the six screws holding the keyboard enclosure together (see Figure Section 4-1).

NOTE: 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.

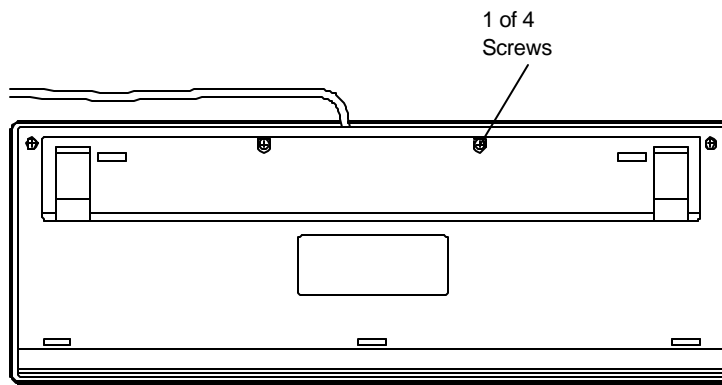


Figure Section 4-1 Removing the Keyboard Enclosure

2. Separate the two halves of the enclosure. 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 (PCB). If the PCB accidentally gets wet, thoroughly dry it before reattaching the keyboard to the system unit.

Mouse

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

1. Unplug the mouse from the system unit.
2. Turn the mouse upside down and locate the mouse ball cover (see Figure Section 4-2).
3. Turn the ball cover counterclockwise and remove the cover.

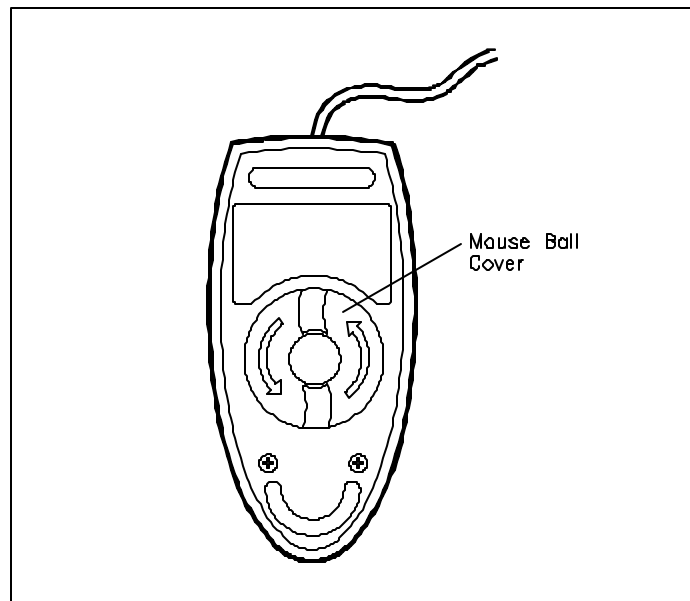


Figure Section 4-2 Removing the Mouse Ball Cover

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.
-

TROUBLESHOOTING

This subsection provides information that helps isolate and repair computer malfunctions at the field level. Step-by-step instructions for diagnosing and solving computer hardware problems are provided.

If disassembly is required, see Sections 5 and 6. Connector pin assignments are given in Appendix A. Jumper settings are explained in Section 2.

Error Messages

Messages may appear when running NEC utilities. Table Section 4-2 describes possible system error and warning messages and their meanings. Table Section 4-3 describes possible ISA NMI error messages.

Table Section 4-2 System Error Messages

Message	Description
8042 Gate – A20 error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short	Error in the address decoding circuitry on the system board.
C: Drive Error	Hard disk drive C does not respond. Run Setup to correct this problem. Also, check the C hard disk drive type in Setup to make sure the hard disk drive type is correct.
C: Drive Failure	Hard disk drive C does not respond. Replace the hard disk drive.
Cache Memory Bad, Do Not Enable Cache	Cache memory is defective.
CH-2 Timer Error	Most AT systems include two timers. There is an error in Timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the RTC on the system board.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run Setup.
CMOS System Options Not Set	The values stored in CMOS RAM does not match the type detected by the BIOS. Run Setup.
CMOS Display Type Mismatch	The graphics type in CMOS RAM does not match the type detected by the BIOS. Run Setup.
CMOS Memory Size Mismatch	The amount of memory on the system board is different than the amount in CMOS RAM. Run Setup.
CMOS time and date not set	Run Setup to set the date and time in CMOS RAM.

Table Section 4-2 System Error Messages

Message	Description
D: Drive Error	Hard disk drive D does not respond. Run the Setup to correct this problem. Also, check the D hard disk drive type in Setup to make sure the hard disk drive type is correct.
D: Drive Failure	Hard disk drive D does not respond. Replace the drive.
Diskette Boot Failure	Boot disk in diskette drive A is corrupt and cannot be used to boot. Use another boot disk and follow screen prompts.
DMA Error	Error in the DMA controller.
DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.
FDD Controller Failure	The BIOS cannot communicate with the diskette drive controller. Power off the system and check all connections.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Power off the system and check all connections.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the disk in diskette drive A, but cannot boot the system. Use another boot diskette.
Keyboard Is Locked	Keyboard lock on the system is engaged. The system must be unlocked to continue.
Keyboard Error	There is a timing problem with the keyboard. Set the Keyboard option in Setup to Not Installed to skip the keyboard POST routines.
KB/Interface Error	There is a error in the keyboard connector.
No ROM BASIC	Cannot find a bootable sector on either diskette drive A or hard disk drive C. The BIOS calls INT 18h which generates this message. Use a bootable disk.
Off Board Parity Error	Parity error in the installed expansion memory. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) XXXX is the hex address where the error occurred.
On Board Parity Error	Parity error in system memory. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) XXXX is the hex address where the error occurred.
Parity Error ????	Parity error in system memory at an unknown address.

Table Section 4-2 System Error Messages

Message	Description
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Table Section 4-3 ISA NMI Error Messages

Message	Description
Memory Parity Error at xxxxx	Memory failed. If the memory location can be determined, it is displayed as xxxxx. If not, the message is Memory Parity Error ????.
Memory Parity Error at xxxxx	An expansion card failed. If the address can be determined, it is displayed as xxxxx. If not, the message is I/O Card Parity Error ????.
DMA Bus Time-out	A device has driven the signal for more than 7.8 microseconds.

Diagnosing and Solving Problems

One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, power off the computer and try again. If the beeping persists, see Table Section 4-4. The table summarizes problems that may develop during computer operation and lists (in sequential order) suggested corrective actions.

Table Section 4-4 Problems and Solutions

Problem	Symptom	Solution
No power	Power lamp on computer status panel will not light.	<ol style="list-style-type: none"> 1. Check that the power cord is plugged into the AC connector 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 power supply and system board. 3. Systematically eliminate possibly shorted PCBs by removing cables and expansion boards. 4. Check the +5 and +12 power supply voltages (see Appendix A, Connector Pin Assignments). Measure voltages with the system board installed. 5. Replace power supply. 6. Replace system board.

Table Section 4-4 Problems and Solutions

Problem	Symptom	Solution
Power supply malfunction	Any one or more of the following conditions could occur: 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.	<ol style="list-style-type: none"> 1. Perform steps 1 through 4 listed in this table under No Power. 2. Check power supply voltages. Voltages should be measured with a load on them (system board plugged in). See Appendix A for connector pin assignments and Appendix B for the power supply specifications. 3. Replace power supply.
Operating system does not boot	Intermittent beeping at power-on. Computer beeps more than once and is unable to complete boot-up.	<ol style="list-style-type: none"> 1. Check system configuration. 2. Check all jumper settings and verify that drives are enabled (refer to Section 2). 3. Reseat SIMMs and option boards in their connectors. Inspect system board for dropped objects. 4. Remove option boards and reboot. 5. Replace system board.
	"Invalid Configuration" message displayed.	<ol style="list-style-type: none"> 1. Press the F1 key to run Setup and correct the parameters. 2. Replace the system board if the date and time must be set each time the computer is powered on.
	Computer halts during loading sequence.	<ol style="list-style-type: none"> 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 or hard disk) for bad boot track or incorrect OS files. 3. Try booting OS from diskette or recopy OS files onto hard disk. 4. Verify the correct hard disk is selected.

Table Section 4-4 Problems and Solutions

Problem	Symptom	Solution
Diskette drive does not work	Lamp on drive panel does not light when diskette is loaded.	<ol style="list-style-type: none"> 1. Check power and signal cable connections between diskette drive, system board, and power supply. 2. Check diskette drive jumpers (see Section 3). 3. Check power supply and replace diskette cable. 4. Replace diskette drive. 5. Replace system board.
Hard disk malfunction	Hard disk drive lamp does not light but hard disk drive can be accessed.	<ol style="list-style-type: none"> 1. Check cable connections between lamp and system board.
	Hard disk controller failure message displayed.	<ol style="list-style-type: none"> 1. Check that the IDE port and hard disk drives are enabled in setup.
	Cannot access hard disk.	<ol style="list-style-type: none"> 1. Check signal and power connections between hard disk, PCB, and power supply. 2. Check drive jumper settings (refer to Section 3). 3. Check power supply and replace hard disk cable. 4. Replace hard disk. 5. Replace system board (or hard disk controller PCB if system board is not used).
Memory malfunction	Total memory is not recognized.	<ol style="list-style-type: none"> 1. Reseat SIMMs. 2. Systematically swap SIMMs. 3. Check to see if the SIMM configuration is valid (see Section 3). 4. Replace SIMMs. 5. Replace system board.
Sound board malfunction	No output from both the 8-bit and 16-bit digitized sounds.	<ol style="list-style-type: none"> 1. Check interrupts. Refer to Appendix D for interrupt settings. 2. Check DMA channels. Refer to Appendix D for DMA channel settings.

Table Section 4-4 Problems and Solutions

Problem	Symptom	Solution
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	<ol style="list-style-type: none"> 1. Check that keyboard/mouse is plugged in. 2. Check password utility (see Section 2). 3. Disable password utility (see Section 2). 4. Replace keyboard (or mouse). 5. Replace system board.
Monitor malfunction	Unable to synchronize display.	<ol style="list-style-type: none"> 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 1). The NEC SVGA Monitor supports up to 1024 x 768. Most monitors don't support resolutions above 640 x 480 (VGA monitors). 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.	<ol style="list-style-type: none"> 1. Check that the computer and monitor are not near motors or electric fields.
	Blank display.	<ol style="list-style-type: none"> 1. Check that built-in VGA (see Section 2) (or optional video board if installed) is enabled. 2. Check that the monitor power ON/OFF switch is ON. 3. Check cable connections between the AC power supply and monitor. 4. Adjust brightness and contrast controls on the monitor. 5. Check cable connections between the monitor connector and the system board (or optional video board). 6. Replace system or video board. 7. Replace monitor.

Beep Codes

One beep indicates that the computer has completed its power-on self-test. If a long beep or a series of long beeps occur, power off the computer and try again. If the long beeps persists, see Table Section 4-5 for the diagnostic beep codes.

The beep codes are announced on the speaker only if a fatal failure is detected. For instance, three long beeps indicates a failure in the first 64 K of RAM.

Table Section 4-5 Diagnostic Beep Codes

Message	Beeps	Description of Failure
Refresh failure	1	The memory refresh circuitry on the system board is faulty.
Parity error	2	Parity error in the first 64 KB of memory.
Base 64 KB memory failure	3	Memory failure in the first 64 KB.
Timer not operational	4	Memory failure in the 64 KB of memory or timer 1 on the system board is not functioning.
Processor error	5	The CPU on the system board generated an error.
8042 – Gate A20 failure	6	The keyboard controller (8042) may be bad. The BIOS cannot switch to protect mode.
Processor exception interrupt error	7	The CPU generated an exception interrupt.
Display memory read/write error	8	The system graphics is either missing or its memory is faulty. This is not a fatal error.
ROM checksum error	9	ROM checksum value does not match the value encoded in the BIOS.
CMOS shutdown register read/write error	10	The shutdown register for CMOS RAM failed.
Cache error/external cache bad	11	The external cache is faulty.

BIOS UPDATE UTILITY

The system BIOS resides on a flash ROM in the system. The flash ROM can be updated, should it ever become necessary. This feature allows the ROM BIOS chip to be “flashed” with a new BIOS code through software, rather than requiring replacement of the chip.

Performing an update is done with a BIOS flash diskette. The diskette, which contains the latest version of the BIOS code, can be obtained from NEC Technologies. Check the NEC Bulletin Board Service (BBS) to obtain the latest version of the BIOS Update utility. How to access the BBS is described next, followed by a procedure for flashing the BIOS.

NEC Bulletin Board Service

To log onto the NEC BBS, follow these steps:

NOTE: First time users must answer a new user questionnaire.

1. From the Windows Program Manager, select Accessories and double click on Terminal.
 2. From the Settings menu, select Communications and check that the settings match the following BBS parameters:
 - Baud rate: 2400 bps
 - Parity: none
 - Data bits: 8
 - Stop bits: 1
 3. Log onto the BBS:
 - Click on the Phone menu item.
 - Enter the BBS phone number 508 635-4706.
 - Click on “OK.”
 4. Press **Enter** twice.
 5. Enter your first name, last name, and password. Press **Enter** after each.
 6. Follow the screen prompts until the NECTECH Main Menu is displayed. The prompts require the following key strokes:
 - Press **S** and then **Enter**
 - Press **S** and then **Enter**
 - Press **Enter** three times.
 7. At the NECTECH Main Menu, press **F** and **Enter** for the file menu.
-

To hang up and log off, follow these steps at the NEC Technologies Bulletin Board:

1. Press **Enter** (to continue).
2. Press **G** (command for Good-bye/Hang-up).
3. Press **Enter**.

Using the BIOS Update Utility

Update the BIOS from the BIOS flash diskette as follows.

1. Write down the Setup parameters currently set on the system (see Section 2, Setup and Operation, for Setup information).
 2. Insert the flash diskette in drive A.
 3. Reboot the system.
 4. At the flash upgrade Main Menu, use the arrow keys to select “Install New BIOS” and press **Enter**.
 5. A prompt appears, asking for confirmation to upgrade the BIOS. Press **Enter** to continue with the flash upgrade and **Cancel** to quit.
 6. At upgrade completion, remove the flash diskette.
 - A. Reboot the system, and run Setup. Check and reset parameters, using the copy of the Setup parameters that were copied earlier in this procedure.
-

Section 5

Desktop Repair

DISASSEMBLY AND REASSEMBLY

This section contains step-by-step disassembly procedures for the desktop systems. The CD-ROM reader (multimedia configurations), hard disk drive (hard drive configurations), and 3 1/2-inch diskette drive (all configurations) are included in these disassembly procedures. Reassembly is the reverse of disassembly. Each procedure is supported by a simplified disassembly illustration to facilitate removal. The detailed exploded-view diagram and parts lists for the desktop systems are included at the end of this section.

