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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® V486 Series computer systems. It 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 a list of NEC service information and telephone numbers that provide access to the NEC Bulletin Board System (BBS), FastFacts™, and Technical Information Bulletins. This section also includes recommended maintenance information and a list of possible solutions for computer problems.

Section 5, Desktop Repair, includes desktop disassembly and reassembly procedures along with an illustrated parts breakdown. NEC service and spare parts ordering information are also provided.

Section 6, Minitower Repair, includes minitower disassembly and reassembly procedures along with an illustrated parts breakdown. NEC service and spare parts ordering information are 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 PowerMate V486 Series systems.

Appendix C, CD-ROM Reader Configuration, provides connector and jumper information for the Quad-Speed CD-ROM reader.

Section 1

Technical Information

This manual contains information for desktop and minitower PowerMate® V486 Series systems. The information applies to all models except where indicated. Models differ primarily in the chassis, CD-ROM reader, and microprocessor.

This section provides an overview of the system hardware. The basic hardware for the system includes a system unit, mouse, and keyboard.

External interface connectors are located in the rear of the system unit and are identified in Section 2, Setup and Operation. Jumper settings for all of the internal boards are also provided in Section 2. Appendix A provides the system unit connector pin assignments and Appendix B provides specifications.

An overview of each of the two system units 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, and four expansion slots (three ISA and one ISA/PCI Bus™). A sound board is installed in one of the expansion slots in multimedia models. The storage device slots accommodate a 3 1/2-inch diskette drive, a 3 1/2-inch hard disk (1-inch height), and two 5 1/4-inch storage devices (1.6-inch height). The system ships with a 3 1/2-inch diskette drive. A 3 1/2-inch hard disk drive (540-MB or 850-MB IDE) and 5 1/4-inch CD-ROM reader are available on various models.

The following figures show front panel features on the desktop system unit.

Figure Section 1-2 Desktop Storage Devices and Controls

MINITOWER SYSTEM UNIT

The minitower chassis provides an enclosure for the system board, power supply, five storage device slots, and five expansion slots (four ISA and one ISA/PCI Bus™). A sound board is installed in one of the expansion slots in multimedia models. The storage device slots accommodate a 3 1/2-inch diskette drive, a 3 1/2-inch hard disk (1-inch height), and two 5 1/4-inch storage devices (1.6-inch height). The system ships with a 3 1/2-inch diskette drive. A 3 1/2-inch hard disk drive (540-MB IDE) and 5 1/4-inch CD-ROM reader are available on various models.

The following figures show front panel features on the minitower system unit.

Figure Section 1-3 Minitower System Controls and Lamps

Figure Section 1-4 Minitower Storage Devices and Controls

SYSTEM BOARD

The system boards are similar, differing only in the processor. The system board contains a Flash ROM which is upgradeable through the BIOS Update utility (see Section 2).

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.

Key features of the system board are listed below.

- processor
 - PowerMate V466 – Intel486DX2™-66
 - PowerMate V4100 – Intel486DX4™-100

 - clock rate
 - PowerMate V466 – 66 megahertz (MHz) internal, 33 MHz external
 - PowerMate V4100 – 100 MHz internal, 33 MHz external

 - support for Intel OverDrive™ processor upgrades
-

- memory – 32-bit (system also supports 36-bit), 70-nano second (ns) single-inline memory modules (SIMMs)
 - 8 megabytes (MB) of random access memory (RAM) in the desktop and minitower systems (expandable to 64 MB)
 - 16 MB in the desktop multimedia systems (expandable to 64 MB)

 - cache
 - 8 KB in the Intel486DX2
 - 16 KB in the Intel486DX4

 - optional 256-KB secondary cache module

 - Trident 9440[®] (TGUI9440AGi Advanced GUI Accelerator)
 - supports 640 x 480 resolution with 16.8 million colors (24-bit true color), 800 x 600 with 64 K colors, 1024 x 768 with 256 colors, and 1280 x 1024 with 16 colors
 - 1-MB video dynamic RAM (DRAM), expandable to 2 MB

 - external input/output (I/O) connectors
 - parallel – one 25-pin connector
 - serial – two RS-232C ports; support asynchronous communication, up to 9600 bps, 9-pin connectors
 - VGA video monitor – supports standard, super, and high-resolution VGA modes, 15-pin connector (D-shell)
 - keyboard – PS/2-compatible, 6-pin connector (mini DIN)
 - mouse – PS/2 compatible, 6-pin connector (mini DIN)

 - internal drive connectors
 - IDE – dual IDE channels, one fast IDE and one standard; CD-ROM reader and hard disk on separate channels; support for up to 10 MB/second 32-bit transfers on PCI Bus; support for a total of four IDE devices; 40-pin connectors
 - diskette drive – supports two diskette drives, 34-pin connector
-

- expansion slots
 - desktop systems (four slots) – three 8-/16-bit ISA slots (two available), one shared 32-bit PCI and 8-/16-bit ISA slot
 - minitower systems (five slots) – four 8-/16-bit ISA slots (two available), one shared 32-bit PCI and 8-/16-bit ISA slot

- energy saving features – system switches to power save mode when idle for an established amount of time

Table Section 1-1 lists the major chips on the system board.

Table Section 1-1 System Board Chips

Chip	Description
486DX2-66 – PowerMate V466	33/66-MHz processor
486DX4-100 – PowerMate V4100	33/100-MHz processor
28F010	128k x 8 Flash ROM
SiS 85C496/497 Green Chipset	
496	PCI, CPU, memory, and IDE controller
497	interface between PCI/CPU memory bus and ISA bus, ISA interface, DMA controller, interrupt controller, counter/timers, NMI control logic, power management, and real time clock
SMC37C665GT Super I/O controller	serial interface (16550), parallel interface (ECP/EPP), diskette drive (1.44- and 1.2-MB)
AmiKey	keyboard/mouse controller (Intel 8049 compatible)
Trident 9440	VGA controller

Processor

The desktop and minitower PowerMate V486 Series systems use the following processors.

- PowerMate V466 – Intel486DX2-66 (66-MHz internal, 33-MHz external)
- PowerMate V4100 – Intel486DX4-100 (100-MHz internal, 33-MHz external)

The processors are advanced 32-bit processors designed to optimize multitasking operating systems. The 32-bit registers and data paths support 32-bit addresses and data types.

The processor is installed in a 237-pin, zero-insertion-force (ZIF) processor socket. This socket allows the installation of Intel OverDrive processors based on the Pentium core (PGA type package). When upgrading processors, they must operate with an external clock of 25 or 33 MHz.

The 486DX2 is exactly like previous 486DXs except that it runs twice as fast internally. When the interface bus portion of the DX2 accesses main memory, executes I/O instructions, or accesses one of the other chips on the system board, the DX2 operates at 33 MHz. The DX2 works at 66 MHz when accessing its internal registers, refers to a memory location already mapped into its internal cache, or performs a floating-point operation and CPU operations.

The DX4 runs three times as fast internally. When the interface portion accesses external registers it operates at 33 MHz and works at 100 MHz when accessing its internal registers.

Secondary Cache

The 8-KB primary cache (16-KB of primary cache in the DX4) is integrated into the processor. The system board provides an 80-pin SIMM socket for an optional 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 possible 64 MB of total memory capacity.

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 back/through cache. 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, which 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 1-3.

Table Section 1-3 System Memory Map

Memory Space	Size	Function
000000-07FFFF	512 KB	Reserved for system base memory
080000-09FFFF	128 KB	Mapped to either system base memory or ISA bus*
0A0000-0BFFFF	128 KB	Mapped to either on-board video memory or ISA video memory
0C0000-0C7FFF	32 KB	Mapped to either on-board video BIOS or ISA video BIOS
0C8000-0EFFFF	160 KB	Mapped to ISA bus
0F0000-0FFFFF	64 KB	Reserved for system BIOS
100000-FDFFFF	14.9 MB	Reserved for Extended and/or Expanded system memory
FE0000-FFFFFF	128 KB	Mapped to ISA bus
1000000- On-Board	14.9 MB	Reserved for Extended and/or Expanded system memory

*Always non-cacheable.

Flash ROM supports the reprogramming of the system and built-in video BIOS. Software controls this feature via port 94h. Flash ROM programming writes to location 0F0000h-0FFFFFh. This range allows access to 64 KB of the 128 KB ROM. To write to the rest of the ROM, bit 3 of port 94h must be set. Again, writing to 0F0000h-0FFFFFh allows the rest of the ROM to be programmed. (Setting bit 3 on port 94h maps the 0F0000h to 0E0000h range.)

Power Management

Each computer system incorporates power management features that lowers 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 sleep mode whenever inactivity is sensed. The computer's power-saving functions are as follows.

- Reduces the CPU clock speed

The CPU clock speed is changed from 33 MHz to 8 MHz (16 MHz in the PowerMate V4100) to put the computer in sleep mode. The cache and video clocks are changed at the same time.

- Blanks out the monitor

Puts the video controller into sleep 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 1-5.

Table Section 1-5 I/O Address Map

Address (Hex)	I/O Device Name
000-01F	DMA controller 1 (channel 0-3)
020-03F	Interrupt controller
040-05F	Timer
060-063	PPI (Programmable Peripheral Interface) keyboard, equipment switches, timer
060-06F	Keyboard controller
070-07F	Real-time clock, CMOS memory, NMI mask
080	Manufacturer's diagnostic checkpoint
081-09F	DMA page register
0A0-0AF	NMI (non-maskable interrupt) mask
092	PS/2 alternate Fast A20 Gate, Hot Reset
094	Extended system port (NEC-specific hardware setup)
095	Extended system port (NEC-specific hardware setup)
097	Extended system port (NEC-specific hardware setup)

Table Section 1-5 I/O Address Map

Address (Hex)	I/O Device Name
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller 2 (channel 4-7)
0E0-0EF	Reserved
170-177	2nd hard disk
1F0-1F7	1st hard disk
1F9-1FF	Reserved
200-207	Game I/O adapter (not available)
220-233	Sound board
278-27F	2nd parallel port (3rd with DMA)
2F8-2FF	2nd asynchronous communications port
330-331	MIDI Port
370-377	Diskette controller 2
378-37F	1st parallel port (2nd with DMA)
388-38B	FM Synthesizer
3A0-3AF	Primary bisynchronous communications port
3B0-3DF	Video Graphics Array (VGA)
3B0-3BF	Monochrome display adapter/printer 1
3C0-3CF	Enhanced Graphics Adapter (EGA) 1
3D0-3DF	Color/Graphics Adapter (CGA and EGA)
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1

System Memory

The Power V486 system boards come standard with 8 MB of RAM (PowerMate V4100 multimedia systems come with 16 MB). The first megabyte includes the standard 640 KB of base memory. The remaining memory is extended memory. Two SIMM sockets are integrated on the system board. The maximum possible memory is 64 MB.

The SIMM memory sockets accept 4-, 8, 16-, or 32-MB SIMMs. Two 32-MB SIMMs may be installed for a total of 64 MB. High-speed RAM is 32 bits wide (no parity) or 36 bits wide (with parity). No parity SIMMs are 1 MB x 32 bit (4 MB), 4 MB x 32 bit (16 MB), and 8 MB x 32 bit (32 MB). There are no switches or jumpers to set when SIMMs are added.

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 two SIMM sockets are assigned as banks 0 and 2. The standard 8 MB of memory is installed in bank 0. The PowerMate V4100 multimedia system has one 16 MB SIMM installed in bank 0.

SIMMs must match the tin metal plating used on the system board SIMM sockets. When adding SIMMs, use tin-plated SIMMs. See Section 3, Options, for installation instructions and SIMM memory configurations.