A Phillips-head screwdriver is the only required tool. For complete disassembly of the system unit, follow the disassembly order listed in Table Section 5-1. To reassemble, follow the table in reverse order.

Individual removal procedures do not require the total disassembly of the computer. Each of the following subsections lists the parts that must be removed before beginning the removal procedure. To reassemble, follow the procedure in reverse order.

Table Section 5-1 PowerMate VP Series Desktop Disassembly Sequence

Sequence	Part	See Page
1	Top cover	5-3
2	Expansion board(s)	5-4
3	PCI/ISA-Bus backboard	5-7
4	3 1/2-inch diskette and hard disk drives	5-7
5	Front panel assembly	5-10
6	Power button cover	5-11
7	Speaker assembly	5-12
8	SIMM memory	5-13
9	5 1/4-inch devices	5-14
10	5 1/4-inch device cage	5-15
11	Power supply	5-16
12	System board	5-18

When disassembling the system unit, follow these general rules.

- Disconnect all peripherals.
- When handling boards or chips, touch the system unit frame to discharge static.
- Do not disassemble parts other than those specified in the procedure.
- All screws are Phillips-head, unless otherwise specified.
- Label all removed connectors. Note where the connector goes and in what position it was installed.

On completion of any reassembly, perform a power-on test (see Section 2, Setup and Operation). If a fault occurs, verify that the reassembly was performed correctly.

CAUTION: When handling boards or chips, ground yourself to release static.

Top Cover Removal

Remove the top cover as follows.

NOTE: Unplug the power cord before disassembling the system unit. Voltage is present inside the system unit even after the power is off. All voltage is removed only when the power cord is unplugged.

1. Power off and unplug the keyboard, mouse, power and all other peripheral cables attached to the system unit.
2. Remove the two cover screws shown in Figure Section 5-1.

Figure Section 5-1 Top Cover Screws

3. Slide the top cover toward the back about one inch.
4. Lift the top cover up and off (see Figure Section 5-2).

Figure Section 5-2 Removing the Top Cover

Expansion Board Removal

Remove any installed expansion board(s) per the following steps.

1. Remove the top cover as previously described.
2. Disconnect any cables leading from the expansion board(s), including the multimedia sound board audio cable (if installed).

NOTE: The CD-ROM uses an IDE interface signal cable. The only cable attached to the sound board is the audio cable.

3. Remove the screw from the expansion slot bracket (see Figure Section 5-3).

To remove a board on the inside of the PCI/ISA-Bus backboard, remove the expansion slot screw as shown in Figure Section 5-4.

Figure Section 5-3 Expansion Slot Screw

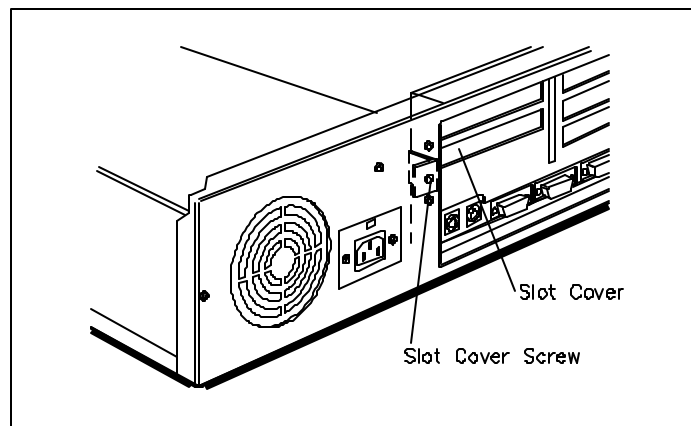


Figure Section 5-4 Inside Expansion Slot Screw

4. Remove the board from the expansion slot.

When removing an expansion board from the backside of the PCI/ISA-Bus back-board, separate the inside expansion slot L-bracket from the expansion board by removing the screw shown in Figure Section 5-5.

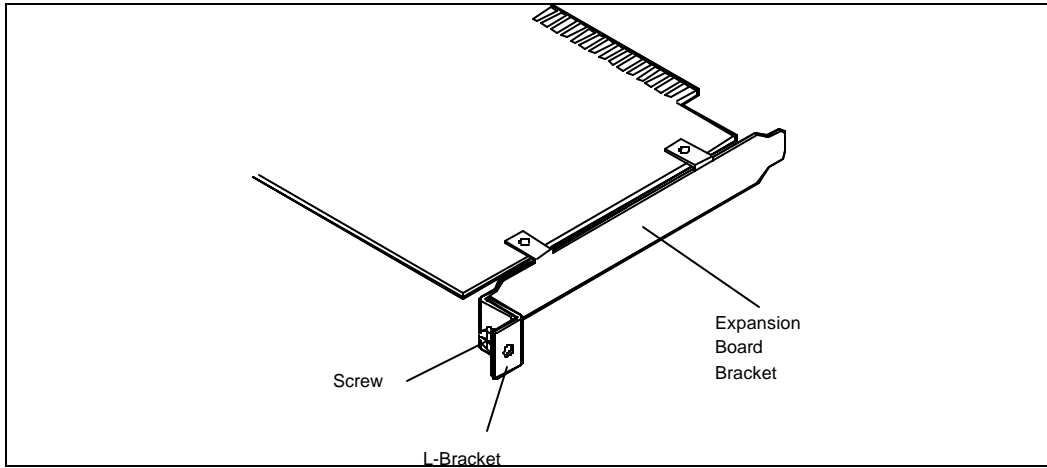


Figure Section 5-5 *Removing the Expansion Slot L-Bracket*

ISA/PCI-BUS Backboard Removal

Remove the ISA/PCI-Bus backboard from the system unit as follows.

1. Remove the top cover and all expansion boards as previously described.
2. Remove the two backboard screws (see Figure Section 5-6).
3. Lift the backboard away from the bracket and out of the system unit.

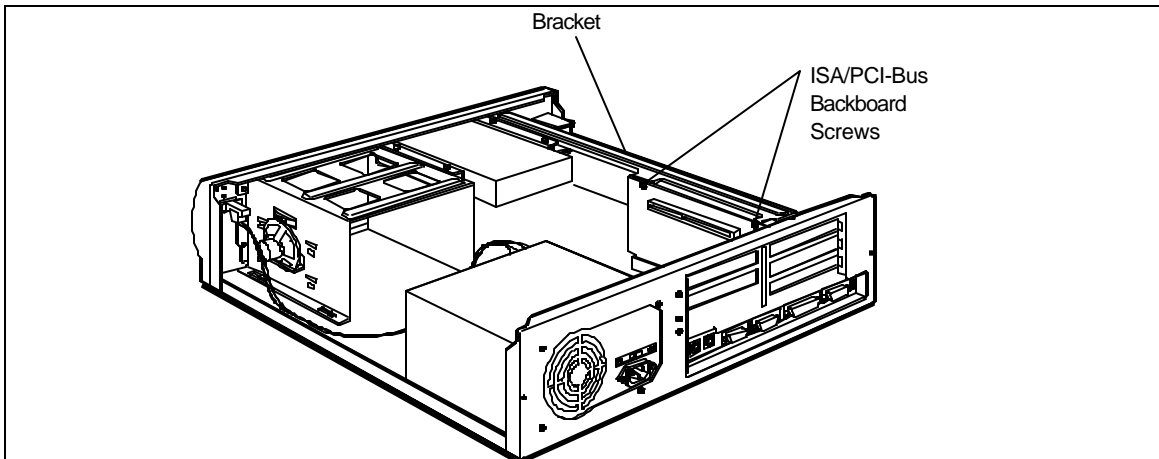


Figure Section 5-6 ISA/PCI-Bus Backboard Screws

3 1/2-inch Diskette and Hard Disk Drive Removal

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

1. Remove the top cover as previously described.
2. Unplug the diskette drive power cable and signal cable from the diskette drive (see Figure Section 5-7).
3. Unplug the hard disk drive power cable and signal cable from the hard disk drive.

NOTE: When reinstalling the drives, note that all power cables are keyed to fit only in the correct position. The red edge of the diskette drive signal cable is positioned as shown.

4. Remove the four 3 1/2-inch drive bracket screws (see Figure Section 5-7).

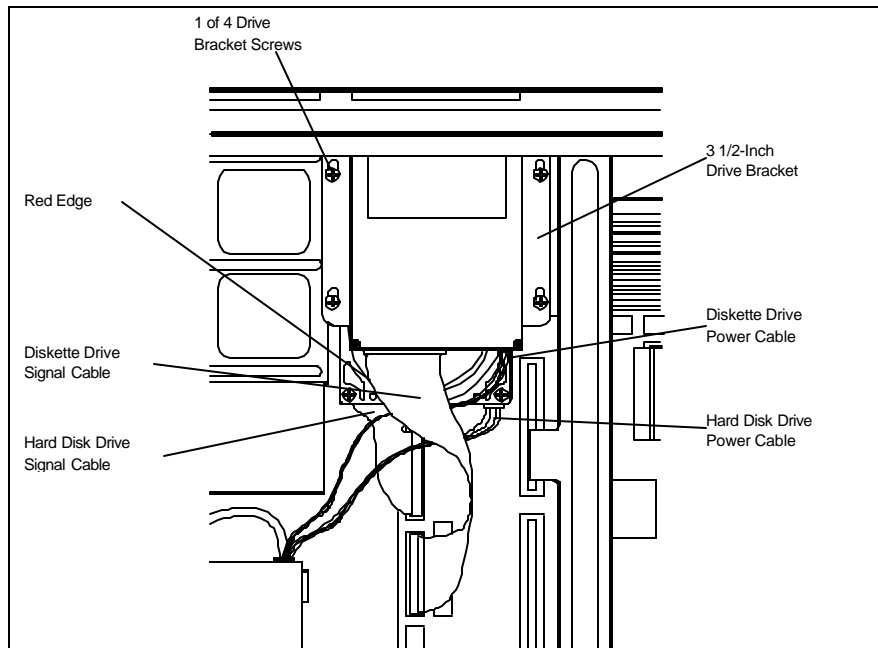


Figure Section 5-7 3 1/2-Inch Drive Bracket Screws

5. Remove the four 3 1/2-inch diskette drive screws, two on each side of the drive bracket (see Figure Section 5-8).

Remove the two 3 1/2-inch hard disk drive screws, two on each side of the drive bracket (see Figure Section 5-8).

6. Pull the drives out from the front of the bracket.

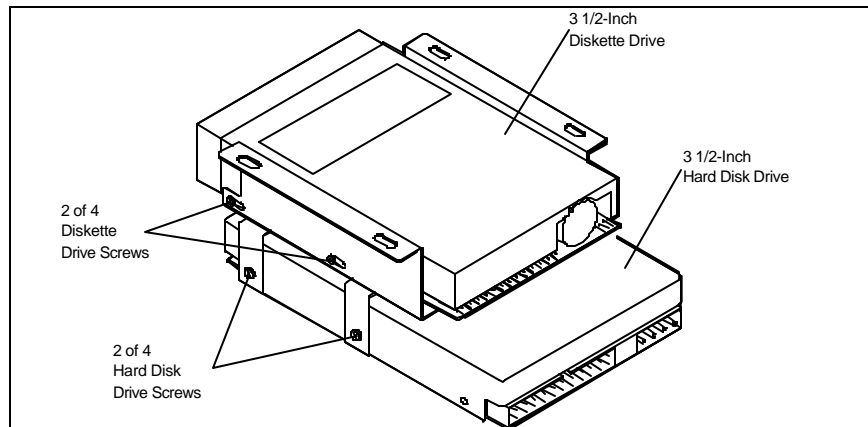


Figure Section 5-8 3 1/2-Inch Diskette and Hard Disk Drive Screws

Front Panel Assembly Removal

Remove the front panel assembly from the system unit as follows.

1. Remove the top cover and 3 1/2-inch drive bracket as previously described.
2. Unplug the following cables from their connectors (see Figure Section 5-9).
 - Power lamp (connector J16)
 - Hard disk drive busy lamp (connector J14)
 - Suspend button (connector J11)
3. Remove the five front panel screws (see Figure Section 5-9).
4. Pass the two lamp and suspend cables through the hole in the front of the system unit chassis when removing the front panel assembly.

Figure Section 5-9 Indicator Panel Connectors

5. Separate the lamps and suspend button from the front panel assembly by pulling them out from their sockets in the panel assembly.
-

Power Button Cover Removal

Remove the power button cover from the front panel as follows.

1. Remove the top cover and front panel as previously described.
2. Release the four power button tabs and push the tabs through the front panel.
3. Remove the power button from the front of the panel.

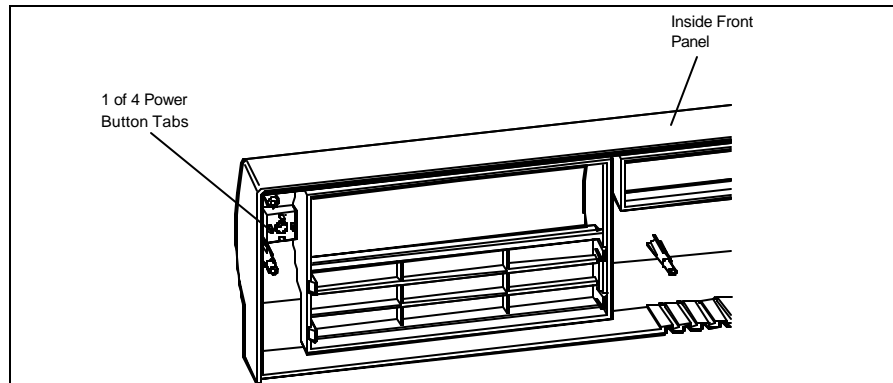


Figure Section 5-10 Power Button Tabs

Speaker Assembly Removal

Remove the speaker from the device cage as follows.

1. Remove the top cover as previously described.
2. Unplug the speaker connector J18 on the system board.
3. Remove the speaker screw from the side of the device cage (see Figure Section 5-11).
4. Lift the speaker from the slot in the device cage.