Interrupt Controller

The interrupt controller operates as an interrupt manager for the 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 1-7. See Section 2, Setup and Configuration, for information on changing the interrupts using Setup and jumpers.

Table Section 1-7 Interrupt Level Assignments

Interrupt Priority	Interrupt Device
IRQ00	Counter/timer
IRQ01	Keyboard
IRQ02	Cascade (INT output from slave)
IRQ03	COM2*
IRQ04	COM1*
IRQ05	Parallel port 1
IRQ06	Diskette drive controller*
IRQ07	Sound board or Network Interface Card (NIC)
IRQ08	Real-time clock
IRQ09	MIDI port
IRQ10	Available
IRQ11	Available
IRQ12	PS/2 mouse*
IRQ13	Coprocessor
IRQ14	Primary IDE (fast)
IRQ15	Secondary IDE (standard)

*Industry standard locations

Video Controller

The Trident 9440 video 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). For example, the Trident 9440 video controller integrates the PCI local bus in core logic. The key is that the PCI local bus interface is 32-bits wide.

The video controller speeds the movement of large blocks of image data in video memory. As display resolutions increase, image creation and movement into video memory are critical factors in graphics performance.

The graphics accelerator is specifically designed for graphics-intensive operations, text and color pixel amplification, and scrolling. The accelerator minimizes bus traffic by off-loading the tasks normally performed by the processor.

In addition to the standard VGA connector, the system provides a VESA-compliant feature connector on the system board.

Video Memory

The system's high-performance PCI local bus video with bit-block transfer (BitBLT) and 1 MB of video memory support resolutions up to 1280 by 1024 pixels with 16 colors, 1024 by 768 with 256 colors, and 640 by 480 with 16.8 million colors.

With 2 MB of video memory, the video hardware supports up to 1280 by 1024 pixels with 256 colors or 1024 by 768 pixels with 64,000 colors.

Table Section 1-9 and Table Section 1-11 provide the different display modes for the video controller.

Table Section 1-9 Text Modes

Mode (Hex)	Colors	Column/ Rows	Buffer	Resolution	Video Clock (MHz)	Horiz Sync (kHz)	Vert Sync (Hz)
00 ¹	16 (grey)	40 x 25	B8000	320 x 200	28.2	31.7	70
00 ²	16 (grey)	40 x 25	B8000	320 x 350	28.3	31.7	70
00 ³	16	40 x 25	B8000	360 x 400	28.2	31.7	70
01 ¹	16	40 x 25	B8000	320 x 200	28.2	31.7	70
01 ²	16	40 x 25	B8000	320 x 350	28.2	31.7	70
01 ³	16	40 x 25	B8000	360 x 400	28.2	31.7	70
02 ¹	16(grey)	80 x 25	B8000	640 x 200	28.2	31.7	70
02 ²	16(grey)	80 x 25	B8000	640 x 350	28.2	31.7	70
02 ³	16	80 x 25	B8000	720 x 400	28.2	31.7	70
03 ¹	16	80 x 25	B8000	640 x 200	28.2	31.7	70
03 ²	16	80 x 25	B8000	640 x 350	28.2	31.7	70
03 ³	16	80 x 25	B8000	720 x 400	28.2	31.7	70
07 ⁴	mono	80 x 25	B8000	720 x 350	28.2	31.5	70
07 ³	mono	80 x 25	B8000	720 x 400	28.2	31.5	70
60 ⁵	16	132 x 25	B8000	1056 x 400	40.0	30.5	67.5
24 ⁵	16	132 x 30	B8000	1056 x 400	40.0	30.5	67.5

¹CGA-style text mode with 8x8 character size and 200 lines vertical resolution.

²EGA-style text mode with 8x14 and 9x14 character sizes and 350 lines vertical resolution.

³VGA-compatible text mode with 9x16 character size and 400 lines vertical resolution.

⁴MDA- style text mode with 9x14 character sizes and 350 lines vertical resolution.

⁵Enhanced VGA mode.

Table Section 1-11 Graphic Modes

Mode (Hex)	Colors	Column /Rows	Buffer	Resolution	Video Clock (MHz)	Horiz Sync (kHz)	Vert Sync (Hz)
04 ¹	4	40 x 25	B8000	320 x 200	25.2	31.5	70
05 ¹	4	40 x 25	B8000	320 x 200	25.2	31.5	70
06 ¹	2	80 x 25	B8000	640 x 200	25.2	31.5	70
0D ¹	16	40 x 25	A0000	320 x 200	25.2	31.5	70
0E ¹	16	80 x 25	A0000	640 x 200	25.2	31.5	70
0F ²	mono	80 x 25	A0000	640 x 350	25.2	31.5	70
10 ²	16	80 x 25	A0000	640 x 350	25.2	31.5	70
11 ²	2	80 x 30	A0000	640 x 480	25.2	31.5	70
12 ²	16	80 x 30	A0000	640 x 480	25.2	31.5	60
13 ²	256	40 x 25	A0000	320 x 200	25.2	31.5	70
20 ²	16	80 x 30	B8000	640 x 480	40.0	30.5	60
22 ²	16	100 x 37	A0000	800 x 600	25.2	31.5	60
24 ^{2,3}	16	128 x 48	A0000	1024 x 768	32.6	31.5	73
30 ²	256	80 x 30	A0000	640 x 480	36.0	35.5	56
32 ²	256	100 x 37	A0000	800 x 600	40.0	38.0	60
34 ^{2,3}	256	128 x 48	A0000	1024 x 768	50.4	48.4	73
38 ^{2,3}	256	80 x 25	A0000	1280 x 1024	25.2	31.5	70
40 ²	32k	80 x 30	A0000	640 x 480	25.2	31.5	60
41 ²	64k	80 x 30	A0000	640 x 480	32.6	31.5	73
42 ²	32k	100 x 37	A0000	800 x 600	25.2	31.5	70
43 ²	64k	100 x 37	A0000	800 x 600	36.0	35.5	56
44 ^{2,3}	32k	128 x 48	A0000	1024 x 768	40.0	38.0	60
45 ^{2,3}	64k	128 x 48	A0000	1024 x 768	50.4	48.4	73
50 ²	16M	80 x 30	A0000	640 x 480	44.9	35.5	87
6A ²	16	100 x 37	A0000	800 x 600	65.0	49.0	61
70 ²	16	100 x 37	A0000	800 x 600	72.0	56.6	70
75 ^{2,3}	16	128 x 48	A0000	1024 x 768	44.9	35.5	87
76 ³	16	160 x 64	A0000	1280 x 1024	72.0	56.6	70
78 ²	256	80 x 25	A0000	640 x 400	72.0	56.6	70
79 ²	256	80 x 30	A0000	640 x 480	44.9	35.5	87

Table Section 1-11 Graphic Modes

Mode (Hex)	Colors	Column /Rows	Buffer	Resolution	Video Clock (MHz)	Horiz Sync (kHz)	Vert Sync (Hz)
7C ²	256	100 x 37	A0000	800 x 600	72.0	56.6	70
7E ^{2,3}	256	128 x 48	A0000	1024 x 768	80.0	48.1	87

¹8x8 character size²8x16 character size³Interlaced

Dual IDE Ports

The system board in the PowerMate V486 Series provides two IDE ports — a fast IDE port (the primary channel) and a standard IDE port (the secondary channel). Each port supports two devices for a total of four IDE devices. The system supports the installation of an IDE CD-ROM reader for system configuration flexibility without the addition of a controller.

The fast IDE port features an enhanced IDE interface which supports up to 10 MB per second 32-bit wide data transfers on the high-performance VESA local bus (VL bus). (Standard IDE supports 2 MB to 3 MB per second on the ISA bus.) In hard disk configurations, the standard hard disk is connected to the fast IDE port for high performance.

ISA/PCI-BUS BACKBOARD

The ISA/PCI-bus backboard plugs into two bus connectors on the system board. The backboard provides expansion slots for additional circuit boards. The backboards for the desktop and minitower systems are described below.

- desktop systems (four slots) – three 8-/16-bit ISA slots (two available), one shared 32-bit PCI and 8-/16-bit ISA slot
- minitower systems (five slots) – four 8-/16-bit ISA slots (two available), one shared 32-bit PCI and 8-/16-bit ISA slot.

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 8- and 16-bit data transfers and typically operates at 8.33 MHz. A connector is provided on the system board for attaching the ISA/PCI-Bus backboard.

PCI Bus

The industry-standard PCI bus is a highly-integrated input/output (I/O) interface that offers the highest performance local bus available for the 486-based 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 local bus eliminates data bottlenecks found in traditional systems, maintains maximum performance at high clock speeds, and provides a clear upgrade path to future technologies.

The PCI bus slot is used in conjunction with an ISA bus slot. This feature allows a PCI bus option board full access to the ISA bus. For example, the PCI bus option board may utilize the parallel port via the ISA bus, or use the ISA bus REFRESH signal. Use of the ISA bus is optional, as the PCI bus has all signals needed to fully support a PCI bus option board.

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 set to IRQ5 via the Setup and jumper settings.

Interrupt levels for the parallel port are given in Table Section 1-13. Software selectable base addresses are 3BCh, 378h, and 278h.

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

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.

Table Section 1-13 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

*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 1-15. 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: Interrupts used for the built-in serial ports are not available for ISA parallel ports.

Table Section 1-15 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 button, suspend button, and indicator lamps. The indicator panel attaches to the system board using connector J15 (reset connector), JP15 (hard disk drive busy lamp connector), and J9 (power lamp connector).

Power Button

The power button controls power to the system unit. Press the button once to turn on the power and again to turn off the power.

Suspend Button

The suspend button initiates a power-saving mode of operation. When pressed during normal operation, the system goes into a Suspend or “Sleep” mode. Suspend mode saves data and system status and shuts off all power-consuming devices, such as the monitor and hard disk drive. An amber system unit power lamp indicates that the system is in Suspend mode.

See Section 2, Setup and Operation for information about using power-saving modes.

Lamps

The front panel contains two lamps, power and disk.

- The power lamp (green) indicates that the system unit is powered on. It also provides the status of system operation.

A green lamp indicates that the system is in a Full Power On mode of operation. An amber lamp indicates that the system is in Suspend mode with full power reduction.

See Section 2, Setup and Operation for information about using power-saving modes.

- The disk lamp (green) indicates when a hard disk is performing a read or write operation.

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. Two connectors connect the power supply to the system board. 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 system ships with a connector cable for a single drive. A replacement cable with two connectors is required when installing a second floppy device. 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. Typically both diskette drive 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 interface connectors on the system board. The system board supports up to two IDE devices on the standard connector and two IDE devices on the fast VL bus IDE connector. The system unit provides one storage slot for a 3 1/2-inch hard disk (1-inch height), and one available storage slots for a optional 5 1/4-inch device (1.6-inch height). See Section 3, Options, for installing an optional hard disk drive.

MULTIMEDIA COMPONENTS

Multimedia components include the CD-ROM reader, sound board, speaker and microphone. The following subsections give a brief description of each. Information on attaching the speakers and microphone is located in Section 2, Setup and Operation.

CD-ROM

CD-ROM readers come pre-installed in the multimedia systems. Operation of the readers are described in Section 2, Setup and Operation. The CD-ROM reader may be used to load programs from a CD. The CD-ROM reader can also be used to play audio CDs. The CD-ROM reader is assigned as drive E.

Sound Board

The sound board is the Creative Labs Sound Blaster™. The sound board is installed in the ISA backboard. System settings for the sound board can be found in a sound board directory on the system's hard disk drive (multimedia systems only). For information on changing the sound board settings, see *the SB 16-bit Multimedia Audio Card User's Guide* that comes with the computer. The following are the factory settings.

- I/O address – 220h for the sound board
- Interrupt request (IRQ) – IRQ7
- Direct memory access (DMA) – DMA channel 5 (16-bit) and DMA channel 1 (8-bit)

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 sound board are shown in Section 2, Setup and Operation. See Appendix A for connector pin assignments and Section B for specifications.

Speakers

PowerMate V486 multimedia systems come with two speakers and the appropriate connecting wires. An AC adapter ships with the speakers. The speaker set features a volume, treble, bass, balance, and power-on controls. The speakers connect to the speaker jacks on the sound board located at the back of the system unit (see Section 2, Setup and Operation). Speaker features are as follows.

- 3-inch magnetically shielded full-range speakers
- Bass (DXBB) boost switch
- Treble boost switch
- Built-in power booster
- Power source: four “C” batteries (not included) or (optional) 6 volt (V) AC power adapter
- 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 on the sound board located at the back of the system unit.

NIC CONNECTORS (NETWORK-READY MODELS)

Network-ready models come with a network interface board. The board allows the system to connect to an Ethernet network and communicate with other computers. The board, also referred to as a network interface card (NIC), provides three connectors for network cabling (see Section 2, Setup and Operation).

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. See Appendix A for a description of connector pin assignments.

MOUSE

A PS/2-compatible mouse is standard equipment for the system. 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. See Section 4, Maintenance and Troubleshooting, for information on cleaning the mouse.

INTEGRATED TECHNOLOGIES

The following sections describe the technologies that provide desktop management, Plug and Play support, power management, and security.

Desktop Management Interface

Desktop Management Interface (DMI) provides tracking information about the system at power-on. At power-on, the system displays the system model number and the system board serial number which is created during manufacturing at NEC.

DMI helps the user or service technician by providing information for quick technical support or software and hardware upgrades.

Plug and Play Support

The system comes with a Plug and Play BIOS which supports Plug and Play technology. Plug and Play eliminates complicated setup procedures for installing Plug and Play expansion boards.

With Plug and Play technology, there are no jumpers to set and no system resource conflicts to resolve. Plug and Play automatically configures the board for the system.

The system also supports non-Plug and Play boards. For information about installing expansion boards, see Section 3, Options.

Power Saving Features

Power saving options for PowerMate 486V Series systems include full power, partial power reduction, and full power reduction modes of operation. The system provides many ways to conserve energy, help the environment, and cut operating expenses.

An “Instant On/Off” feature conveniently puts the system into a full power reduction mode of operation at the press of a button. See Section 2, Setup and Operation for information about using power-saving modes.

Security Features

Security features in the PowerMate 486V Series provides protection against unauthorized access to the system.

Security options include:

- **Dual Password Security** – provides two levels of password security. A supervisor password allows access to the system’s Setup utility for system configuration. A user password allows system boot up only after the entry of a password.
- **Diskette Drive Access Protection** – includes support for locking out diskette drive access when a user password is provided.
- **Fixed Disk Boot Sector** – provides a “Write Protected” option that helps prevent viruses.
- **Backup Reminder Message** – displays a periodic reminder to the user to back up the system hard disk files.
- **Virus Scan Reminder Message** – displays a periodic reminder to the user to scan for any viruses on the hard disk.

See Section 2, Setup and Operation for a complete list of security options and information about setting them.

Section 2

Setup and Operation

This section provides information on hardware setup for PowerMate V486 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 include the system unit, 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 available at the end of Sections 5 and 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 computer).

1. At the rear of the system, set the voltage selector switch to 115V or 230V and insert the power cord into the system power socket.

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.
3. Connect the monitor and any other peripherals to the rear panel. See “External Multimedia Connections” and “Network Connectors” later in this subsection for multimedia and network connections.

Figure Section 2-2 Peripherals Connections

4. Press the power button to power-on the system. The indicator lamps and reset button are also identified in the figure.

Figure Section 2-3 Lamps, Reset Button, and Power 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 insert the power cord into the power socket.

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 2-4 Minitower Voltage Selector Switch

2. Connect the keyboard and mouse cables to the back of the system unit
3. Connect the monitor and any other peripherals to the rear panel. See “External Multimedia Connections” and “Network Connectors” later in this subsection for multimedia and network connections.

Figure Section 2-5 Minitower Peripherals Connections

4. Press the power button to power-on the system. The user lamps and reset button are also identified in the figure.

Figure Section 2-6 Minitower Indicators, Reset Button, and Power 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).

External Multimedia Connections

This section explains how to connect the multimedia components to the system's multimedia connectors. 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.

Sound Board Jacks

Systems configured with multimedia components come with a sound board. The sound board provides jacks for connecting a microphone and external speakers to the system.

Figure Section 2-7 Sound Board Connectors

- Line In Jack – connects devices such as a cassette, DAT, or Minidisc player to the sound board for playback or recording.
 - Microphone In Jack – connects a microphone for voice input.
 - Line Out Jack – bypasses the sound board's internal amplifier to connect powered speakers or an external amplifier for audio output. (This is the jack to use for the speakers shipped with the system.)
 - Speaker Jack – connects speakers for audio output from the sound board's built-in power amplifier. The built-in amplifier has a maximum output power of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if the speakers cannot handle this power. (Use this jack to connect unamplified speakers.)
-

- MIDI/Joystick Connector – connects a joystick or MIDI kit to the sound board.

The joystick connector on the sound board is identical to that on a standard PC game control adapter or game I/O connector. Any analog joystick with a 15-pin D-sub connector can be connected to the joystick connector. It also works well with any application that is compatible with the standard PC joystick. To use two joysticks, use a Y-cable splitter.

NOTE: If a game board is installed in the system, it will conflict with the joystick connector on the sound board.

To avoid this conflict, remove either the game board or disable the joystick connector on the sound board by removing the jumper block from Jumper JYEN

Connecting the Speakers

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

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

If installing batteries, install two “C” cell into each compartment at this time and replace the rear covers.

CAUTION: Do not install batteries in the speakers when using an AC adapter installed.

2. Connect the left speaker cable (with the dual plug) to the right speaker connector labeled TO LEFT SPEAKER.
-

3. Connect the right speaker cable (with the single plug) to the SPK OUT jack at the rear of the sound board at the rear of the system unit.

Figure Section 2-8 Speaker Connections

Connect the 6-volt AC adapter as follows.

1. Remove any install batteries from the speakers.
2. Plug the AC adapter into the DC 6V jack on the back of the left speaker (see Figure Section 2-8)
3. Plug the other end of the AC adapter into a properly grounded wall outlet.

Network Connectors

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).
 - Includes AutoLink™ auto installation software which installs all Novell® Netware® DOS ODI client software into the operating system.
 - Provides 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.
-

- Provides 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 Interface Card User's Guide and drivers ship with network configured systems. Call the network administrator to install the appropriate drives. Use the following figures to select the appropriate connections.

Figure Section 2-9 Network Board Connectors

SYSTEM CONFIGURATION

This subsection 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 adding optional hardware, Setup does not need to be run.

However, run Setup to set features that customize the system, such as security features.

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

Setup Utility

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

- to set the time and date.
 - to update or check system parameters when adding or removing expansion options.
 - to correct a hardware discrepancy when the Power-On-Self-Test (POST) displays an error message and a prompts appears to run Setup.
 - to check the installation of optional memory by comparing the amount memory installed with the amount of memory displayed by Setup.
 - to change certain system operating parameters.
 - to customize the system with security features such as passwords and I/O control functions.
 - to set system parameters in the event that the system battery needs to be replaced.
-

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.

PhoenixBIOS Setup — Copyright 1992-95 Phoenix Technologies Ltd.			
Main	Advanced	Security Power Exit	
System Time:	[■]:19:20]	Item Specific Help	
System Date:	[03/12/1995]	<Tab>, <Shift-Tab>, or <Enter> selects field.	
Diskette A:	[1.44 MB, 3 1/2"]		
Diskette B:	[Not Installed]		
> IDE Adapter 0 Master:	C: 540 Mb		
> IDE Adapter 0 Slave:	None		
> IDE Adapter 1 Master:	None		
> IDE Adapter 1 Slave:	None		
Video System:	[EGA/VGA]		
> Memory Shadow:	[Enabled]		
> Boot sequence:	[A: then C:]		
> Numlock:	[Auto]		
System Memory:	640 KB		
Extended Memory:	7 MB		
F1 Help	↑↓ Select Item		-/+ Change Values
ESC Exit	←→ Select Menu		Enter Select > Sub-Menu
		F9 Setup Defaults	
		F10 Previous Values	

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 **F2** or **Alt H**. This help window provides two pages of general information about using Setup.

The following sections 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, 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 chapter 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. The following table 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 chapter).
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 Command or Selects submenu.
Alt-R	Refreshes screen

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.

To display a submenu, use the arrow keys to move the cursor to the desired submenu. Then 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 directly from Main Menu summary window.

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.
Video System	Monochrome EGA/VGA, (default) CGA 80x25	Selects the default video device.
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.

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 master/slave combination for standard desktop configurations with an IDE hard disk and a CD-ROM reader is “2 Masters.” If adding an IDE hard disk to the desktop system, the combination becomes “2 Masters, 1 Slave.”

The master/slave combination for standard configurations with an IDE hard disk is “1 Master.” If adding a hard disk to the fast IDE port (primary channel), 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).

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 fast IDE port (primary channel), IDE Adapter 1 configures the standard IDE port (secondary channel).

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 the following table 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.

Table Section 2-3 IDE Hard Disk Parameters

Parameter	Options	Description
Autotype Fixed Disk	Automatically detected by the system	Pressing Enter causes the system to attempt to detect the hard disk type. If successful, Setup fills in the remaining fields on this menu and disk parameters need not be selected.
Type	1 to 39 User	Selecting 1 to 39 fills in all remaining fields with values for predefined disk type. "User" prompts user to fill in remaining fields.
Heads	1 to 64	Specifies number of read/write heads.
Sectors/Track	1 to 63	Specifies number of sectors per track.
Landing Zone*	1 to 2048	Specifies number of cylinder specified as the landing zone for the read/write heads.
Write Precomp*	1 to 2048 None	Specifies number of the cylinder at which to change the write timing.

*IDE drives do not require setting Landing Zone and Write Precomp.

Memory Shadow

For memory shadowing parameters, select "Memory Shadow" directly from the Main Menu summary window. See the following table 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 cards, 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 the following table 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”.
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	2 – 5 Disabled (default)	Number of times the system an fail to boot before the boot fail message appears.

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 the following table to configure the keyboard parameters.

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	
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.

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 the following table to configure the peripherals:

Table Section 2-7 Integrated Peripherals Parameters

Feature	Options	Description
COM1 port COM2 port	Disabled User-selectable settings Auto	Selects a unique address and interrupt request for the listed COM ports. Auto selects the next available combination. COM1 default: 3F8, IRQ4 COM2 default: 2F8, IRQ3 COM port settings must match system board JP9A and JP9B jumper setting, later in this section.
LPT port	Disabled 378, IRQ 7 (default) User-selectable settings Auto	Selects a unique address and interrupt request for the LPT port. Auto selects the next available combination. The LPT port setting must match the system board JP9C jumper setting, later in this section.
Diskette Controller	Enabled (default) Disabled	Enables the on-board diskette drive controller.
IDE Controller	Enabled (default) Disabled	Enables the on-board standard IDE controller (secondary channel).
Local bus IDE controller	Enabled (default) Disabled	Enables the on-board fast IDE controller (primary channel).