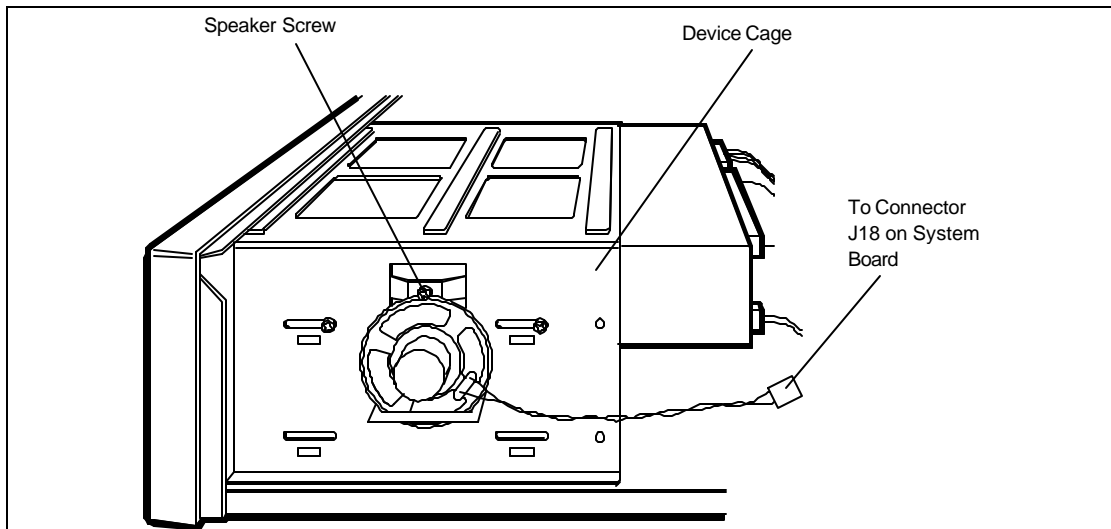


Figure Section 5-11 Speaker Screw

SIMM Removal

Remove SIMM sticks from the system board as follows.

1. Remove the top cover, and any full size expansion boards as previously described.
2. Open the two clips at each end of the SIMM connector (see Figure Section 5-12). Tilt the SIMM stick forward, so that the SIMM can be removed from the socket.
3. Remove the SIMM stick from the system board. Repeat step 2 for each SIMM to be removed.

NOTE: Detailed information on removing SIMM sticks is in Section 3, Options.

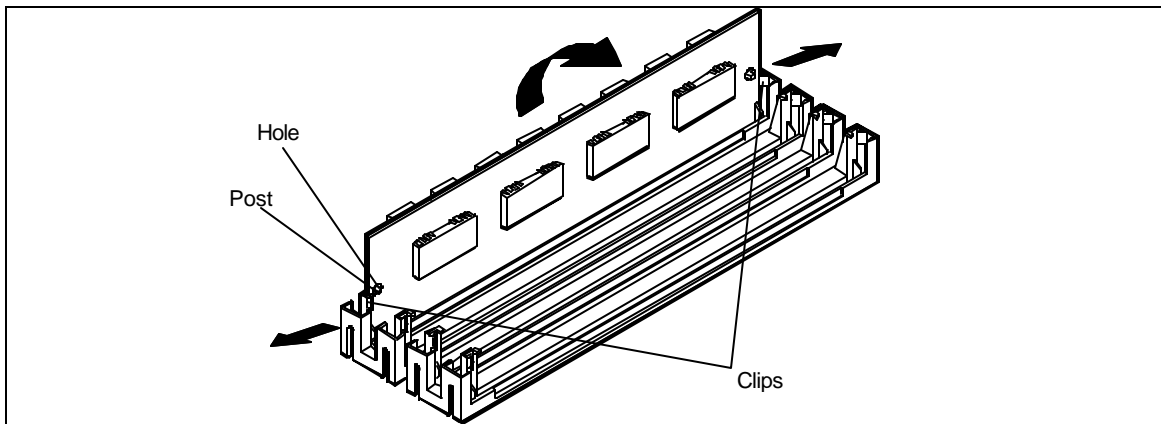


Figure Section 5-12 SIMM Socket

Optional 5 1/4-Inch Device Removal

Remove an optional 5 1/4-inch device from the 5 1/4-inch device cage per Figure Section 5-13, and the following steps.

1. Remove the top cover, front panel, and 3 1/2-inch drive bracket as previously described.
2. Unplug all signal and power cables from the device(s) in the 5 1/4-inch device cage (see Figure Section 5-13), including the audio cable connected to the CD-ROM (if installed).
3. Remove the four device screws, two from each side of the 5 1/4-inch device cage (see Figure Section 5-13).
4. Remove the device from the 5 1/4-inch device cage.

NOTE: When reinstalling the 5 1/4-inch device, note that all power cables are keyed to fit only in the correct position. The red edge of the diskette drive signal cable is positioned as shown.

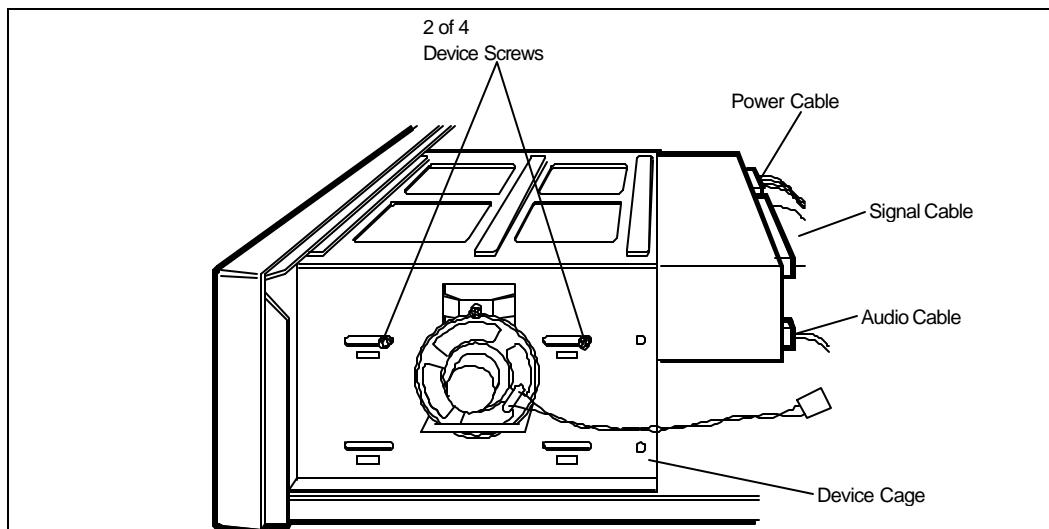


Figure Section 5-13 5 1/4-Inch Device Screws

5 1/4-Inch Device Cage Removal

Remove the 5 1/4-inch device cage from the system unit as follows.

NOTE: Devices housed inside the device cage can be removed from the device cage without removing the device cage. See the preceding procedure.

Remove the device cage only when completely disassembling the system unit.

1. Remove the top cover, front panel, and 3 1/2-inch drive bracket as previously described.
2. Unplug all signal and power cables from the device(s) in the 5 1/4-inch device cage (see Figure Section 5-13), including the audio cable connected to the CD-ROM reader (if installed).
3. Remove the four device cage screws from the front of the device cage (see Figure Section 5-14).
4. Pull the device cage out of the system unit. Devices in the cage do not need to be removed when removing the cage.

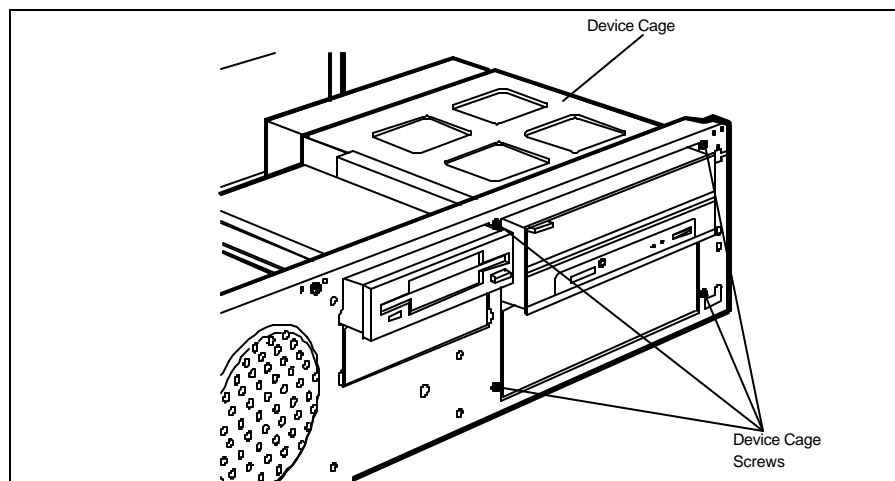


Figure Section 5-14 5 1/4-Inch Device Cage Screws

Power Supply Removal

Remove the power supply from the system unit as follows.

1. Remove the top cover and front panel as previously described.
2. Unplug the power cable attached to the system board's connector.
3. Unplug the power cables from all installed devices.
4. Remove the two screws securing the power button to the front of the system unit (see Figure Section 5-15).

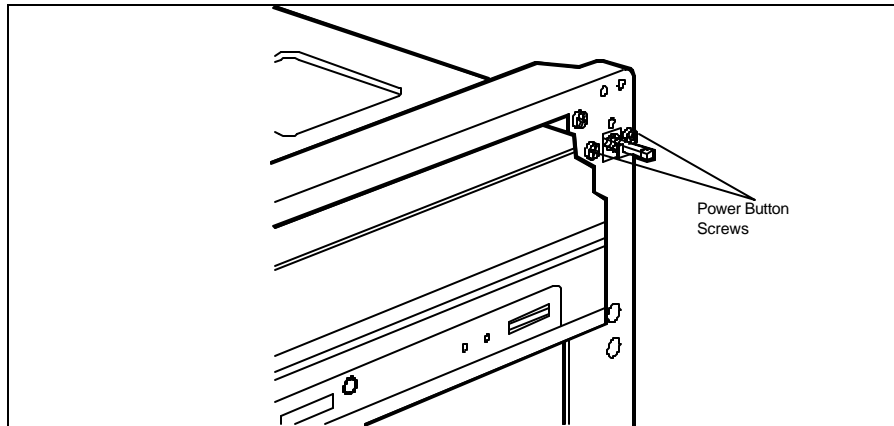


Figure Section 5-15 Power Button Screws

5. Remove the four screws holding the power supply to the system unit (see Figure Section 5-16).
6. Slide the power supply toward the system board to release the two tabs at the front, then lift it out of the system unit.

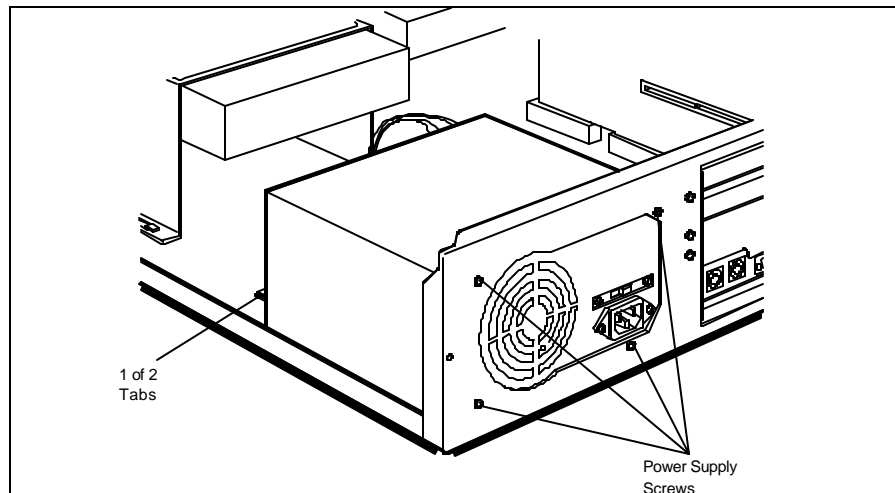


Figure Section 5-16 Power Supply Screws

System Board Removal

Remove the system board per the following steps.

1. Remove the following components as previously described:
 - top cover
 - expansion boards
 - ISA/PCI-bus backboard
 - 3 1/2-inch drive bracket
 - SIMMs installed on the system board.

NOTE: If installed, remove the optional video DRAM module (see Section 3, Options).

2. Remove and label all cables connected to the system board. Appendix A shows the general locations of the connectors on the system board. Appendix A also includes the pin assignments for each connector.
3. Remove the seven screws that hold the system board to the system unit chassis. Remove the system board from the system unit.

Illustrated Parts Breakdown

This subsection contains the illustrated parts breakdown (IPB) and NEC part numbers for the PowerMate VP series desktop computer. Table Section 5-2 lists the field-replaceable parts for the computer. Figure Section 5-17 is the illustrated parts breakdown.

NOTE: In the U.S., call 1(800) 632-4525 to order NEC spare parts. To order options in the U.S., call your local sales office.

Table Section 5-2 PowerMate VP Series Desktop Field-Replaceable Parts List*

Item	Description	Part Number
1	PowerMate VP75 Logo	158-030580-011
2	Power Lamp, Hard Disk Drive Busy Lamp, and Suspend Button Assemblies	158-050705-002
3	Fan Assembly and Extender Cable	158-050823-000
4	Board Edge Guide	158-050685-019
5A	3 1/2-inch x 1-inch, 540-MB Hard Disk	158-050395-322
5B	3 1/2-inch x 1-inch, 1.2-GB Hard Disk	158-050395-338
6	3 1/2-inch x 1-inch, 1.44-MB Diskette Drive	808-870954-101A
7	3 1/2-inch Drive Bracket	158-050685-109
8	PCI/ISA-Bus Backboard Bracket	158-050685-006
9	Hard Disk Drive IDE Signal Cable	158-050562-002
10	CD-ROM IDE Signal Cable	158-050562-004
11	Diskette Drive Signal Cable	158-050578-001
12	Desktop Chassis	158-050685-002
13	System Board (without CPU)	158-050803-000A
14	Audio Cable	158-050824-000
15A	4-MB SIMM Stick	158-082552-070
15B	8-MB SIMM Stick	158-082553-070
16	Sound Board	158-050797-000
17	ISA/PCI-Bus Backboard	158-050795-000A
18	Network Board	158-050796-000

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Table Section 5-2 PowerMate VP Series Desktop Field-Replaceable Parts List*

Item	Description	Part Number
19	Top Cover	158-050685-001
20	Power Supply	158-050730-000
21	External Speaker Assembly	158-050746-000
22	Heatsink for Pentium 75/50 CPU	158-060324-001
23	Pentium 75/50 CPU	158-082502-005
24	Microphone	158-050696-100
25	5 1/4-inch Device cage	158-050685-011
26	4X CD-ROM Reader	158-050817-000
27	Speaker Assembly (internal)	158-050685-003
28	Power Button Cover and Spring	158-050685-008
29	Front Panel Bezel	158-050685-007
30	5 1/4-inch Blank Panel	158-050685-010
31	Keyboard	158-050707-000
32	Power Cord	808-857649-101A
33	NEC Mouse (PS/2-compatible)	158-050484-002

*

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Figure Section 5-17 PowerMate VP Series Desktop Illustrated Parts Break-down*

Table Section 5-3 lists the PowerMate VP series desktop options.