Parity

The Parity option in the Advanced menu controls system memory parity checking. The default setting for the U.S. and Canada 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 set to enabled to set a User password.
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 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	Supervisor (default) User	Supervisor 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 Monthly	When a schedule is specified, displays a message during bootup asking (Y/N) the system has been backed up or scanned for viruses.
Virus check reminder		<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 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 Power menu to specify the settings for Power Management.

Use the legend keys to make the selections and exit to the Main Menu. Use the following chart in making the selections.

Table Section 2-10 Power Management Parameters

Feature	Options	Description
APM	Enabled (default) Disabled	APM (advanced power management) allows APM-aware software to better manage power savings.
Power Management Mode	Disabled Customize (default) Maximum Medium Minimum	Maximum, Medium, and Minimum set power-management options with predefined values. Select Customize to select the level of power management. Disabled turns off power management when the appropriate power statement is modified in the CONFIG.SYS file (see the following procedure).
Suspend Timeout	Disabled (default) User selectable	Inactivity period required after Standby to Suspend (maximum power shutdown).
Fixed Disk Timeout	Disabled (default) User selectable	Inactivity period of fixed disk required before standby (motor off).
Video off in Standby	Enabled (default) Disabled	Controls power to the monitor. Enabled turns off the monitor in Standby mode. Disabled leaves monitor power on in Standby mode.
Standby CPU speed	Max (default) High Medium Low	Sets the processor speed during Standby.
Parallel Port Activity	Disabled (default) Enabled	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	Disabled (default) Enabled	Enables serial port activity by resetting the timer and bringing the system to full power when it is in a low power management mode.
IRQ0...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 to make them operative.

Unlike standard RAM memory, NVRAM is sustained by an onboard battery when the system off.

After saving the selections, the program displays this message:

```
Changes have been saved  
Press <space> to continue
```

A prompt appears if attempting to exit without saving,

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 default values (as described below) can be loaded or change the values 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:

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 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:

Previous 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 users with 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 the system board. Situations that require changing jumper settings include the following:

- adding secondary cache to the system
- upgrading the processor
- forgetting the system password.

CAUTION: Jumpers are set correctly at the factory.

Only change (or check) the appropriate jumper setting if adding secondary cache, forgot the password, or upgrading the processor. Otherwise, keep the jumpers at their factory settings.

The following figures show jumper locations on the system board and a description of jumper settings. Use the procedures that follow the figures to change jumper settings or to clear a forgotten password.

Figure Section 2-10 System Board Jumpers

Figure Section 2-11 Password Clear Jumper

Figure Section 2-12 Secondary Cache Jumpers

Figure Section 2-13 Processor Clock Speed Jumper

Figure Section 2-14 Processor Voltage Jumpers

Figure Section 2-15 Jumpers JP3 through JP9, JP11, JP21 through JP23

Changing Jumper Settings

To change system board jumper settings, use the following procedure. Use needle-nose pliers to move a jumper.

CAUTION: If system conditions require disabling the password, see the following section “Clearing the Password.”

1. Power 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 3).
-

3. Locate the jumper on the system board (see the figures earlier in this subsection).
4. If required, remove any installed expansion boards to access the jumper (see “Board Removal” in Section 3).
5. Change the jumper setting by lifting the plastic block and placing it on the appropriate pins.
6. Replace any removed expansion boards (see “Board Installation” in Section 3).
7. Replace the system unit cover (see Section 3).

Clearing the Password

Use the following procedure to disable the current password and to set a new one.

1. Turn off and unplug the system and any external options.
 2. Remove the system unit cover (see “Removing the Cover” in Section 3).
 3. Locate jumper JP2 on the system board (see Figure Section 2-11 earlier in this section).
 4. If required, remove any installed expansion boards to access the jumper (see “Board Removal” in Section 3).
 5. Set a jumper on the JP2 pins 1 and 2.
 6. Replace the system unit cover (see Section 3).
 7. Connect system power cables and external options.
 8. Power on the system.
 9. Power off the system and unplug the system and any external options.
 10. Remove the jumper block from the JP2 block.
 11. Replace any removed expansion boards (see “Board Installation” in Section 3).
 12. Replace the system unit cover (see Section 3).
 13. Run Setup to set a new password (see “Security Menu” earlier in this section).
-

Section 3

Options

This section provides installation instructions for adding the following expansion options for the desktop and minitower systems.

- expansion boards
- SIMM upgrade kits
- secondary cache
- video DRAM
- processor upgrades, such as an OverDrive processor
- storage devices, such as hard disks, CD-ROM readers, and diskette drives
- external peripherals, such as a printer or serial device.

All options except for the monitor require that the system unit top cover be removed. When installing the monitor, turn to the “NEC SVGA Monitor” subsection.

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.

If a fault occurs after completing the option installation, verify that the installation was performed correctly. One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs or the option is not operating properly, turn off the computer and try again. If the problem persists, see “Troubleshooting” in Section 4.

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.

Figure Section 3-1 Desktop Cover Screws

3. Slide the top cover toward the rear about one inch.
4. Lift the top cover up and off.

Figure Section 3-2 Removing the Desktop Cover

MINITOWER COVER REMOVAL

Remove the minitower 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 three cover screws.

Figure Section 3-3 Minitower Cover Screws

3. Pull the top cover about two inches toward the front of the unit.
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 expansion slots, the minitower system has five expansion slots:

- three ISA slots in the desktop system, four ISA slots in the minitower system
- one shared PCI/ISA slot.

ISA expansion slots support industry-standard 8-bit or 16-bit expansion boards. The PCI/ISA slot also supports PCI expansion boards.

PCI expansion boards run at the system's processor speed. The PCI bus handles 32 bits of data at a time, being wider as well as faster than the standard ISA bus. PCI boards can send and receive data much faster which boosts system performance.

Desktop Expansion Board Installation

Install expansion boards into the desktop system as follows.

1. Remove the top cover as previously described.
2. Remove the expansion slot screw and cover. Save the expansion slot cover in the event the expansion board is removed in the future.

To remove the expansion slot cover on the inside of the PCI/ISA backboard, remove the 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 of the PCI/ISA-Bus backboard, separate the 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 L-Bracket

4. Install the expansion board into an expansion slot connector. When installing a full-size expansion board, make sure that the expansion board slides into the guide rail at the front of the system unit.

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

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

Minitower Expansion Board Installation

Install expansion boards into the minitower system unit as follows.

1. Remove the top cover as previously described.
2. Remove the expansion slot screw and cover. Save the expansion slot cover in the event the expansion board is removed in the future.

Figure Section 3-9 Minitower Expansion Slots

3. Install the expansion board into an expansion slot connector. When installing a full-size expansion board, make sure that the expansion board slides into the guide rail at the front of the system unit.
 4. Reinstall the expansion slot screw to secure the expansion board.
 5. Connect any expansion board cables.
 6. Replace the top cover.
-

SIMM UPGRADE KITS

The system board comes standard with 8 MB of memory (16 MB in desktop multimedia systems). Memory over the first megabyte of RAM is extended RAM. SIMM upgrade kits are 70-ns SIMMs.

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

Memory expansion options include the following kits.

- 4-MB SIMM kit is a 1 MB x 32 bit SIMM stick.
- 8-MB SIMM kit is a 2 MB x 32 bit SIMM stick.
- 16-MB SIMM kit is a 4 MB x 32 bit SIMM stick.
- 32-MB SIMM kit is a 8 MB x 32 bit SIMM stick.

The system board also supports 36-bit parity SIMMs.

SIMM sticks install in two sockets on the system board. The system supports up to 64 MB of high-speed memory. Different size SIMMs may be intermixed.

Use the following procedures to install a SIMM stick.

CAUTION: Static discharge can damage SIMM components. Heed the cautions in the following section.

Cautions

Always remove a SIMM from its shipping material carefully. Static discharge can damage SIMM components. Take the following precautions when handling SIMMs:

- Avoid carpets in cool, dry areas.
 - Do not remove the SIMM from its anti-static packaging until installing it.
 - Before handling a SIMM, discharge any static electricity by touching a grounded metal object, such as the metal frame inside the system unit.
 - Always hold a SIMM by its edges. Avoid touching the components on the SIMM.
-

SIMM Installation

Use the following procedures to install SIMMs in the system.

Checking the Memory in the System

Use the following procedure to locate SIMM sockets and to check the memory configuration in the system.

1. Remove the top cover and any expansion boards covering the socket as previously described.
2. Locate the two SIMM sockets, SIMM socket 1 and SIMM socket 2, on the system board.

Figure Section 3-9 Locating SIMM Sockets In The Desktop

Figure Section 3-10 Locating SIMM Sockets In the Minitower

3. Check the memory configuration that is presently in the system. Multimedia systems with a DX4 processor (such as PowerMate V4100 multimedia models) ship with 16 MB of memory; other systems ship with 8 MB of memory.

For optimized performance, fill SIMM sockets according to the following table using 4-MB, 8-MB, 16-MB, and 32-MB sticks.

Table Section 3-1 Memory Configurations

Total Memory	SIMM Socket 1	SIMM Socket 2
4 MB	4 MB	Empty
8 MB	4 MB	4 MB
8 MB*	8 MB	Empty
12 MB	8 MB	4 MB
12 MB	4 MB	8 MB
16 MB	8 MB	8 MB
16 MB**	16 MB	Empty
20 MB	4 MB	16 MB
20 MB	16 MB	4 MB
24 MB	8 MB	16 MB
24 MB	16 MB	8 MB
32 MB	16 MB	16 MB
32 MB	32 MB	Empty

Table Section 3-1 Memory Configurations

Total Memory	SIMM Socket 1	SIMM Socket 2
36 MB	4 MB	32 MB
36 MB	32 MB	4 MB
40 MB	8 MB	32 MB
48 MB	16 MB	32 MB
48 MB	32 MB	16 MB
64 MB	32 MB	32 MB
64 MB	64 MB	Empty

* Standard configuration for all systems except multimedia systems with a DX4 processor.

** Standard configuration for all multimedia systems with a DX4 processor.

Installing SIMMs

Use the following procedure to install SIMM sticks.

NOTE: If you remove the IDE and floppy cable from the system board to get better access to SIMM sockets, note where pin #1 is located.

1. Remove the SIMM in SIMM socket 1:

NOTE: If installing a SIMM in socket 2, first remove the SIMM in socket 1. SIMM socket 1 must be empty before accessing socket 2.

- Press the metal clips at the outer edges of the socket away from the SIMM.
- Push the SIMM away from the locking tabs and remove it from the socket.

Figure Section 3-11 Removing a SIMM

2. Install a SIMM as follows.

CAUTION: Before installing a SIMM, reduce static discharge by touching the system's metal chassis.

- Locate the notched end of the SIMM.

Figure Section 3-12 Locating the Notched End of the SIMM

- Locate the appropriate SIMM socket.
- Align the notched end of the SIMM with the correct end of the SIMM socket (see the following figure).
- Insert the SIMM at an angle into the socket.
- Carefully tilt the SIMM towards the locking tabs. Using equal pressure at the ends of the SIMM, push it until it locks under the metal clips at the ends of the socket.

Figure Section 3-13 Inserting the SIMM

3. Replace any removed expansion boards and the system unit cover.
4. Connect external peripherals and power cables.
5. Power on the system.

If there is a discrepancy in the amount of memory that the Power-On Self-Test finds with the amount of memory that was installed, check that the SIMM sticks are installed correctly. If the problem persists, see Section 4, Troubleshooting.

SECONDARY CACHE

Secondary cache increases system performance. The system supports the addition of 256 KB of secondary cache. The system requires the following cache module options:

- one 32-KB by 8-bit tag cache module (28-pin)
- four 64-KB by 8-bit cache modules (32-pin).

Use the following steps to install the secondary cache modules.

1. Remove the system unit cover and any expansion boards covering the cache socket as previously described.
2. Locate the cache module sockets on the system board.

NOTE: In the desktop system, the 3 1/2-inch drive bracket might have to be removed to access the tag cache socket.

To remove the 3 1/2-inch drive bracket, see “Installing a Storage Device in the Desktop” later in this chapter.

Figure Section 3-14 *Locating the Cache Sockets in the Desktop*

Figure Section 3-15 Locating the Cache Sockets in the Minitower

3. Install the tag cache module as follows.
 - Locate the notched end of the cache module.
 - Align the notched end of the module with the notched end of the tag cache socket.

Figure Section 3-16 Aligning the Cache Module

- Partially insert the module pins into the socket holes. Check that all pins are correctly inserted into the holes and that none are bent.

CAUTION: Pins bend and break easily. To avoid bending any pins during insertion, use equal pressure on both ends of the module.

- Using equal pressure at the ends of the cache module, push it downwards until it is fully seated in the socket.

Figure Section 3-17 Installing the Cache Module

4. Repeat step 3 to install the other four cache modules.
5. Configure the system for 256 KB of secondary cache by setting the following jumpers on the system board:
 - JP16 — set a jumper on pins 2 and 3.
 - JP17 — set a jumper on pins 1 and 2.

See Section 2 to locate and set the JP16 and JP17 Secondary Cache jumpers.

6. Replace any removed expansion boards and the system unit cover.
-

VIDEO UPGRADE

The system comes with 1 MB of video dynamic RAM (DRAM). Video memory can be upgraded by adding two 256-KB by 16-bit video DRAM modules.

The upgrade significantly increases video performance and allows the system to display more colors at higher resolutions.

Use the following steps to upgrade video memory in the system.

1. Remove the system unit cover and any expansion boards covering the video memory sockets as previously described.
2. Locate the video DRAM sockets on the system board.

Figure Section 3-18 Locating Video DRAM Sockets in the Desktop

Figure Section 3-19 Locating Video DRAM Sockets in the Minitower

3. Install a video DRAM module as follows.

CAUTION: Reduce static electricity by touching the metal frame of the system unit.

- Locate the notched end of the video DRAM socket (see the following figure).
 - Align the notched end of the module over the notched end socket.
 - Carefully insert the video DRAM module into the socket. Using equal pressure, gently press down until the module is fully seated in the socket.
-

Figure Section 3-20 *Aligning the Video DRAM Module*

4. Repeat step 3 to install the second video DRAM module.
5. Replace any removed expansion boards and the system unit cover.

OVERDRIVE PROCESSOR INSTALLATION

The zero-insertion force (ZIF) socket accepts pin-grid-array (PGA) processors, including primary processors, such as 486DX2 and DX4 chips, and OverDrive processors.

Use the following procedures to install the chip upgrades in the system.

CAUTION: Incorrect installation of the chip can damage the chip, system board, or both. Follow the installation instructions carefully.

CAUTION: The system requires a heatsink on the upgrade chip. Heatsinks are available through NEC.

Install an OverDrive processor into the system board as follows.

1. Remove the top cover and any expansion boards covering the PGA/OverDrive socket as previously described.
2. Locate the PGA/OverDrive socket on the system board.

Figure Section 3-21 Locating the PGA/OverDrive Socket in the Desktop

Figure Section 3-22 Locating the PGA/OverDrive Socket in the Minitower

3. Lift the PGA/OverDrive socket lever all the way back and remove the processor currently installed.

Figure Section 3-23 PGA/OverDrive Socket Lever

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

4. Insert the OverDrive processor by aligning the notched corner with inner alignment hole of the socket.

Figure Section 3-24 OverDrive Processor Alignment

5. Set the jumper settings for the installed OverDrive processor (see Section 2, Setup and Operation).
 6. Replace any removed expansion boards.
 7. Replace the top cover and run Setup to reconfigure the computer for the OverDrive processor (see Section 2, Setup and Operation).
-

STORAGE DEVICES

This subsection provides the procedures for installing an optional storage device into the system unit. The system board supports up to two diskette drives and up to four IDE storage devices. The optional NEC diskette and hard disk drives are described first, then procedures for installing the devices follow.

Diskette Drive

A 3 1/2-inch diskette drive comes standard with the PowerMate V486 systems. The system ships with a connector cable for a single drive, a replacement cable with two connectors is required when installing a second floppy device. The first diskette drive (3 1/2-inch) is drive A, the second diskette drive (if installed) is drive B.

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

Diskette Drive Settings

The standard 1.44-MB diskette drive setting is shown in Figure Section 3-25. The default settings for the optional 1.2-MB diskette drive are shown in Figure Section 3-26.

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 diskette drive. Both diskette drives (the standard and the optional) are normally terminated.

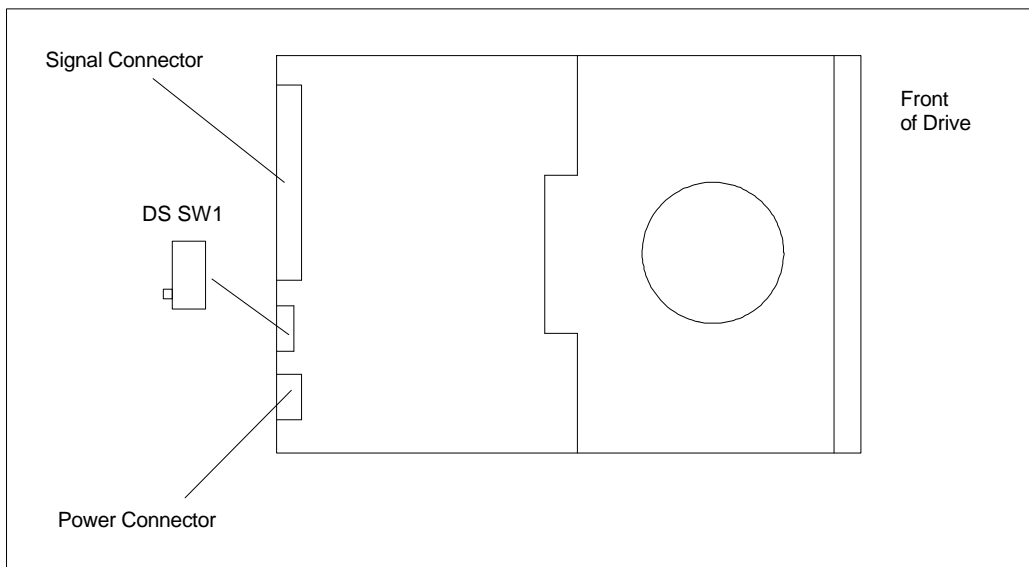


Figure Section 3-25 OSDA-90C, 1.44-MB Diskette Drive

Figure Section 3-26 FD-55GFR, 1.2-MB Diskette Drive

Hard Disk Drives

There are two IDE interface connectors on the system board supporting up to four IDE devices. One system board IDE connector provides a Fast local bus interface. The other system board IDE connector provides the standard IDE interface. The 3 1/2-inch hard disk drive shipped with the system unit uses the Fast IDE local bus connector. The standard IDE connector on the system board is used by the CD-ROM reader in the multimedia systems.

When installing a second hard disk drive, use the open IDE connector on the cable coming from the Fast local bus system board IDE 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. Systems come with a hard disk drive preinstalled in the computer. Jumpers for the drives are set for single drive configurations. Jumper settings and their locations are shown in Figure Section 3-27 and Figure Section 3-28.

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

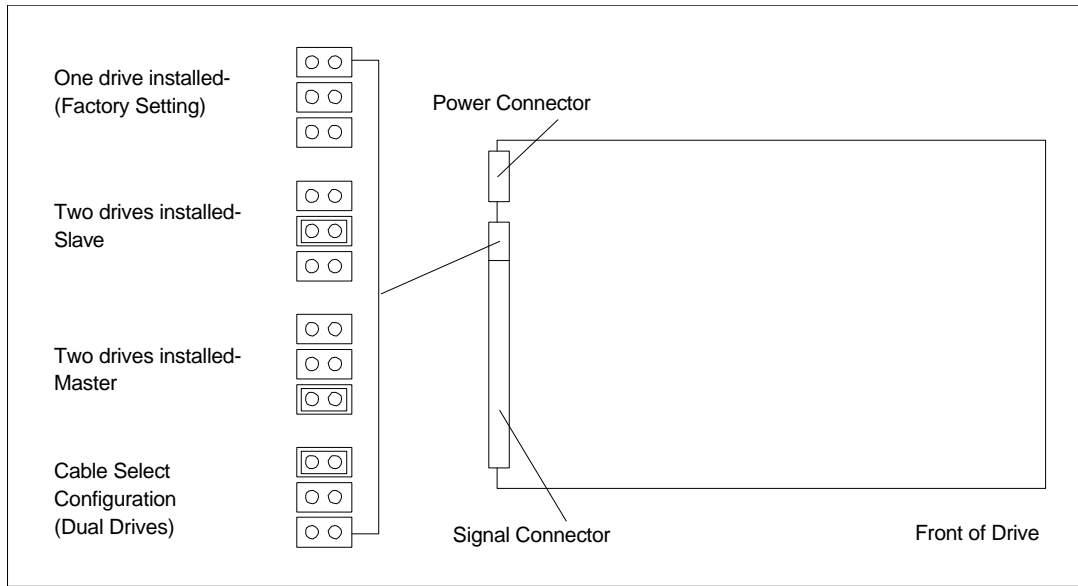


Figure Section 3-27 *WDAC2540, 540-MB Hard Disk Drive*

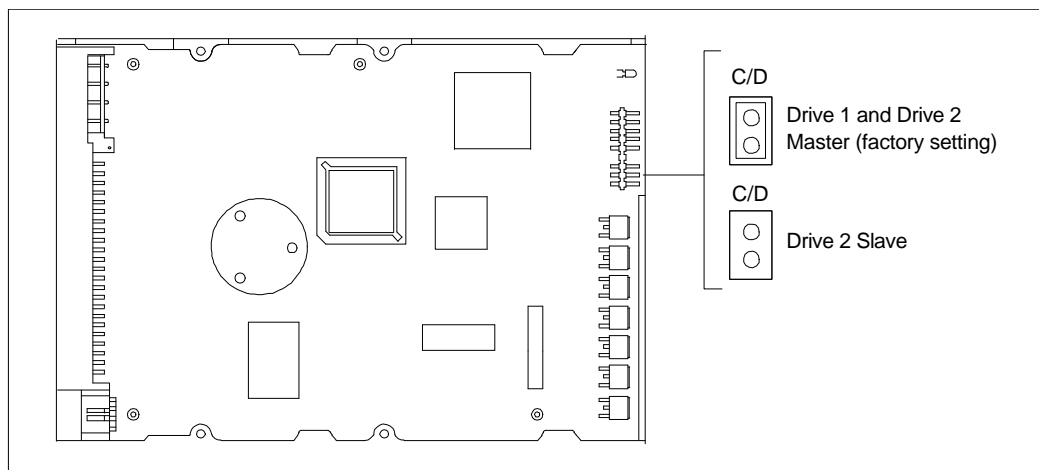


Figure Section 3-28 *CFA850A, 850-MB Hard Disk Drive*

DESKTOP STORAGE DEVICE INSTALLATION

Use the following procedure to install a storage device in the desktop system. The following figure shows cable connector connections on the system board and power supply.

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

A 3 1/2-inch hard disk drive must be mounted in a 5 1/4-inch bracket when installing it in a 5 1/4-inch storage slot.