Table Section 5-3 PowerMate VP Series Desktop Options*

Description	Part Number
4-MB SIMM Upgrade Kit (1 MB x 32-bit)*	158-053746-000
8-MB SIMM Upgrade Kit (2 MB x 32-bit)*	158-053746-001
16-MB SIMM Upgrade Kit (4 MB x 32-bit)*	158-053746-003
32-MB SIMM Upgrade Kit (8 MB x 32-bit)*	158-053746-002
1-MB DRAM Module	158-053685-003
1.2-MB Diskette Drive Kit	158-053476-000

* All PowerMate Series SIMM kits have tin edge connectors.

Table Section 5-4 lists PowerMate VP series desktop documentation and packaging.

Table Section 5-4 PowerMate VP Series Desktop Documentation and Packaging

Description	Part Number
<i>PowerMate VP Series User's Guide</i>	819-181129-000
<i>PowerMate VP Desktop Multimedia Quick Setup</i>	819-181146-000
<i>PowerMate VP Series Service and Reference Manual</i>	819-181170-000
<i>PowerMate VP Series Service Video Training Kit</i>	158-056099-026
<i>NEC Multimedia Series Ensemble Software User's Guide</i>	819-181124-000
PowerMate VP Series Desktop Shipping Carton	158-040442-007
PowerMate VP Series Desktop Multimedia Shipping Carton	158-040490-001
Shipping Carton Inserts (4)	158-040395-004

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Section 6

Minitower Repair

DISASSEMBLY AND REASSEMBLY

This section contains step-by-step disassembly procedures for the minitower systems. The CD-ROM reader (multimedia configurations), hard disk drive (hard drive configurations), and 3 1/2-inch diskette drive (all configurations) are included in these disassembly procedures. Reassembly is the reverse of disassembly. Each procedure is supported by a simplified disassembly illustration to facilitate removal. The detailed exploded-view diagram and parts lists for the minitower systems are included at the end of this section.

A Phillips-head screwdriver is the only required tool. For complete disassembly of the system unit, follow the disassembly order listed in Table Section 6-1. To reassemble, follow the table in reverse order.

Individual removal procedures do not require the total disassembly of the computer. Each of the following subsections lists the parts that must be removed before beginning the removal procedure. To reassemble, follow the procedure in reverse order.

Table Section 6-1 PowerMate VP Series Minitower Disassembly Sequence

Sequence	Part	See Page
1	Top cover	6-3
2	Bottom access cover	6-5
3	Expansion board(s)	6-4
4	Front panel assembly	6-7
5	Power button cover	6-8
6	Blank panel and metal cover plate	6-9
7	Speaker assembly	6-10
8	SIMM memory	6-11
9	5 1/4-inch device cage	6-12
10	5 1/4-inch device	6-12
11	3 1/2-inch hard disk drive	6-14
12	3 1/2-inch diskette drive	6-16
13	Power supply	6-19
14	PCI/ISA backboard	6-21
15	System board	6-22

When disassembling the system unit, follow these general rules.

- Disconnect all peripherals.
- When handling boards or chips, touch the system unit frame to discharge static.
- Do not disassemble parts other than those specified in the procedure.
- All screws are Phillips-head, unless otherwise specified.
- Label all removed connectors. Note where the connector goes and in what position it was installed.

On completion of any reassembly, perform a power-on test (see “Check” in Section 2). If a fault occurs, verify that the reassembly was performed correctly.

CAUTION: When handling boards or chips, ground yourself to release static.

Top Cover Removal

Remove the top cover as follows.

NOTE: Unplug the power cord before disassembling the system unit. Voltage is present inside the system unit even after the power is off. All voltage is removed only when the power cord is unplugged.

1. Power off and unplug the keyboard, mouse, power, and all other peripheral cables attached to the system unit.
2. Remove the four cover screws shown in Figure Section 6-1.

Figure Section 6-1 Removing the Top Cover Screws

3. Slide the top cover toward the rear about one inch (see Figure Section 6-2).
4. Lift the top cover up and off the system unit.

Figure Section 6-2 Removing the Top Cover

Bottom Access Cover Removal

Remove the bottom access cover from the system unit as follows.

1. Power off and unplug the keyboard, mouse, power cord, and all other peripheral cables attached to the system unit.
2. Place the system unit on its right side.
3. Remove the access cover screw as shown in Figure Section 6-3.
4. Slide the bottom access cover toward the rear of the system, releasing the tabs from the cutouts in the bottom of the chassis.
5. Remove the bottom access cover from the system unit.

Figure Section 6-3 Minitower Bottom Access Cover

Expansion Board Removal

Remove the sound board (multimedia configurations), network board (network configurations), or any other installed expansion board(s) per the following steps.

1. Remove the top cover and bottom access cover as previously described.
2. Disconnect any cables leading from the expansion board(s). The sound board has an audio cable and signal cable attached.
3. Remove the screw from the expansion slot bracket (see Figure Section 6-4).
4. Remove the expansion board.

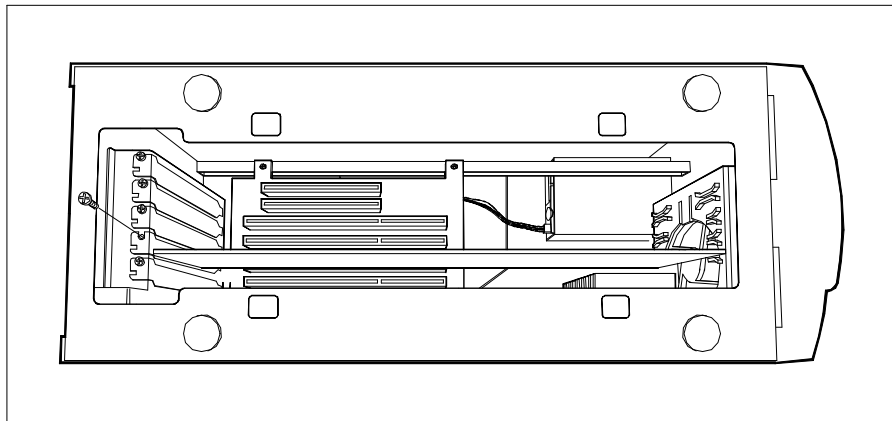


Figure Section 6-4 Expansion Slot Screw

Front Panel Assembly Removal

Remove the front panel assembly from the chassis as follows.

1. Remove the top cover as previously described.
2. Remove the four screws (two on each side) holding the front panel to the system unit (see Figure Section 6-5).

Figure Section 6-5 Front Panel Screws

Power Button Cover Removal

Remove the power button cover from the front panel as follows.

1. Remove the top cover and front panel as previously described.
2. Release the four power button tabs from the inside of the front panel and push the tabs through the front panel (see Figure Section 6-6).
3. Remove the power button from the front of the panel.

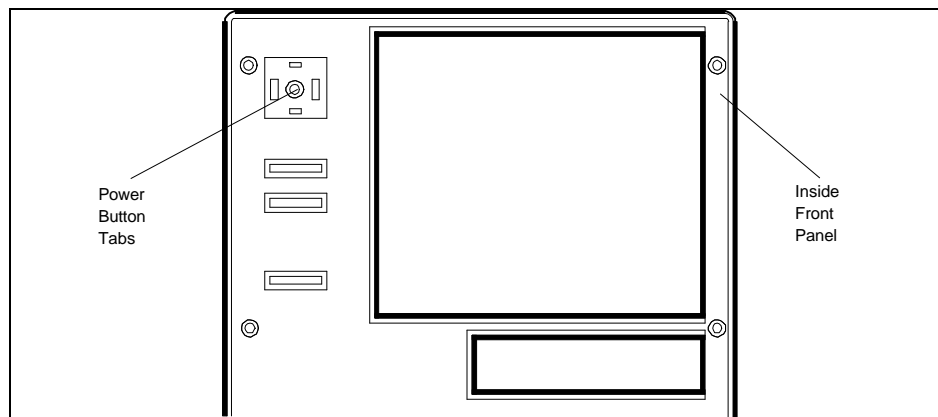


Figure Section 6-6 Power Button Tabs

Blank Panel and Metal Cover Plate Removal

Remove the blank panels and the metal cover plates from the chassis as follows.

1. Remove the top cover and front panel as previously described.
2. Release the blank panel tabs and remove the blank panel from the metal cover plate (see Figure Section 6-7).
3. Remove the two screws holding each metal cover plate to the device cage. Remove the plates.

Figure Section 6-7 Blank Panel Removal

Speaker Assembly Removal

Remove the speaker per Figure Section 6-8 and the following steps.

1. Remove the top cover as previously described.
2. Unplug the speaker from connector J18 on the system board.
3. Slide the speaker over the raised spot and out from the speaker tabs.
4. Remove the speaker from the system unit.

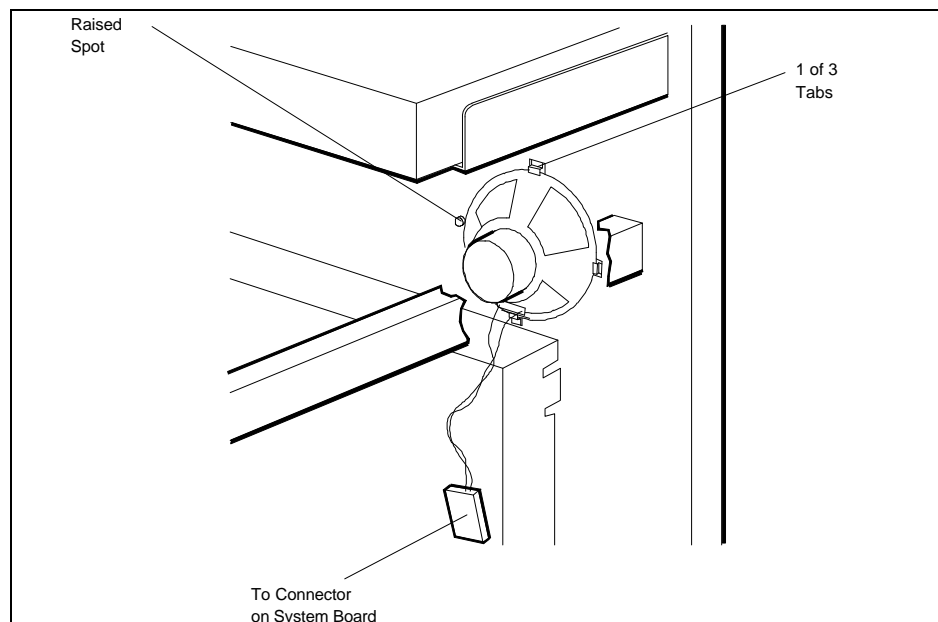


Figure Section 6-8 Speaker Tabs

SIMM Removal

Remove any optional SIMM sticks from the system board as follows.

1. Remove the top cover and any full size expansion boards as previously described.
2. Open the clips at each end of the SIMM connector (see Figure Section 6-9). Tilt the SIMM forward, so that the SIMM can be removed from the socket.
3. Remove the SIMM stick from the system board. Repeat steps 2 and 3 for each SIMM being removed.

NOTE: Detailed information on removing SIMM sticks is in Section 3, Options.

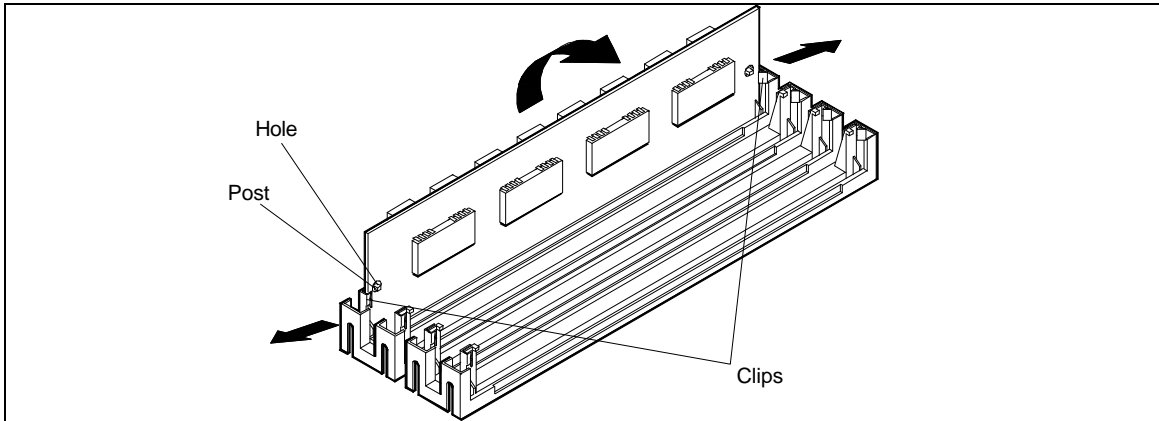


Figure Section 6-9 SIMM Socket

5 1/4-Inch Device Cage Removal

Remove the 5 1/4-inch device cage from the system unit as follows.

- 1.** Remove the top cover as previously described.
- 2.** Label and unplug all signal and power cables from any device(s) in the 5 1/4-inch device cage. Also unplug the audio cable from the CD ROM reader (if installed).
- 3.** Remove the five screws securing the device cage to the chassis (see Figure Section 6-10).
- 4.** Pull the device cage out from the front of the system unit. Any devices in the cage do not need to be removed.

Figure Section 6-10 Removing the Device Cage Screws

5 1/4-Inch Device Removal

Remove a 5 1/4-inch device from the 5 1/4-inch device cage as follows.

1. Remove the top cover, front panel, and device cage as previously described.
2. Remove the four 5 1/4-inch device screws; two on each side (see Figure Section 6-11).
3. Remove the device from the 5 1/4-inch device cage.

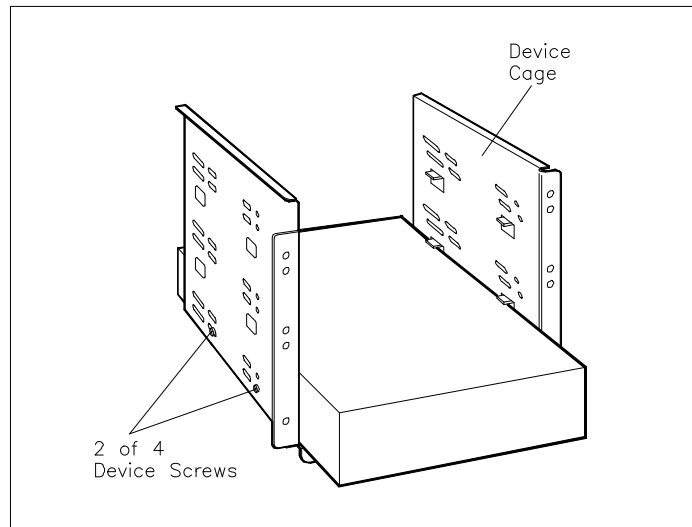


Figure Section 6-11 5 1/4-Inch Device Screws

3 1/2-inch Hard Disk Drive Removal

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

1. Remove the top cover as previously described.
2. Unplug the hard disk drive power and signal cables from the hard disk drive (see Figure Section 6-12).