Figure Section 3-29 System Board Cable Connections in the Desktop

Removing the 3 1/2-inch Drive Bracket

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 3-30).
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 3-30 3 1/2-Inch Drive Bracket Screws

Removing the Blank Panel

Remove the front panel assembly from the desktop chassis as follows.

1. Remove the desktop cover and 3 1/2-inch diskette drive bracket as previously described.
2. Remove the five front panel screws.

Figure Section 3-31 Removing the Indicator Panel

3. From the inside of the front panel, release the blank panel tabs and remove the panel.

Figure Section 3-32 Removing the Blank Panel

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

4. Reinstall the front panel.

Installing the Storage Device

Install the device into the device slot as follows.

1. Remove the top cover, front panel, and 3 1/2-inch drive bracket as previously described.
2. Insert the device, connector end first, into the device slot.
3. Connect the device cables as follows:
 - If installing an IDE device, such as an IDE hard disk, connect the IDE cable and power cable.

NOTE: If installing a hard disk, use the IDE cable attached to the fast IDE port (IDE1 connector) for the best performance.

Figure Section 3-33 Connecting IDE Device Cables

If installing an IDE CD-ROM reader, also connect the audio cable (see the instructions that come with the reader).

- If installing a 1.2-MB diskette drive, connect the diskette drive signal cable and power cable.

NOTE: The installation of a second diskette drive requires the removal of the standard two-connector diskette drive cable and the installation of a three-connector cable.

Figure Section 3-34 Connecting 1.2-MB Diskette Drive Cables

4. Secure the 3 1/2-inch device in the slot as follows.

- Align the holes in the device with the holes in the device bracket.

Secure the device to the bracket with the screws that come with the drive. Use three screws (two screws on one side, one screw on the other side).

Figure Section 3-35 Securing a 3 1/2-Inch Device to the Bracket

5. Secure the device in the 5 1/4-inch slot using four screws (two on each side).

Figure Section 3-36 Securing the Device in the 5 1/4-Inch Slot

6. Replace the 3 1/2-inch device bracket in the 3 1/2-inch device slot.
Secure the device bracket in place with the four screws removed earlier.

Figure Section 3-37 Securing the 3 1/2-Inch Drive Bracket

7. Replace the system unit cover.
 8. Connect external peripherals and power cables.
 9. Run the Setup program to set the new configuration (see Section 2).
-

MINITOWER STORAGE DEVICE INSTALLATION

Use the following procedure to install a storage device in the minitower system. The following figure shows cable connector connections on the system board and power supply.

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

A 3 1/2-inch hard disk drive must be mounted in a 5 1/4-inch bracket when installing it in a 5 1/4-inch storage slot.

Figure Section 3-38 System Board Cable Connectors in the Minitower

1. Remove the minitower cover as previously described.
2. Remove the metal slot cover by pushing the cover out of the slot from inside the system.

Store the slot cover. If the device is removed from the slot, replace the slot cover.

Figure Section 3-39 Locating the Slot Cover

3. Insert the device into the device slot.
4. Connect the device cables as follows:
 - If installing an IDE device, connect the appropriate IDE cable and power cable.

NOTE: If installing a hard disk, use the IDE cable attached to the fast IDE port (IDE1 connector) for the best performance.

Figure Section 3-40 Connecting IDE Device Cables

- If installing an IDE CD-ROM reader, also connect the audio cable (see the instructions that come with the reader).
- If installing a 1.2-MB diskette drive, connect the diskette drive signal cable and power cable.

NOTE: The installation of a second diskette drive requires the removal of the standard two-connector diskette drive cable and the installation of a three-connector cable.

Figure Section 3-41 Connecting 1.2-MB Diskette Drive Cables

5. Secure the device in the slot as follows.
 - Align the holes in the device with the holes in the device bracket.
 - Secure the device to the bracket with the four screws that come with drive (two screws on each side).

Figure Section 3-42 Securing a 3 1/2-Inch Device

Figure Section 3-43 Securing a 5 1/4-Inch Device

6. If an accessible device was installed, such as a diskette drive or CD-ROM reader, locate the blank panels on the front of the system unit cover.

Locate the blank panel for the device slot that contains the new device.

Remove the blank panel by pressing the panel tabs inward from inside of the cover and pushing the blank panel out.

Figure Section 3-44 Locating the Blank Panel Tabs

7. Replace the system unit cover.
 8. Connect external peripherals and power cables.
 9. Run the Setup program to set the new configuration (see Section 2).
-

EXTERNAL PERIPHERALS

This section contains instructions for connecting the following external peripherals to the system unit ports:

- a parallel printer to the parallel printer port
- two RS-232C devices, such as a pointing device and serial printer, to the serial 1 and serial 2 ports.

Parallel Printer

Use the following steps to connect a parallel printer to the system unit.

1. Turn off and unplug the system unit and any external options connected to the system unit.
2. Make sure that the printer power is off and the power cable is unplugged.
3. Connect the printer cable to the printer port on the rear of the system unit. Secure the cable as follows.
 - Secure the system unit connection with the screws provided.
 - Lock the connector to the printer with the connector clips.

Figure Section 3-45 Connecting a Printer Cable to the Desktop

Figure Section 3-46 Connecting a Printer Cable to the Minitower

RS-232C Device

Use the following procedure to connect an RS-232C device, such as a pointing device or serial printer, to the computer.

1. Turn off and unplug the system unit and any external option connected to the system unit.
 2. Make sure that any power to the RS-232C device is off and the power cable is unplugged.
-

3. Connect the RS-232C cable to one of the system's serial ports and to the device. Secure the cable with the screws provided.

Figure Section 3-47 Connecting an RS-232C Cable to the Desktop

Figure Section 3-48 Connecting an RS-232C Cable to the Minitower

Section 4

Maintenance and Troubleshooting

This section provides information on maintaining and troubleshooting Ready Multimedia series computers. NEC service and information telephone numbers are listed in Table 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 files - provides software drivers and the latest ROM BIOS 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™ - automated service that sends the latest information about NEC products to the 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 four screws holding the keyboard enclosure together.

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.

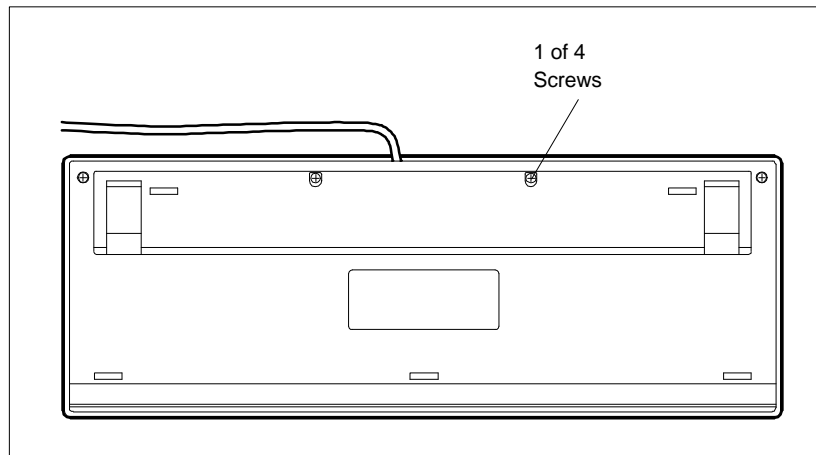


Figure Section 4-1 *Removing the Keyboard Enclosure*

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

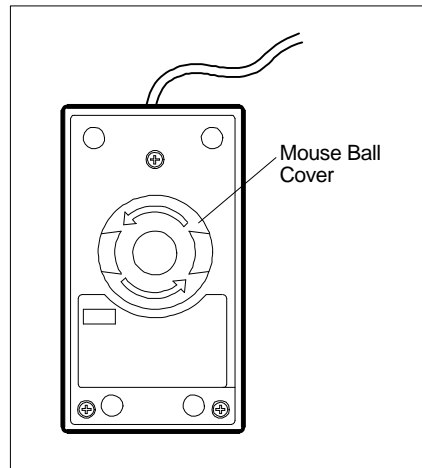


Figure Section 4-2 *Removing the Mouse Ball Cover*

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

Routine Checks

Make the following routine checks when servicing the computer.

- Inspect all external cabling. Replace any damaged cables.
 - If the computer no longer saves settings (date, time), replace the battery.
-

- If raster lines are visible when the monitor is operating, adjust the monitor contrast and brightness knobs.

Successful computer power-up is indicated by a beep. This should occur each time the computer is powered up.

TROUBLESHOOTING

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

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

Error Messages

Messages may appear when running NEC utilities. Table Section 4-2 describes the possible error and warning messages that may be displayed when using the BIOS Update Utility.

Table Section 4-2 BIOS Update Utility Error Messages

Message	Action
An error indicates that the system does not contain a Flash ROM.	The utility cannot be used.
Contact technical support for update information.	A message states that the system's version of BIOS cannot be updated by diskette because it's not a supported version.
Contact technical support for update information.	An error indicates that the system BIOS reprogramming is not enabled or possibly that no Flash ROM is installed. The utility cannot be used.
A message indicates that the update is in progress.	Do not disturb the system in any way while this screen appears. The system resets after the update completes.
An error notes that the system does not have enough RAM available.	Make sure you boot the system from the BIOS Update Utility diskette.
A message states that the diskette you are about to use has already been used.	The previously installed BIOS may not be restored if the update is continued. This condition is acceptable if a separate copy of the utility diskette is kept for each system.
An error indicates that you are attempting to restore the original BIOS before installing the new BIOS.	First install the new BIOS.

How to Load Remote Support Session

Use the following steps to load the Remote Support Session program.

1. Check that the telephone line is connected to the modem connector in the back of the computer (see Section 2).

NOTE: The modem requires an analog telephone line. Standard modems do not operate on digital phone lines.

2. With the system power off, insert the NEC System Recovery diskette into diskette drive A. The diskette comes with the system.
3. Power on the system unit and monitor. A menu appears.
4. Type **2** to select “Remote Support Session.”

A batch file is executed and both the chat and log features are enabled by TSC. TSC uses the chat feature to inform the caller of what actions are being taken and to notify the caller that the keyboard will be locked up while determining the problem. When possible, TSC corrects the problem and remotely reboots the computer. If the problem requires on-site service, TSC provides the caller with a service telephone number.

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 4-3.

Table Section 4-3 summarizes problems that may develop during computer operation and lists (in sequential order) suggested corrective actions.

Table Section 4-3 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.
Power supply malfunction	<p>Any one or more of the following conditions could occur:</p> <p>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.</p>	<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. 4. Replace power supply.

Table Section 4-3 Problems and Solutions

Problem	Symptom	Solution
Operating system does not boot	Intermittent beeping at power-on. Computer beeps more than once and is unable to complete boot-up.	<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 F2 key to run Setup and correct the parameters. 2. Replace the battery 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.
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.

Table Section 4-3 Problems and Solutions

Problem	Symptom	Solution
Hard disk malfunction	Hard disk drive lamp does not light but hard disk drive can be accessed	1. Check cable connections between lamp and system board.
	Hard disk controller failure message displayed.	1. Check that the IDE port and hard disk drives are enabled in setup.
	Cannot access hard disk.	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.	1. Reseat SIMMs. 2. Systematically swap SIMMs. 3. Check to see if the SIMM configuration is valid (See Section 3) 3. Replace SIMMs. 4. Replace system board.
Sound board malfunctions.	No output from both the 8-bit and 16-bit digitized sounds	1. Check interrupts. Refer to Section 2 for interrupt settings. 2. Check DMA channels. Refer to Section 2 for DMA channel settings.
Keyboard or mouse malfunction	Monitor has prompt, but cannot input data.	1. Check that keyboard/mouse is plugged in. 2. Check password utility (see Section 2). 3. Disable password utility (see Section 2). 4. Check cable connections between keyboard/mouse interface board and system board. 5. Replace keyboard (or mouse). 6. Replace system board.

Table Section 4-3 Problems and Solutions

Problem	Symptom	Solution
Monitor malfunction	Unable to synchronize display.	<ol style="list-style-type: none"> 1. Adjust the monitor's synchronization knobs. 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.
Communication error	No or bad data when communicating.	<ol style="list-style-type: none"> 1. Check cable connections between system board and device. 2. Check that the interface port is selected. 3. Test or replace device and interface cable. 4. Replace system board.

DOS Application Problems

Hardware conflicts occur when two or more peripheral devices contend for the same signal lines or channels. Conflicts between the sound board and another peripheral device may be due to the settings of the I/O address, interrupt, or DMA channel. The sound board's factory default settings are:

- Audio Interface
 - Base address: 220H to 233H
 - MIDI Port I/O address: 330H to 331H
 - Interrupt: 5
 - 8-bit DMA: 1
 - 16-bit DMA: 5

To resolve hardware conflicts, change the hardware settings of the sound board or the expansion boards in the system if the expansion board is using the sound board's setting. To change the DMA channel and interrupt settings (see Section 2, Setup and Operation). Table Section 4-4 summarizes problems that may encounter when running from DOS:

Table Section 4-4 Sound Board DOS Problems

Problem	Cause	Solution
The installation program cannot run	RAM memory might be less than 420 KB in the system. INSTALL.EXE requires 420 KB of free memory to run properly.	To check the available memory, enter MEM at DOS prompt. The "largest executable program size" message on the screen should be more than 430080 bytes. If you do not have the available memory, remove some of the resident programs before running INSTALL.

Table Section 4-4 Sound Board DOS Problems

Problem	Cause	Solution
SOUND or/and BLASTER environment strings could not be found.	The sound or/and Blaster environment command may not be included in the AUTOEXEC.BAT file. The Sound environment specifies the directory location and Blaster environment specifies the I/O address, interrupt, and DMA channel settings of the sound board. Both environment strings need to be set up in the DOS environment.	<p>Add the sound environment command to the AUTOEXEC.BAT file. Type SET SOUND=C:\SB16 at the DOS prompt.</p> <p>Add the Blaster environment command to the AUTOEXEC.BAT file. Run the program SBCONFIG. When the program is run, the statement SET BLASTER=A220 I5 D1 H5 P330 T6 will be added to the file.</p> <p>Reboot the system for the new settings to take effect.</p>
Some third party software report an error when detecting the I/O, interrupt, or DMA channel setting.	<p>These software do not support the Blaster environment</p> <p>To reconfigure CT-VOICE.DRV's and ORGAN.DRV's I/O, interrupt, and DMA channel settings:</p>	<p>Reconfigure the three drivers: SBFMDRV.COM, CT-VOICE.DRV, ORGAN.DRV to ensure that the hard-coded settings on the drivers correspond with the settings on the sound board.</p> <p>To reconfigure SBFMDRV.COM's I/O setting:</p> <ol style="list-style-type: none"> 1. Change to \SB16 directory. 2. Type INST-DRV. 3. Specify the hardware settings according to the hardware settings on the sound board. 4. Press Enter. <ol style="list-style-type: none"> 1. Change to \SB16 directory. 2. Type INST-DRV DRV. 3. Specify the hardware settings according to the hardware settings on the sound board. 4. Press Enter.
Error message: Out of	The system environment space	Add

Table Section 4-4 Sound Board DOS Problems

Problem	Cause	Solution
environment	is used	Shell=C:\COMMAND.COM /E:512 /P to the CONFIG.SYS file.
Joystick is not working properly.	The joystick port on the sound board conflicts with the existing joystick port in the system.	Remove either the additional joystick in the system or remove the jumper block from JYEN to disable the joystick port on the sound board.
Joystick is not working properly.	The CPU speed of the system is too fast.	Reduce the speed of the system.
No sound.	Audio equipment is not connected properly or the volume is not adjusted to an audible level.	Check to see that the speakers or headphones are connected to the sound board's audio output connector and the volume control knob is set to mid-range.
System hangs during 16-bit digitized sound test. But 8-bit works	The DMA controller on the motherboard does not function properly during 16-bit DMA transfer. 16-bit DMA transfer on such machines might corrupt the data in the main memory and cause the system to hang or encounter a parity error.	Select the "use 8-bit DMA" option for the 16-bit DMA channel when running SBCONFIG.EXE. When that option is selected, 16-bit PCM data will be transferred through the 8-bit DMA channel.

Windows Application Problems

Table Section 4-5 summarizes problems that may encounter when running the applications in Windows.

Table Section 4-5 Sound Board Windows Problems

Problem	Cause	Solution
No sound when running Windows applications.	<p>One or more of the sound drivers might not be included in the SYSTEM.INI file.</p> <p>If one or more of the drivers are missing, run WINSETUP by following the steps below:</p>	<p>Check the SYSTEM.INI file by following the steps below:</p> <ol style="list-style-type: none"> 1. Choose RUN from the File menu in Program Manager. 2. Type SYSEDIT in the Command Line text box and choose OK. <p>The SYSTEM.INI file should resemble the following:</p> <pre>[drivers] timer=timer.drv midimapper=midimap.drv MIDI=sb16fm.drv Aux=sb16aux.drv Wave=sb16snd.drv MIDI1=sb16snd.drv [sndblst.drv] port=220 int=5 DMA Channel=1 HDMA Channel=5 MIDIPort=330</pre> <ol style="list-style-type: none"> 1. Choose Run from the File menu in the File Manager 2 Type C:\SB16\WINSETUP in the Command Line text box. 3 Choose OK. 4. Follow the instructions on the screen to complete the installation process.

Table Section 4-5 Sound Board Windows Problems

Problem	Cause	Solution
Windows fails to install a device driver or the message "Device not found" appears when you try to play a Wave or MIDI file, or CD.	The appropriate drivers might not have been included in the SYSTEM.INI file.	<p>Check the [mci] section in the SYSTEM.INI using SYSEDIT.</p> <p>The SYSTEM.INI file should resemble the following:</p> <pre>[mci] WaveAudio=mcwave.drv Sequencer=mciseq.drv CDAUDIO=mcicda.drv</pre> <p>If one or more of the drivers are missing, refer to Windows user's guide on how to install the drivers.</p>
The MIDI output could not be heard.	MIDI mapper might not be mapped	<p>Located in the Control Panel is a MIDI Mapper that maps the MIDI output to different MIDI devices. The two MIDI devices on the sound board are the external MIDI port and the internal MIDI synthesizer. If the mapper is mapped to the MIDI port, connect the external MIDI equipment to the sound board. Normally, the MIDI output is mapped to the internal MIDI synthesizer.</p>

Diagnostic Output and Beep Codes

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 4-6 for diagnostic outputs and beep codes.

The diagnostic port output codes are placed at the diagnostic status port (port 80) to indicate tests in progress and failed tests to someone with hardware that can detect the output. If the FAILBEEP option is selected, the BEEP CODES are announced on the speaker only if a fatal failure is detected. For instance, “2-1-4” (a burst of two beeps, a single beep, a burst of four beeps) indicates a failure of bit 3 in the first 64 K of RAM. Both sets of codes are only used prior to screen initialization and screen retrace verification. Once the screen is believed operable, diagnostic reporting is via screen messages, except if MANLOOP EQU TRUE and the jumpers say to loop on POST. In this case, it is assumed that no video adapter is attached and some additional errors are reported via the diagnostic port and the speaker.

Table Section 4-6 Diagnostic Output and Beep Codes

Diagnostic Port Output	Beep Codes	Description of Test or Failure
EB_PDIF	EQU0400h	Pointing device interface failure (mouse)
E_REGS	EQU 01h	80486 register test in progress
E_CRAM	EQU 02h	1-1-3 CMOS write/read test in progress or failure
E_BROM	EQU 03h	1-1-4 BIOS ROM checksum in progress or failure
E_TIMR	EQU 04h	1-2-1 Programmable Interval Timer test in progress or failure
E_DMAI	EQU 05h	1-2-2 DMA initialization in progress or failure
E_PAGE	EQU 06h	1-2-3 DMA page register write/read test in progress or failure
E_REFR	EQU 08h	1-3-1 RAM refresh verification in progress or failure
E_RAM0	EQU 09h	1st 64 K RAM test in progress
E_MMUL	EQU 0Ah	1-3-3 1st 64 K RAM chip or data line failure
E_MOEL	EQU 0Bh	1-3-4 1st 64 K RAM odd/even logic failure
E_MADD	EQU 0Ch	1-4-1 1st 64 K RAM address line failure
E_RAMP	EQU 0Dh	1-4-2 1st 64 K RAM parity test in progress or failure
E_FSTIMR	EQU 0Eh	1-4-3 Fail-safe timer test in progress
E_NMIIO	EQU 0Fh	1-4-4 Software NMI port test in progress
E_MBIT	EQU 10h	2-1-1 1st 64 K RAM chip or data line failure - bit 0
E_MBIT	EQU 11h	2-1-2 1st 64 K RAM chip or data line failure - bit 1
E_MBIT	EQU 12h	2-1-3 1st 64 K RAM chip or data line failure - bit 2

Table Section 4-6 Diagnostic Output and Beep Codes

Diagnostic Port Output	Beep Codes	Description of Test or Failure
E_MBIT EQU 13h	2-1-4	1st 64 K RAM chip or data line failure - bit 3
E_MBIT EQU 14h	2-2-1	1st 64 K RAM chip or data line failure - bit 4
E_MBIT EQU 15h	2-2-2	1st 64 K RAM chip or data line failure - bit 5
E_MBIT EQU 16h	2-2-3	1st 64 K RAM chip or data line failure - bit 6
E_MBIT EQU 17h	2-2-4	1st 64 K RAM chip or data line failure - bit 7
E_MBIT EQU 18h	2-3-1	1st 64 K RAM chip or data line failure - bit 8
E_MBIT EQU 19h	2-3-2	1st 64 K RAM chip or data line failure - bit 9
E_MBIT EQU 1Ah	2-3-3	1st 64 K RAM chip or data line failure - bit A
E_MBIT EQU 1Bh	2-3-4	1st 64 K RAM chip or data line failure - bit B
E_MBIT EQU 1Ch	2-4-1	1st 64 K RAM chip or data line failure - bit C
E_MBIT EQU 1Dh	2-4-2	1st 64 K RAM chip or data line failure - bit D
E_MBIT EQU 1Eh	2-4-3	1st 64 K RAM chip or data line failure - bit E
E_MBIT EQU 1Fh	2-4-4	1st 64 K RAM chip or data line failure - bit F
E_DMAS EQU 20h	3-1-1	Slave DMA register test in progress or failure
E_DMAM EQU 21h	3-1-2	Master DMA register test in progress or failure
E_PIC0 EQU 22h	3-1-3	Master interrupt mask register test in progress or failure
E_PIC1 EQU 23h	3-1-4	Slave interrupt mask register test in progress or failure
E_IVLD EQU 25h		Interrupt vector loading in progress
E_KEYC EQU 27h	3-2-4	Keyboard controller test in progress or failure
E_CVER EQU 28h		CMOS power-fail and checksum checks in progress
E_CCON EQU 29h		CMOS config info validation in progress
E_CRTM EQU 2Bh	3-3-4	Screen memory test in progress or failure
E_CRTIEQU 2Ch	3-4-1	Screen initialization in progress or failure
E_CRTR EQU 2Dh	3-4-2	Screen retrace tests in progress or failure
E_VROM EQU 2Eh		Search for video ROM in progress
E_OK EQU 30h		Screen believed operable w/video ROM
E_OK EQU 31h		Monochromatic screen believed operable
E_OK EQU 32h		40-column color screen believed operable
E_OK EQU 33h		80-column color screen believed operable

Table 4-7 lists codes that are reported via the diagnostic port and the speaker only if MANLOOP EQU TRUE and the “manufacturing jumper” indicates loop on POST. Otherwise, these errors are reported via the screen and POST continues. Use of the manufacturing jumper requires working correctly configured CMOS.