NOTE: When reinstalling the drives, note that all power cables are keyed to fit only in the correct position.

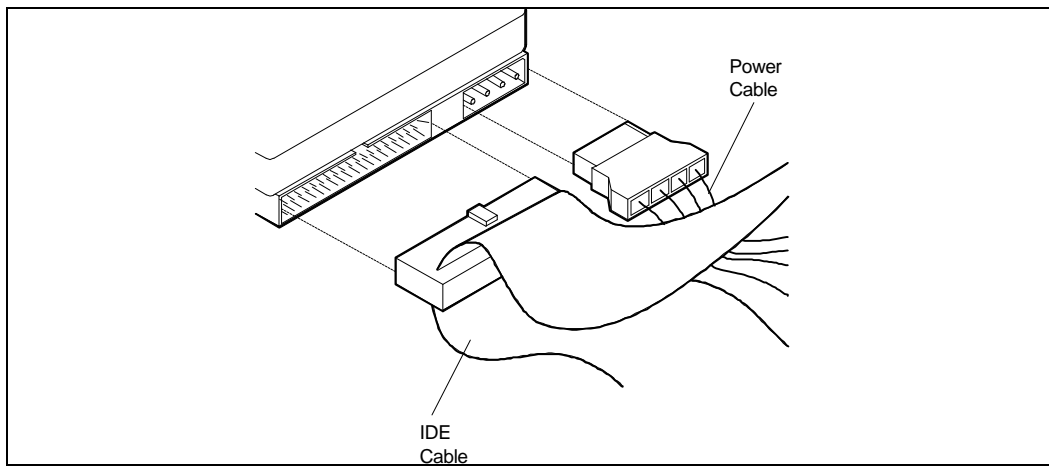


Figure Section 6-12 3 1/2-Inch Hard Disk Drive Cables

3. Remove the four screws holding the 3 1/2-inch hard disk drive to the underside of the chassis top (see Figure Section 6-13). (Note, optional hard disk drive screws shown, standard hard drive similar.)
4. Remove the 3 1/2-inch hard disk drive from the chassis.

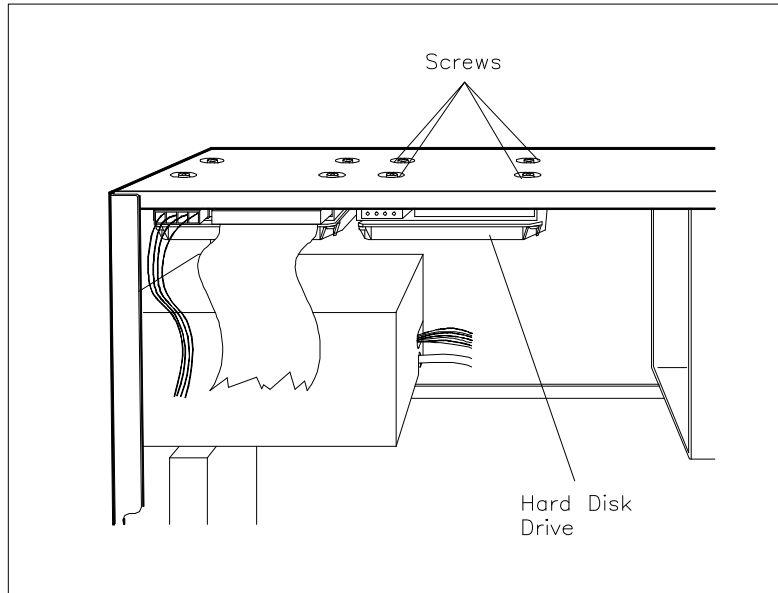


Figure Section 6-13 Removing the 3 1/2-Inch Hard Disk Drive

3 1/2-inch Diskette Drive Removal

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

1. Remove the top cover as previously described.
2. Unplug the diskette drive power cable and signal cable from the diskette drive (see Figure Section 6-14).

NOTE: When reinstalling the diskette drive, note that all power cables are keyed to fit only in the correct position. The red edge of the diskette drive signal cable is positioned as shown.

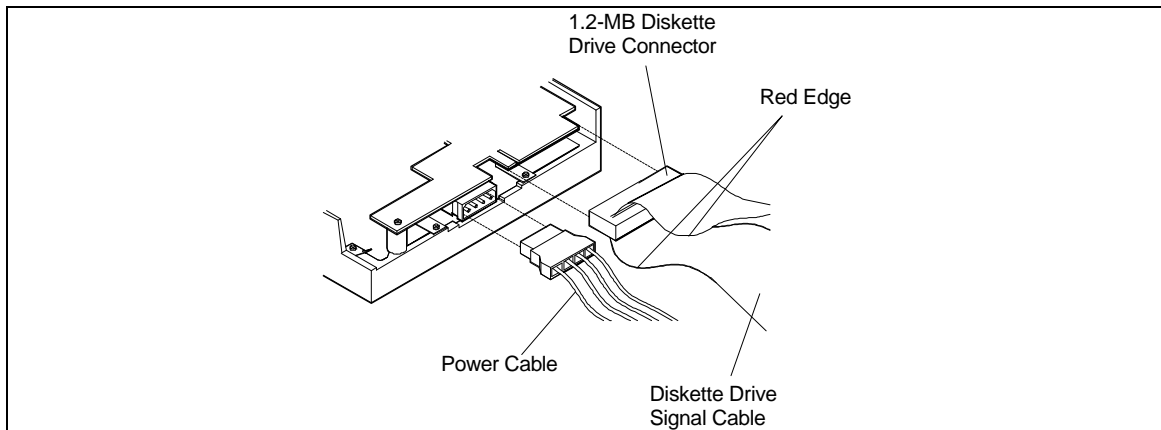


Figure Section 6-14 3 1/2-Inch Diskette Drive Cables

3. Remove the three 3 1/2-inch diskette drive bracket screws shown in Figure Section 6-15.

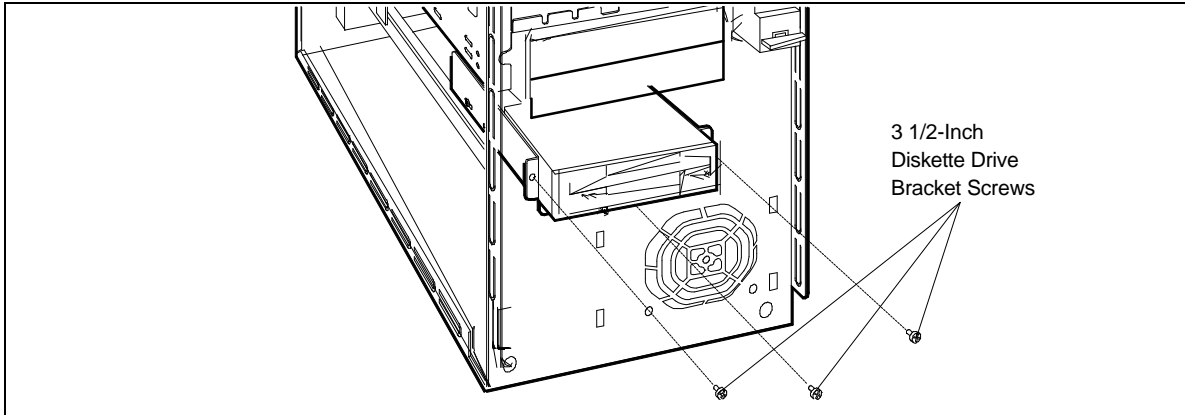


Figure Section 6-15 Diskette Drive Bracket Screws

4. Slide the 3 1/2-inch diskette drive with bracket out of the system unit.
5. Remove the four 3 1/2-inch diskette drive screws, two to a side (see Figure Section 6-16).
6. Remove the drive from the bracket.

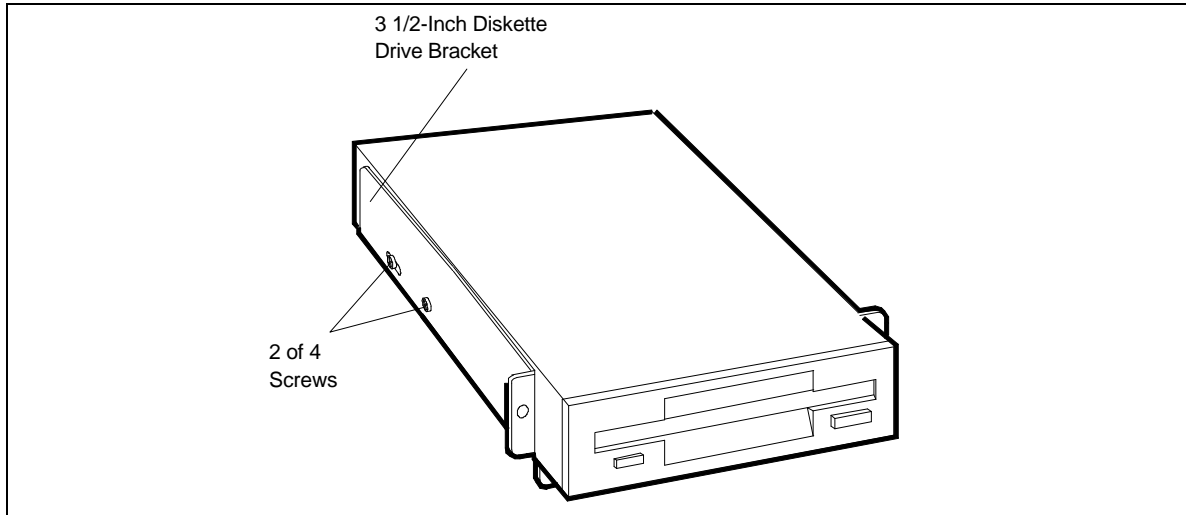


Figure Section 6-16 *Diskette Drive Screws*

Power Supply Removal

Remove the power supply as follows.

1. Remove the top cover as previously described.
2. Unplug the two power cables attached to the system board's connectors.
3. Unplug the power cables from all installed devices.
4. Remove the two screws securing the power button to the front of the system unit (see Figure Section 6-17).

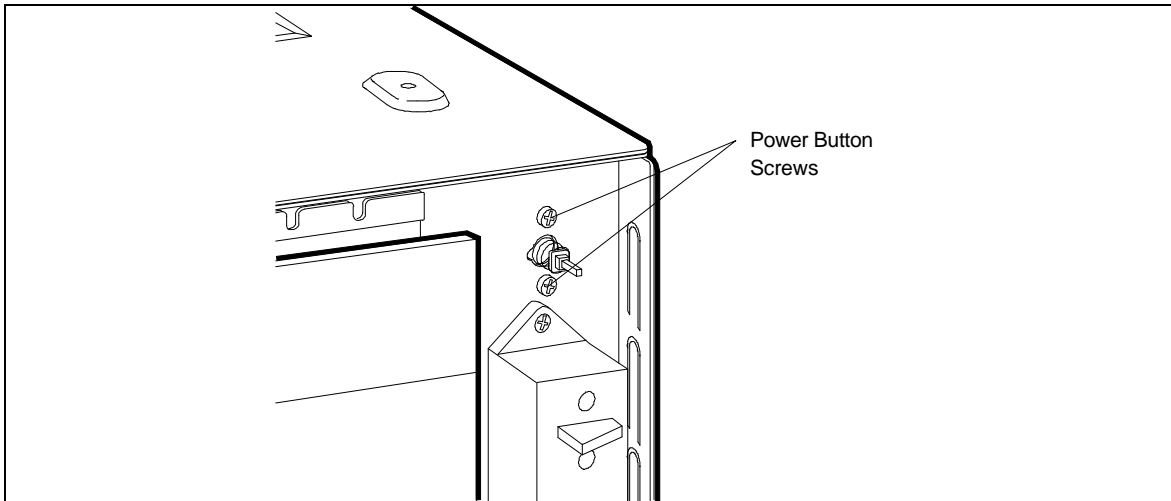


Figure Section 6-17 Power Button Screws

5. Remove the four screws securing the power supply to the system (see Figure Section 6-18).
6. Slide the power supply toward the front of the system unit to release the two tabs at the top of the chassis. Remove the power supply from the system unit.

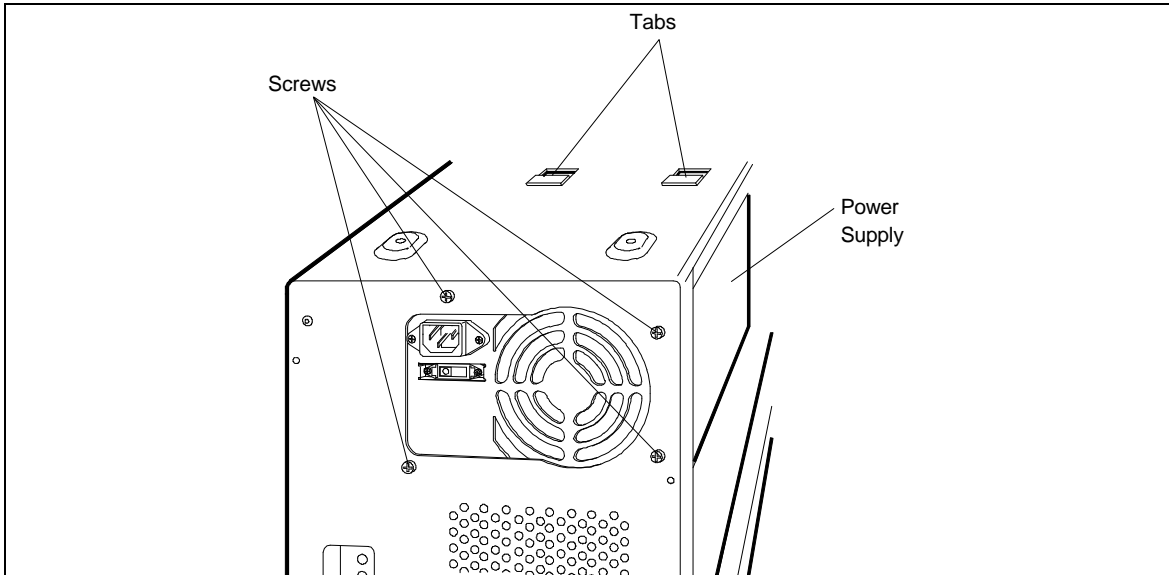


Figure Section 6-18 Power Supply Screws

PCI/ISA Backboard Removal

Remove the PCI/ISA backboard as follows.

1. Remove the top cover and all expansion boards as previously described.
2. Remove the two backboard bracket screws (see Figure Section 6-19).
3. Pull the backboard and bracket out of the system unit.

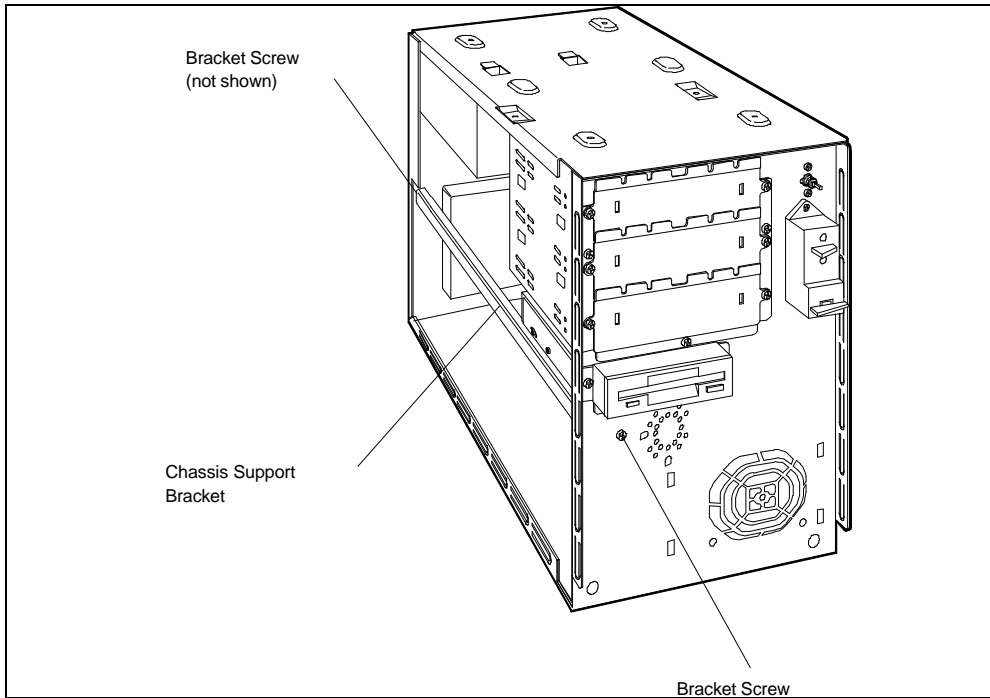


Figure Section 6-19 Chassis Support Bracket Screws

4. Separate the backboard from the bracket by removing the two attaching screws.

System Board Removal

Remove the system board per the following steps.

1. Remove the following components as previously described:
 - top cover
 - expansion slot boards
 - PCI/ISA backboard
 - 3 1/2-inch drive cage
 - 3 1/2-inch diskette drive bracket
 - SIMMs installed on the system board
 - optional video DRAM module if installed.
 2. Remove and label all cables connected to the system board. Appendix A provides the connector identifiers and pin assignments for each connector.
 3. Remove the seven screws that hold the system board to the system unit chassis. Remove the system board from the system unit.
-

Illustrated Parts Breakdown

This subsection contains the illustrated parts breakdown (IPB) and NEC part numbers for the PowerMate VP minitower computer, including part numbers for the multimedia and network components. Table Section 6-2 lists the field-replaceable parts for the computer. Figure Section 6-20 is the illustrated parts breakdown.

NOTE: In the U.S., call 1(800) 632-4525 to order NEC spare parts. To order options in the U.S., call your local sales office.

Table Section 6-2 PowerMate VP Minitower Field-Replaceable Parts List*

Item	Description	Part Number
1	NEC Mouse (PS/2-compatible)	158-050484-002
2	Power Cord	808-857649-101A
3	System Board	158-050803-000A
4	Pentium 75/50 CPU	158-082502-005
5	Heatsink for Pentium 75/50 CPU	158-060324-001
6	Sound Board	158-050797-000
7	Network Board	158-050796-000
8	ISA/PCI-Bus Backboard	158-050818-000A
9A	4-MB SIMM (1 x 32 bit)	158-082552-070
9B	8-MB SIMM (2 x 32 bit)	158-082553-070
10	Bottom Cover	158-050705-108
11	Chassis Support Bracket	158-050705-008
12	Chassis Key and Lock	158-050705-003
13	3 1/2-Inch x 1-Inch, 540 MB Hard Disk	158-050395-322
14	Hard Disk Drive IDE Signal Cable	158-050562-005
15	Minitower Chassis	158-050705-109
16	Power Supply	158-050684-000
17	Microphone	158-050696-100
18	Top Cover	158-050705-001
19	External Speaker Assembly	158-050746-000
20	Audio Cable	158-050824-000

*This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Table Section 6-2 PowerMate VP Minitower Field-Replaceable Parts List*

Item	Description	Part Number
21	Power Lamp, Hard Disk Drive Busy Lamp, and Sleep Button Assembly	158-050705-202
22	4X IDE CD-ROM Reader	158-080817-000
23	CD-ROM IDE Signal Cable	158-050562-004
24	5 1/4-Inch Metal Blank Panel Cover	158-050705-012
25	5 1/4-Inch Plastic Blank Panel Cover	158-050705-004
26	Diskette Drive Signal Cable	158-050578-001
27	3 1/2-Inch x 1-Inch, 1.44-MB Diskette Drive	808-870954-101A
28	5 1/4-Inch Device Cage	158-050705-013
29	3 1/2-Inch Diskette Drive Cage	158-050705-009
30	Fan Cover/Card Guide	158-050705-015
31	Power Button Cover and Spring	158-050698-008
32	PowerMate VP75 Logo	158-030597-008
33	Front Panel Bezel	158-030596-001
34	Fan Assembly and Extender Cable	158-050823-000
35	Speaker Assembly	158-050705-005
36	Keyboard	158-050707-000

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Figure Section 6-20 PowerMate VP75 Series Minitower Illustrated Parts Breakdown*

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Table Section 6-3 PowerMate VP Series Minitower Options

Description	Part Number
4-MB SIMM Upgrade Kit (1 MB x 32-bit)*	158-082552-070
8-MB SIMM Upgrade Kit (2 MB x 32-bit)*	158-082553-070
16-MB SIMM Upgrade Kit (4 MB x 32-bit)*	158-053746-003
32-MB SIMM Upgrade Kit (8 MB x 32-bit)*	158-053746-002
1-MB DRAM Module	158-053685-003
1.2-MB Diskette Drive Kit	158-053476-000

* All PowerMate Series SIMM kits have tin edge connectors.

Table Section 6-4 lists PowerMate VP series minitower documentation and packaging.

Table Section 6-4 PowerMate VP Minitower Documentation and Packaging*

Description	Part Number
<i>PowerMate VP Series User's Guide</i>	819-181129-000
<i>PowerMate VP Series Service and Reference Manual</i>	819-181170-000
<i>PowerMate VP Series Service Video Training Kit</i>	158-056099-026
<i>NEC Multimedia Series Ensemble Software User's Guide</i>	819-181124-000
PowerMate Minitower Series Shipping Carton	158-040455-012
PowerMate Minitower Multimedia Series Shipping Carton	158-040492-000
PowerMate Minitower Multimedia Series Shipping Carton	158-040395-004
Shipping Carton Inserts (4)	158-040395-004

* This data was prepared February 1995. For an up-to-date listing of spare parts, please call FastFacts (800) 366-0476 and order document number 42181170.

Appendix A

Connector Pin Assignments

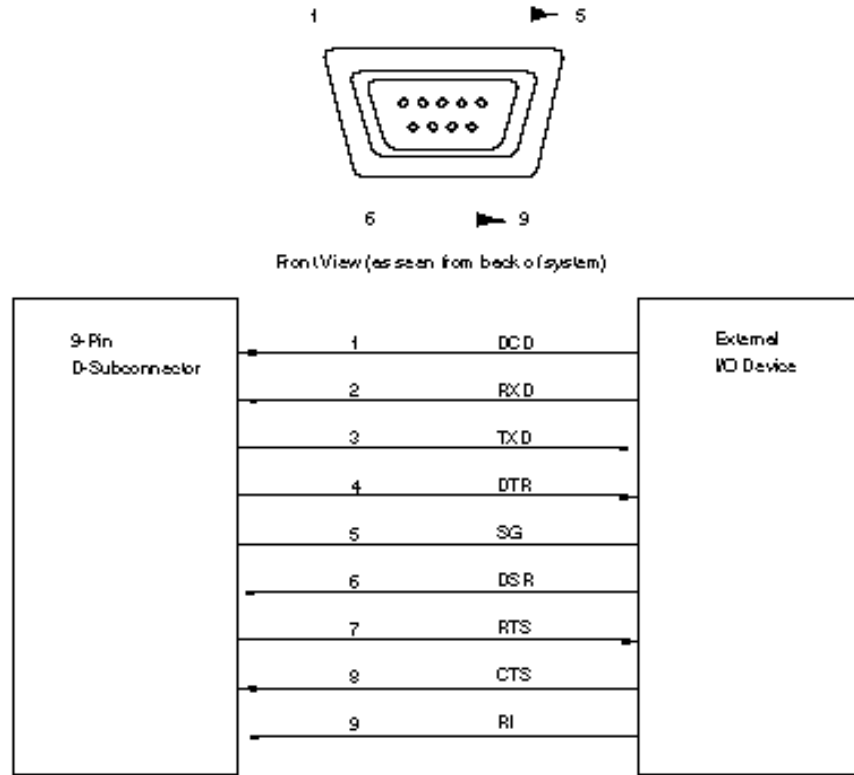
This appendix describes the system board connector pin assignments. Figure Appendix A-1 shows the locations of the system board connectors. Table Appendix A-1 identifies the connector function with the connector number. Descriptions of the connectors are provided in the following subsections. Jumper settings are provided in Section 2, Setup and Operation.

Figure Appendix A-1 System Board Layout

Table Appendix A-1 System Board Connector Descriptions

Function	Connector Number	Type
Monitor (VGA interface)	J20	15 pin female sub D-shell
Parallel interface	J15	25 pin female sub D-shell
Serial interface COM1/COM2	J3, J10	9 pin D-shell
Mouse	J2	6-pin PS/2 style connector
Keyboard	J1	6-pin PS/2 style connector
Power supply	J8	1 x 12 pin locking header
Diskette drive interface	J5	2 x 17 pin header
PCI IDE interface (primary)	J7	2 x 20 pin header
IDE interface (secondary)	J4	2 x 20 pin header
Not used	J12, J17	1 x 2 pin header
Power lamp	J16	1 x 5 pin header
Hard disk drive busy lamp	J14	1 x 4 pin header
Fan	---	Connected to power supply cable
Speaker	J18	1 x 4 pin header
Power Status	J13	1 x 2 pin header
Suspend	J11	1 x 2 pin header
SIMM memory sockets	SIMM 1, 2, 3, 4	72 pin single inline connector

Serial Interface Connectors



Serial interface signals are output from the system board through two 9-pin COM port connectors. The 9-pin, D-subconnectors are located at the rear of the system unit. Pin locations and pin assignments for the two serial interface connectors are shown in Figure Appendix A-2.

Figure Appendix A-2 Serial Interface (J3/J10)

Parallel Interface Connector

The system has a 25-pin parallel port on the system board. Parallel interface specifications for this port conform to the IBM-PC interface. Pin locations and pin assignments for the parallel interface connector are shown in Figure Appendix A-3.

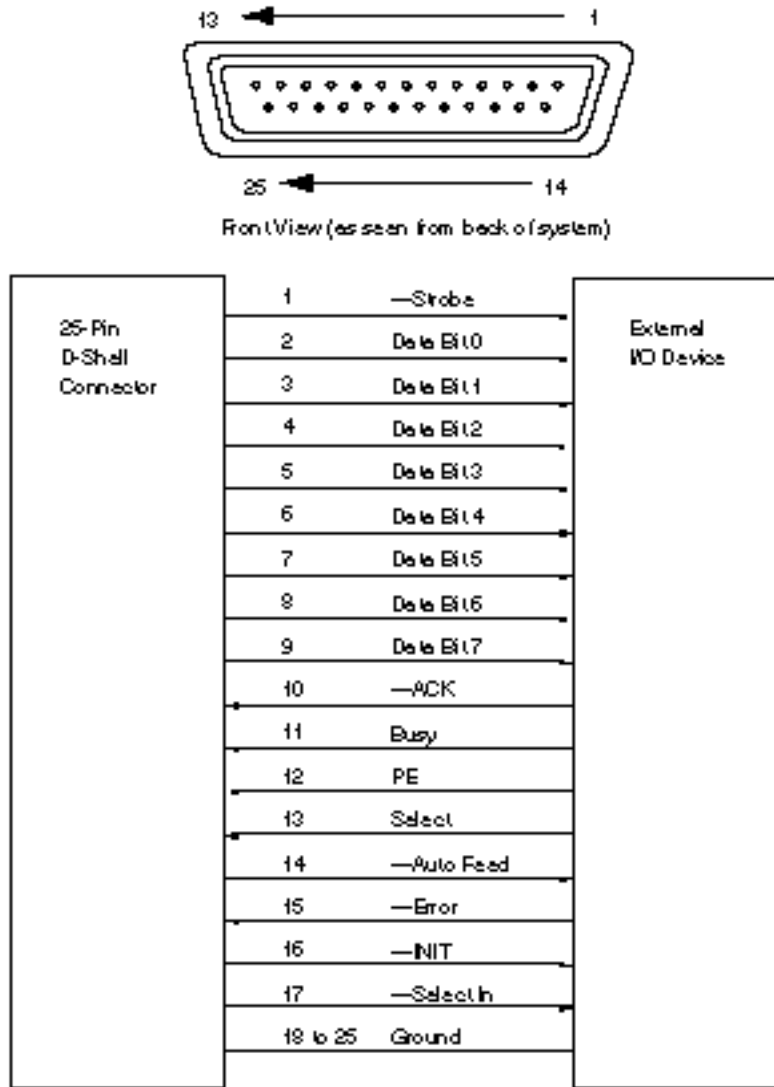


Figure Appendix A-3 Parallel Interface (J15)

VGA Interface Connector Pin Assignments

Video signals are output from the system board through a VGA interface connector, which is a 15-pin, D-subconnector (VESA VS890803-2) located at the rear of the system unit. Table Appendix A-2 shows the connector pin locations and pin assignments.

Table Appendix A-2 Video Connector (J20) Pin Assignments

Pin	Signal
1	Red
2	Green
3	Blue
4	Monitor ID bit 2 (not used)
5	Ground
6	Red return (ground)
7	Green return (ground)
8	Blue return (ground)
9	Key (no pin)
10	Sync return (ground)
11	Monitor ID bit 0 (not used)
12	Monitor ID bit 1 (not used)
13	Horizontal sync
14	Vertical sync
15	Not used

Speaker Connector Pin Assignments

Speaker connector pin locations and pin assignments are shown in Table Appendix A-3.

Table Appendix A-3 Speaker Connector (J18) Pin Assignments

Pin	Signal
1	+5 Vdc
2	Key
3	On-board speaker
4	Speaker data out

Power Supply Connector

Voltages from the power supply are input to the system board through the power supply connector. Figure Appendix A-4 shows the connector pin locations and pin assignments.

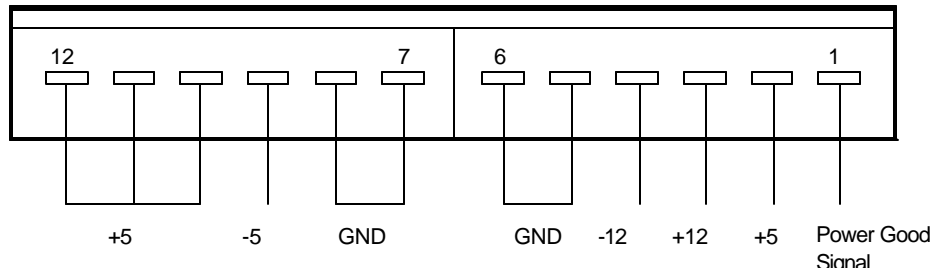


Figure Appendix A-4 Power Supply Connector (J8) Pin Assignments

Keyboard and Mouse Connectors

The keyboard and mouse use standard PS/2 connectors. Pin assignments are given in Table Appendix A-4.

Table Appendix A-4 Keyboard (J1) and Mouse (J2) Connector Pin Assignments

Pin	Keyboard Connector	Mouse Connector
1	Keyboard Data	Mouse Data
2	N/C	N/C
3	GND	GND
4	+5V, (fused)	+5V, (fused)
5	Keyboard Clk	Mouse Clk
6	N/C	N/C

Power Lamp Connector

Power lamp connector pin assignments are given in Table Appendix A-5. The two-wire power lamp cable connects to a five-position connector (J16) on the system board. The cable's green wire (1) goes to pin 1 and the black wire (2) goes to pin 3 on the five-position connector.

Table Appendix A-5 Power Lamp Connector (J16) Pin Assignments

Pin	Signal
1	Lamp Power +5V
2	Ground

Hard Disk Drive Busy Lamp Connector

Hard disk drive busy lamp connector pin assignments are given in Table Appendix A-6. The two-wire hard disk drive busy lamp cable connects to a four-position connector (J14) on the system board. The cable's yellow wire (1) goes to pin 1 and the black wire (2) goes to pin 2 on the four-position connector.

Table Appendix A-6 Hard Disk Drive Lamp Connector (J14) Pin Assignments

Pin	Signal
1	+5V
2	Hard disk busy
3	Key
4	+5V

Fan Connector

Fan connector pin assignments are given in Table Appendix A-7. The connector plugs into one of the power supply cable connectors.

Table Appendix A-7 Fan Connector Pin Assignments

Pin	Signal
1	Ground
2	+12V (fused)

3	Ground
---	--------

Suspend Button Connector

Suspend button connector pin assignments are given in Table Appendix A-8.

Table Appendix A-8 Suspend Button Connector (J11) Pin Assignments

Pin	Signal
1	Reset
2	Key
3	Ground

Diskette Drive Interface Pin Assignments

Table Appendix A-9 provides the pin assignments for the diskette drive interface.

Table Appendix A-9 Diskette Drive Connector (J5) Pin Assignments

Ground Pin	Signal Pin	I/O	Signal Name
1	2	O	FDHDIN
3	4	—	Not used
5*	6	—	FDEDIN
7	8	—	–INDEX
9	10	—	–MOTEN1
11	12	O	–DS2
13	14	O	–DS1
15	16	O	–MOTEN2
17	18	O	–DIR
19	20	O	–STEP
21	22	O	–WRT DATA
23	24	O	–WRT EN GATE
25	26	I	–TRK0
27	28	I	–WRT PROT
29	30	I	–READ DATA
31	32	O	–HS SEL
33	34	I	–DSKT CHG

*Pin 5 is reserved for connector polarization.

IDE Interface Connectors

All signal levels in the IDE interface are TTL compatible. A logic 1 is a signal whose voltage level is between 2.0 and 5.0 V. A logic 0 is a signal measuring between 0.00 V and 0.70 V.

The two system board IDE connectors are physically identical. Electrically the primary IDE/PCI bus IDE connector (J7) is faster and the secondary IDE/PCI connector (J4) is slower. Table Appendix A-10 provides the IDE pin assignments. All signals on the Host interface have the prefix HOST. All negatively active signals are further prefixed with a “-” designation. All positively active signals are prefixed with a “+” designation.

Table Appendix A-10 IDE/PCI Connector Pin Assignments (J4,J7)

Pin	Signal	Pin	Signal
01	-HOST RESET	02	GND
03	+HOST DATA 7	04	+HOST DATA 8
05	+HOST DATA 6	06	+HOST DATA 9
07	+HOST DATA 5	08	+HOST DATA 10
09	+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	GND	20	KEY
21	DRQ3	22	GND
23	-HOST IOW	24	GND
25	-HOST IOR	26	GND
27	IOCHRDY	28	+HOST ALE
29	-DACK3	30	GND
31*	+HOST IRQ14	32	-HOST IO16
33	+HOST ADDR 1	34	GND
35	+HOST ADDR 0	36	+HOST ADDR 2
37	-HOST CS0	38	-HOST CS1
39	-HOST SLV/ACT	40	GND

*The Primary IDE/PCI connector uses IRQ15

SIMM Sockets

Table Appendix A-11 provides the SIMM socket pin assignments.

Table Appendix A-11 SIMM Socket Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	25	D22	49	D8
2	D0	26	D7	50	D24
3	D16	27	D23	51	D9
4	D1	28	A7	52	D25
5	D17	29	N/C	53	D10
6	D2	30	+5V	54	D26
7	D18	31	A8	55	D11
8	D3	32	A9	56	D27
9	D19	33	N/C	57	D12
10	+5V	34	RAS2	58	D28
11	N/C	35	MP2	59	+5V
12	A0	36	MP0	60	D29
13	A1	37	MP1	61	D13
14	A2	38	MP3	62	D30
15	A3	39	GND	63	D14
16	A4	40	CAS0*	64	D31
17	A5	41	CAS2*	65	D15
18	A6	42	CAS3*	66	N/C
19	N/C	43	CAS1*	67	PD0 (N/C)
20	D4	44	RAS0	68	PD1 (N/C)
21	D20	45	N/C	69	PD2 N/C
22	D5	46	N/C	70	PD3 N/C
23	D21	47	WE	71	N/C
24	D6	48	N/C	72	GND

ISA/PCI-Bus Backboard Connector Pin Assignments

Table Appendix A-12 provides the pin assignments for the ISA/PCI-bus backboard connector on the system board.

Table Appendix A-12 ISA/PCI-Bus Backboard Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	IOCHCK	B1	GND	E1	GND	F1	GND
A2	SD07	B2	RSET DRV	E2	GND	F2	GND
A3	SD06	B3	+5V	E3	-PCIINT1	F3	-PCIINT3
A4	SD05	B4	IRO09	E4	-PCIINT2	F4	-PCIINT4
A5	SD04	B5	-5V	E5	+5V	F5	+5V
A6	SD03	B6	DRQ2	E6	Key	F6	Key
A7	SD02	B7	-12V	E7	+5V	F7	+5V
A8	SD01	B8	OWS	E8	-PCIRST	F8	PCLKF
A9	SD00	B9	+12V	E9	-GNT0	F9	GND
A10	IOCHRDY	B10	GND	E10	-REQ0	F10	-GNT1
A11	AEN	B11	SMEMWR	E11	GND	F11	GND
A12	SA19	B12	SMEMRD	E12	PCLKE	F12	-REQ1
A13	SA18	B13	IORD	E13	GND	F13	AD31
A14	SA17	B14	IOWR	E14	AD30	F14	AD29
A15	SA16	B15	DACK3	E15	+3.3V	F15	+3.3V
A16	SA15	B16	DRQ3	E16	Key	F16	Key
A17	SA14	B17	DACK1	E17	+3.3V	F17	+3.3V
A18	SA13	B18	DRQ1	E18	AD28	F18	AD27
A19	SA12	B19	REFRESH	E19	AD26	F19	AD25
A20	SA11	B20	BCLK	E20	AD24	F20	-CBE3
A21	SA10	B21	IRQ07	E21	AD22	F21	AD23
A22	SA09	B22	IRQ06	E22	AD20	F22	AD21
A23	SA08	B23	IRQ05	E23	AD18	F23	AD19
A24	SA07	B24	IRQ04	E24	+3.3V	F24	+3.3v
A25	SA06	B25	IRQ03	E25	Key	F25	Key
A26	SA05	B26	DACK2	E26	+3.3V	F26	+3.3V
A27	SA04	B27	T/C	E27	AD16	F27	AD17

Table Appendix A-12 ISA/PCI-Bus Backboard Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A28	SA03	B28	BALE	E28	-FRAME	F28	-IRDY
A29	SA02	B29	+5V	E29	-CBE2	F29	-DEVSEL
A30	SA01	B30	OSC	E30	-TRDY	F30	-PLOCK
A31	SA00	B31	GND	E31	-STOP	F31	-PERR
C1	SBHE	D1	MEMCS16	G1	SDONE	H1	-SERR
C2	LAB23	D2	I/OCS16	G2	-SB0	H2	AD15
C3	LAB22	D3	IRQ10	G3	-CBE1	H3	AD14
C4	LAB21	D4	IRQ11	G4	PAR	H4	AD12
C5	LAB20	D5	IRQ12	G5	GND	H5	GND
C6	LAB19	D6	IRQ15	G6	Key	H6	Key
C7	LAB18	D7	IRQ14	G7	GND	H7	GND
C8	LAB17	D8	DACK0	G8	AD13	H8	AD10
C9	MEMRD	D9	DRQ0	G9	AD11	H9	AD8
C10	MEMWR	D10	DACK5	G10	AD9	H10	AD7
C11	SD08	D11	DRQ5	G11	-CBE0	H11	AD5
C12	SD09	D12	DACK6	G12	AD6	H12	AD3
C13	SD10	D13	DRQ6	G13	AD4	H13	AD1
C14	SD11	D14	DACK7	G14	AD2	H14	AD0
C15	SD12	D15	DRQ7	G15	Key	H15	Key
C16	SD13	D16	+5V	G16	+5V	H16	+5V
C17	SD14	D17	MASTER	G17	+5V	H17	+5V
C18	SD15	D18	GND	G18	GND	H18	GND

ISA Expansion Bus Connector Pin Assignments

The expansion slots signals, voltages, and grounds are supplied through the bus connectors. There are no active components on the ISA/PCI-bus backboard. Table Appendix A-13 provides the pin assignments for the ISA expansion slots.

Table Appendix A-13 ISA Expansion Slot Pin Assignments

Pin	Direction	Signal	Pin	Direction	Signal
A1	Input	IOCHCK	B1	Ground	GND
A2	Input/Output	SD07	B2	Output	RSET DRV
A3	Input/Output	SD06	B3	Power	+5V
A4	Input/Output	SD05	B4	Input	IRO09
A5	Input/Output	SD04	B5	Power	-5V
A6	Input/Output	SD03	B6	Input	DRQ2
A7	Input/Output	SD02	B7	Power	-12V
A8	Input/Output	SD01	B8	Input	0WS
A9	Input/Output	SD00	B9	Power	+12V
A10	Input	IOCHRDY	B10	Ground	GND
A11	Output	AEN	B11	Output	SMEMWR
A12	Input/Output	SA19	B12	Output	SMEMRD
A13	Input/Output	SA18	B13	Input/Output	IORD
A14	Input/Output	SA17	B14	Input/Output	IOWR
A15	Input/Output	SA16	B15	Output	DACK3
A16	Input/Output	SA15	B16	Input	DRQ3
A17	Input/Output	SA14	B17	Output	DACK1
A18	Input/Output	SA13	B18	Input	DRQ1
A19	Input/Output	SA12	B19	Input/Output	REFRESH
A20	Input/Output	SA11	B20	Output	BCLK
A21	Input/Output	SA10	B21	Input	IRQ07
A22	Input/Output	SA09	B22	Input	IRQ06
A23	Input/Output	SA08	B23	Input	IRQ05
A24	Input/Output	SA07	B24	Input	IRQ04
A25	Input/Output	SA06	B25	Input	IRQ03
A26	Input/Output	SA05	B26	Output	DACK2

Table Appendix A-13 ISA Expansion Slot Pin Assignments

Pin	Direction	Signal	Pin	Direction	Signal
A27	Input/Output	SA04	B27	Output	T/C
A28	Input/Output	SA03	B28	Output	BALE
A29	Input/Output	SA02	B29	Power	+5V
A30	Input/Output	SA01	B30	Output	OSC
A31	Input/Output	SA00	B31	Ground	GND
C1	Input/Output	SBHE	D1	Input	MEMCS16
C2	Input/Output	LAB23	D2	Input	I/OCS16
C3	Input/Output	LAB22	D3	Input	IRQ10
C4	Input/Output	LAB21	D4	Input	IRQ11
C5	Input/Output	LAB20	D5	Input	IRQ12
C6	Input/Output	LAB19	D6	Input	IRQ15
C7	Input/Output	LAB18	D7	Input	IRQ14
C8	Input/Output	LAB17	D8	Output	DACK0
C9	Input/Output	MEMRD	D9	Input	DRQ0
C10	Input/Output	MEMWR	D10	Output	DACK5
C11	Input/Output	SD08	D11	Input	DRQ5
C12	Input/Output	SD09	D12	Output	DACK6
C13	Input/Output	SD10	D13	Input	DRQ6
C14	Input/Output	SD11	D14	Output	DACK7
C15	Input/Output	SD12	D15	Input	DRQ7
C16	Input/Output	SD13	D16	Power	+5V
C17	Input/Output	SD14	D17	Input	MASTER
C18	Input/Output	SD15	D18	Ground	GND

SOUND BOARD PIN ASSIGNMENTS

The pin assignments for the sound board are provided in Table Appendix A-14 through Table Appendix A-16.

Table Appendix A-14 Sound Board Signal Connector

Pin	Signal	Pin	Signal
1	Ground	2	Data Bit 0
3	Ground	4	Data Bit 1
5	Ground	6	Data Bit 2
7	Ground	8	Data Bit 3
9	Ground	10	Data Bit 4
11	Ground	12	Data Bit 5
13	Ground	14	Data Bit 6
15	Ground	16	Data Bit 7
17	Ground	18	Parity Bit
19	Ground	20	Ground
21	Ground	22	Ground
23	RESVD1	24	RESVD3
25	Ground	26	Tempwr
27	RESVD2	28	RESVD4
29	Ground	30	Ground
31	Ground	32	Attention
33	Ground	34	Ground
35	Ground	36	BUSY
37	Ground	38	Acknowledge
39	Ground	40	Reset
41	Ground	42	Message
43	Ground	44	Select
45	Ground	46	CD
47	Ground	48	Request
49	Ground	50	I/O

Table Appendix A-15 Audio Connector

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

Table Appendix A-16 MIDI/Joystick Connector

Pin	Signal
1	+5 Vdc
2	Joystick 1, Fire 1
3	Joystick 1, X
4	Ground
5	Ground
6	Joystick 1, Y
7	Joystick 1, Fire 2
8	+5 Vdc
9	+5 Vdc
10	Joystick 2, Fire 1
11	Joystick
12	Ground (MIDI - out)
13	Joystick 2, Y
14	Joystick 2, Fire 2
15	+5 Vdc (MIDI - in)

Appendix B

Specifications

This section provides the specifications for the system unit, power supply, diskette drives, and hard disk drives.

SYSTEM UNIT SPECIFICATIONS

Table Appendix B - 1 lists system unit specifications.

Table Appendix B - 1 System Unit Specifications

Item	Specification
Desktop Dimensions	Width: 16.9 inches (42.9 cm) Depth: 16.2 inches (41.2 cm) Height: 4.4 inches (11.2 cm)
Weight	Weight: 21.5 lb (9.7 kg) – (dependent upon options)
Minitower Dimensions	Width: 8.5 inches (22 cm) Depth: 17.5 inches (44.5 cm) Height: 15.25 inches (38 cm)
Weight	Weight: 30 lb (13.6 kg) – (dependent upon options)
Keyboard:	Width: 19.0 inches (48.3 cm) Depth: 8.4 inches (21.3 cm) Height: 1.6 inches (4.1 cm)
Weight	Weight: 3.5 to 4.0 lb (1.6 to 1.8 kg)
Device Slots	Two 5 1/4-inch, front-access slots (three in the minitower) One 3 1/2-inch front access slot One 3 1/2-inch internal slot (two internal slots in the minitower)
Expansion Slots	Four expansion slot connectors (five in the minitower) – three 16-bit ISA slots – one ISA/PCI shared slot – one PCI slot (minitower only)

Table Appendix B -1 System Unit Specifications

Item	Specification
Peripheral Interface	PS/2-style keyboard connector, rear panel PS/2-style mouse connector, rear panel Two RS-232C serial ports, rear panel Parallel printer port, rear panel VGA port, rear panel
Front Panel	Power button Power indicator lamp Hard disk drive busy indicator lamp Suspend button
Processor	Intel Pentium 75-MHz
Cache Memory	16 KB of primary cache (8 KB data, 8 KB instruction) integrated in the processor, 256 KB secondary cache
Flash ROM	128 KB (28F001): Flash ROM
Chip Set	Intel Mercury Chip set
System Memory	
Standard	8-MB on system board, expandable to 128 MB
Multimedia	16 MB on system board, expandable to 128 MB
Optional SIMMs	4-, 8-, 16-, 32-, and 64-MB; 32- or 36 bit, 70-ns SIMMs
Video Interface	Cirrus Logic CL-DG5434 – PCI-Bus Video – 1-MB video DRAM standard, expandable to 2-MB – Maximum resolution 1280 x 1024 pixels
Battery	Real-time clock/battery module on system board
Power Supply	145 Watt, 115 V/230V switch selectable (desktop) 200 Watt, 115 V/230V switch selectable (minitower)
CD-ROM Reader	Standard in multimedia systems – Quadruple speed – Disc format: ISO 9660 – Data transfer rate: 600 KB/sec (mode 1), 684.4 KB/sec (mode 2) – Access time (typical): 230 msec – Built-in buffer: 128 KB – Host interface: IDE (ATAPI) – Photo CD Compatibility: Multisession Photo CD, Single session Photo CD

Table Appendix B -1 System Unit Specifications

Item	Specification
Sound Board	Creative Labs 16-bit audio board with a Panasonic/Creative CD-ROM interface. Fully Adlib and Sound Blaster Compatible.
Speakers	3-inch stereo speakers <ul style="list-style-type: none"> – Bass and treble boost controls – Built-in power booster – Balance knob – 6-volt AC power adapter – 3.5 mm stereo plug
Network Interface Board	3Com EtherLink III 3C509B-COMBO Network interface <ul style="list-style-type: none"> – IEEE 802.31 10Base-T and Ethernet – IEEE 802.3 industry standard for 10 Mbps CSMA/CD local area network Connectors <ul style="list-style-type: none"> – RJ-45 – AUI – BNC
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 C.R.C., c.1374 IEC 950 - safety VDE 0871/6.78, Class B - emissions

POWER SUPPLY SPECIFICATIONS

Table Appendix B -2 lists the input power specifications for the power supply.

Table Appendix B -2 Power Supply Input Requirements

Features	145 W	200 W
Input frequency	50 Hz (47 Hz ~ 53 Hz)	50 Hz (47 Hz ~ 53 Hz)
	60 Hz (57 Hz ~ 63 Hz)	60 Hz (57 Hz ~ 63 Hz)

Input voltage	90V - 135V ~ 5.0A	100 ~ 120V 8.0A
	180V - 265V ~ 3.0A	200 ~ 240V 5.0A

Table Appendix B -3 lists the output power specifications for the power supply.

Table Appendix B -3 Power Supply Output Specifications

Pin	145 W	200 W
1	+5V, 18A Max	+5V, 23A Max
2	-5V, .3A Max	-5V, .5A Max
3	+12V, 4.2A Max	+12V, 8A Max
4	-12V, .3A Max	-12V, .5A Max

DISKETTE DRIVE SPECIFICATIONS

Table Appendix B -4 lists the specifications for the diskette drives.

Table Appendix B -4 Specifications for Diskette Drives

Features	OSDA-90C 1.44-MB	FD-55GFR 1.2 MB
Storage Capacity		
Unformatted	2.0 MB	1.67 MB
Formatted	1.44 MB	1.2 MB
Recording Density		
Bit density	17,434 bpi	9870 bpi max
Track density	135 tpi	96 tpi
Number of Cylinders	80	80
Number of Tracks	160 (80 tracks x 2 sides)	160 (80 tracks x 2 sides)
Recording Method	MFM	MFM/FM
Disk Speed	300 rpm	360 rpm
Data Transfer Rate	500/250k bps	500/250k bps
Access Time		
Average seek	94 ms	94 ms
Minimum seek	3 ms	3 ms
Head load	Non-head load	35 ms max
Dimensions		
Height	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
Width	4.9 in. (101.6 mm)	5.7 in. (146 mm)
Depth	5.9 in. (150 mm)	7.4 in. (190 mm)

Table Appendix B -4 Specifications for Diskette Drives

Features	OSDA-90C 1.44-MB	FD-55GFR 1.2 MB
Weight	1.0 lb (0.63 kg)	1.5 lb (0.67 kg)
Operating Temperature	41° to 113°F (5° to 45°C)	39° to 115°F (4° to 46°C)
Relative Humidity Tolerance Range	20% to 80%	20% to 80%
Power		
+12 Vdc	Not Used	1.19 A (start up)
+5 Vdc	0.87 A (start up)	0.09 A (start up)
Power Consumption	1.5 W (operating)	2.6 W (operating)
Error Rate		
Recoverable	1 per 10 ⁻⁹	1 per 10 ⁻⁹
Non-recoverable	1 per 10 ⁻¹²	1 per 10 ⁻¹²
Seeks	1 per 10 ⁻⁶	1 per 10 ⁻⁶
Mean Time Between Failures	12,000 hours	12,000 hours

HARD DISK SPECIFICATIONS

Specifications for the hard disk drives are given in Table Appendix B -5.

Table Appendix B -5 Specifications for 540-MB and 1.275-GB Hard Disk Drives

Features	540-MB	1.275-GB
Physical Configuration		
Formatted Capacity	540 MB	1278 MB
Actuator Type	Rotary voice-coil	Rotary voice-coil
Number of Disks	1	3
Data Heads	2	6
Servo	Embedded	Embedded
Tracks per Inch (tpi)	3300 tpi	3849 tpi
Bytes per Block	512	512
Blocks per Drive	528,192	833,010
Dimensions (H x W x D)	1.0 x 4.0 x 5.75 in.	1.0 x 4.0 x 5.75 in.
Weight	1.2 lb	1.35 lb
Performance		
Track-to-track	4.0 ms	3.0 ms
Average read	11 ms ²	11.0 ms
Average write	13 ms ²	11.5 ms
Average Latency	6.67 ms	6.67 ms
Rotation Speed	4500 rpm	4500 rpm
Data Rate Transfer	6.0 MB/s (sustained)	3.9 to 6.9 MB/s
Buffer to host	11.0 MB/s (burst)	16.7 MB/s w/flow control
Start/Stop Cycles	50,000 min	40,000 min
Interface	IDE	IDE

Appendix C

CD-ROM Reader Configuration

This appendix provides connector and jumper setting information for the quadruple speed CD-ROM reader. Use this information for removing, reconfiguring, or reinstalling the CD-ROM reader.

The rear panel of the quadruple speed CD-ROM reader provides the connectors and jumpers for cabling and configuring the reader. The front panel controls are shown in Section 1, Technical Information. These features are shown in Figure Appendix C - 1 and then described.

Figure Appendix C -1 Rear View of the Quadruple Speed Reader

- **Audio output connector**
Provides the digital audio output from the CD-ROM reader to the sound board.
 - **Configuration jumpers**
Sets the configuration for the CD-ROM reader to a Master or Slave configuration (see Figure Appendix C -2 and the following jumper descriptions).
 - **IDE cable connector**
Connects the IDE interface to the CD-ROM reader. This connection controls the CD-ROM reader and data. Connect the IDE interface cable from the secondary IDE port on the system board to this connector. The IDE interface cable is keyed to fit in only the correct position.
 - **Power connector**
Provides operating power from your computer. The IDE power cable is keyed to fit in only the correct position.
-

Use the following jumper setting information to set the quadruple speed CD-ROM reader to a Master or Slave configuration.

NOTE: The quadruple speed CD-ROM reader jumpers are set correctly at the factory.

Figure Appendix C -2 Quadruple Speed Reader Jumper Settings

Appendix D

Sound Board Configuration

This appendix provides the configuration settings for the sound board. The factory default settings for the sound board are as follows:

MIDI Interface

Base I/O Address: 330H

Audio Interface

Base I/O Address: 220H

Joystick Connector: Enabled

Interrupt: IRQ 7

Low DMA channel: 1

High DMA channel: 5

The factory default settings of the sound board or another peripheral device on the system may need to be changed if any of the following occurs:

- A peripheral device uses the same I/O addresses, DMA channel, or interrupt setting as your sound board (known as a hardware conflict).
- Another Joystick/Game Connector is installed in the system.

Changing Hardware Settings

Jumper configurations define the hardware settings of the sound board. Before actually changing a jumper configuration, identify the current and the proposed new setting. Jumper locations for the board are shown in Figure Appendix D-1.

CAUTION: As many applications are designed to work with the sound board's default settings, do not change the settings unless it is absolutely necessary (hardware conflicts may result).

Figure Appendix D-1 Jumpers on the Sound Board

To change the configuration of jumpers:

1. Power off the computer and all other peripheral devices.
 2. Remove the system's cover and board from your system.
 3. Identify the jumpers to change.
 4. Select the settings for the board by placing the jumper blocks on the desired jumpers.
-

MIDI Base I/O Address

The base I/O address for the MPU-401 UART MIDI on the sound board can be changed using jumper MSEL. Two base I/O addresses, 300H and 330H (factory default settings), are available. To change the base I/O address, enable the jumper corresponding to the setting shown in Figure Appendix D-2.

Figure Appendix D-2 Base I/O Address Settings of MPU-401 UART MIDI***Joystick Connector***

The joystick connector on the sound board can be enabled or disabled using jumper JYEN. The factory default setting of the joystick connector is enabled. If a joystick connector is already in use, disable the one on the sound board.

To change the joystick connector setting, enable or disable jumper JYEN as shown in Figure Appendix D-3.

Figure Appendix D-3 Joystick Connector Settings

Audio Interface DMA Channel

The audio interface supports both low and high DMA channels for direct data transfer to the system's memory. Low DMA channels 0, 1 (factory default setting), and 3 are used to transfer 8-bit data. The low DMA channel setting can be changed using jumpers DAS0 and DAS1, as shown in Figure Appendix D-4.

Figure Appendix D-4 Low DMA Channel Settings

High DMA channels 5 (factory default setting), 6, and 7 are used to transfer 16-bit data. The high DMA channel setting can be changed using jumpers DBS0 and DBS1, as shown in Figure Appendix D-5.

Figure Appendix D-5 High DMA Channel Settings

Audio Interface Base I/O Address

Four base I/O addresses are available for the audio interface: 220H (factory default setting), 240H, 260H, and 280H. To change the base I/O address, enable the jumpers corresponding to the settings shown in Figure Appendix D-6.

Figure Appendix D-6 Base I/O Address Settings for the Audio Interface

Audio Interface IRQ Line

Four IRQ lines are available for the audio interface: IRQ 2, 5, 7 (factory default setting), and 10. The IRQ line setting can be changed using jumpers IS0 and IS1. To change the IRQ line, enable the jumpers corresponding to the setting shown in Figure Appendix D-7.

Figure Appendix D-7 IRQ Line Settings for the Audio Interface

MIDI Interface

A jumper is available on the sound board to enable its MPU-401 UART MIDI Interface. The default setting of this jumper MPUEN is enabled (see Figure Appendix D-8). Remove the jumper block if it is necessary to disable the interface.

Figure Appendix D-8 MPU-401 UART MIDI Settings

(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 a shielded and properly grounded I/O cable to ensure compliance of this unit to the specified limits of the rules.

(For Canadian Use Only)

This equipment is a Class B digital apparatus which complies with the Radio Interference Regulations, C.R.C., c.1374.

Cet appareil numérique de la classe B est conforme au Règlement sur le brouillage radioélectrique, C.R.C., ch.1374.

BATTERY REPLACEMENT

A lithium battery in your computer maintains system configuration information. In the event that the battery fails to maintain system configuration information, NEC recommends that you replace the battery. See Chapter 9 for battery replacement information.

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 remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut 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. In MINNESOTA, call 1-800-225-PRBA if further disposal information is required.

Contact your local waste management officials for other information regarding the environmentally sound collection, recycling, and disposal of the batteries.