Table Section 4-7 Diagnostic Output and Beep Codes Looped on POST

Diagnostic Port Output	Beep Codes	Description of Test or Failure
E_TIMRI	EQU 34h 4-2-1	Timer tick interrupt test in progress or failure
E_SHUTD	EQU 35h 4-2-2	Shutdown test in progress or failure
E_GTA20	EQU 36h 4-2-3	Gate A20 failure
E_PMUXI	EQU 37h 4-2-4	Unexpected interrupt in protected mode
E_BAMEM	EQU 38h 4-3-1	RAM test in progress or failure above address 0FFFFh
E_TIMR2	EQU 3Ah 4-3-3	Interval timer channel 2 test in progress or failure
E_TODCK	EQU 3Bh 4-3-4	Time-of-Day clock test in progress or failure
E_SRLPT	EQU 3Ch 4-4-1	Serial port test in progress or failure
E_PRLPT	EQU 3Dh 4-4-2	Parallel port test in progress or failure
E_80287	EQU 3Eh 4-4-3	Math coprocessor test in progress or failure

Section 5

Desktop Repair

DISASSEMBLY AND REASSEMBLY

This section contains step-by-step disassembly procedures for the desktop systems. The CD-ROM reader, hard disk drive, and 3 1/2-inch diskette drive are installed and 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 shown later in 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 Desktop Disassembly Sequence

Sequence	Part	See Page
1	Top cover	5-3
2	Expansion board(s)	5-4
3	PCI/ISA-Bus backboard	5-6
4	Front panel assembly	5-6
5	Power button cover	5-8
6	Speaker assembly	5-9
7	SIMM memory	5-10
8	3 1/2-inch diskette and hard disk drives	5-11
9	5 1/4-inch devices	5-13
10	5 1/4-inch device cage	5-14
11	Power supply	5-15
12	System board	5-16
13	Battery	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 “Setup” in Section 2). If a fault occurs, verify that the reassembly was performed correctly. If the problem persists, see Section 4, Maintenance and Troubleshooting.

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

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.

Top Cover Removal

Use the following procedure to remove the top cover.

1. Power off and unplug all peripheral cables attached to the system unit.
2. Remove the two cover screws.

Figure Section 5-1 Top Cover Screws

3. Slide the top cover toward the front about one inch.
4. Lift the top cover up and off.

Figure Section 5-2 Removing the Top Cover

Expansion Board Removal

Use the following procedure to remove an expansion board.

1. Remove the top cover as previously described.
2. Disconnect any cables leading from the expansion board.
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 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 backboard, separate the expansion slot L-bracket from the expansion board by removing the screw.

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

PCI/ISA-BUS Backboard Removal

Use the following procedure to remove the PCI/ISA-Bus backboard from the system board.

1. Remove the top cover and all expansion slot boards as previously described.
2. Remove the two PCI/ISA-Bus backboard screws.
3. Lift the backboard away from the bracket and out of the system unit.

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

Front Panel Assembly Removal

Use the following procedure to remove the front panel assembly from the system unit.

1. Remove the top cover as previously described.
2. Unplug the following cables from their connectors.
 - Power lamp (connector J9)
 - Hard disk drive busy lamp (connector JP15)
 - Reset button (connector J15)

3. Remove the five front panel screws.

Figure Section 5-7 Indicator Panel Screws

4. Feed the two lamp and reset cables through the hole in the front of system unit chassis when removing the front panel assembly.
 5. Separate the lamps and reset button from the front panel assembly by pulling them out from their socket in the panel assembly.
-

Power Button Cover Removal

Use the following procedure to remove the power button cover from the front panel.

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.

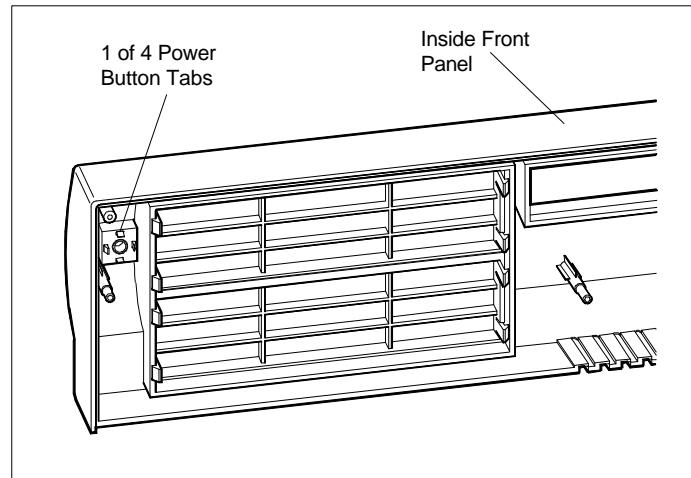


Figure Section 5-8 Power Button Tabs

Speaker Assembly Removal

Use the following procedure to remove the speaker from the device cage.

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.
4. Lift the speaker from the slot in the device cage.

Figure Section 5-9 Speaker Screw

SIMM Removal

Use the following procedure to remove SIMM sticks from the system board.

1. Remove the top cover, and any full size expansion boards as previously described.
2. Spread apart the two clips at each end of the SIMM stick (the clips are part of the system board's connectors). Tilt the SIMM stick forward, allowing the post to slide out of the hole in the SIMM stick.
3. Remove the SIMM stick from the system board. Repeat step 2 for each SIMM to be removed.

NOTE: If more information is needed, see the installation instructions in Section 3, Options.

Figure Section 5-10 SIMM Socket

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

Use the following procedure to remove the 3 1/2-inch diskette drive and 3 1/2-inch hard disk drive.

1. Remove the top cover as previously described.
2. Unplug the diskette drive power cable and signal cable from the diskette drive.
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 position of the red edge of the diskette drive signal cable is shown in Section 3, Optins.

4. Remove the four 3 1/2-inch drive bracket screws.

Figure Section 5-11 3 1/2-Inch Drive Bracket Screws

5. Remove the three screws securing the diskette drive to the drive bracket.
Remove the three screws securing the hard disk drive to the drive bracket.
6. Pull the drives out from the front of the bracket.

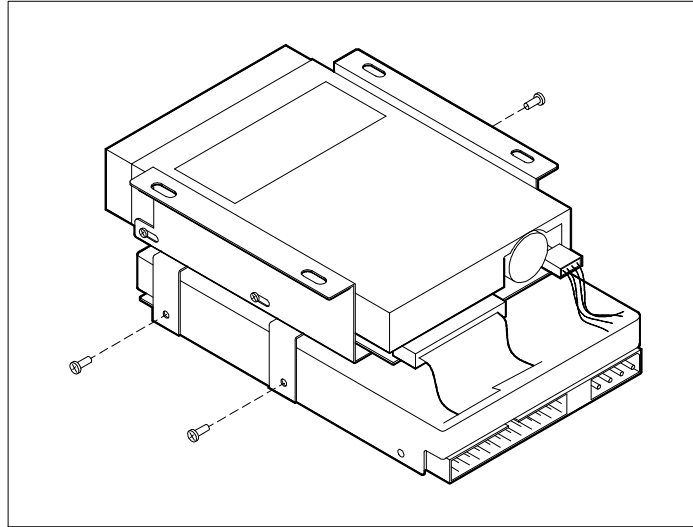


Figure Section 5-12 3 1/2-Inch Diskette and Hard Disk Drive Screws

5 1/4-Inch Device Removal

Use the following procedure to remove a 5 1/4-inch device from the 5 1/4-inch device cage.

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.
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 out of the 5 1/4-inch device cage from the front of the system unit.

NOTE: When reinstalling the 5 1/4-inch device, note that all power cables are keyed to fit only in the correct position. The position of the red edge of the diskette drive signal cable is shown in Section 3, Options.

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

5 1/4-Inch Device Cage Removal

Use the following procedure to remove the 5 1/4-inch device cage from the system unit.

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.
3. Remove the four device cage screws from the front of the device cage.
4. Pull the device cage out from the inside of the system unit. Devices in the device cage do not need to be removed when removing the device cage.

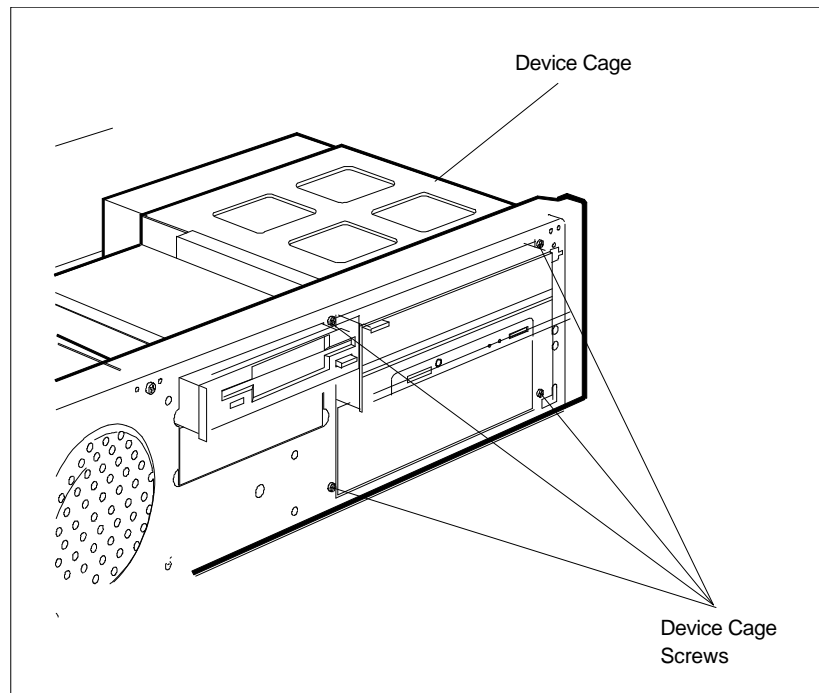


Figure Section 5-14 5 1/4-Inch Device Cage Screws

Power Supply Removal

Use the following procedure to remove the power supply from the system unit.

1. Remove the top cover and front panel 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.

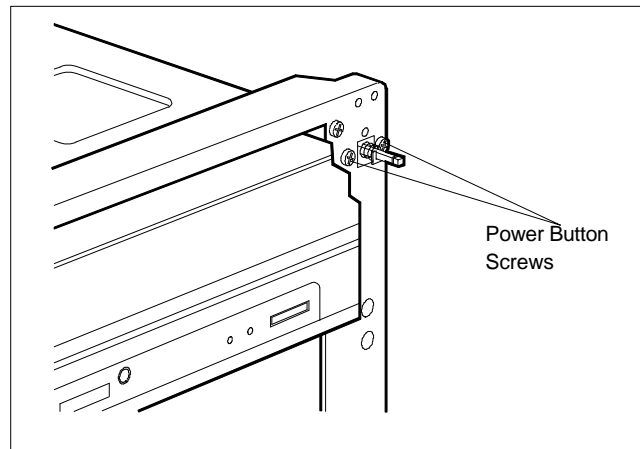


Figure Section 5-15 Power Button Screws

5. Remove the four screws holding the power supply to the system unit.
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.

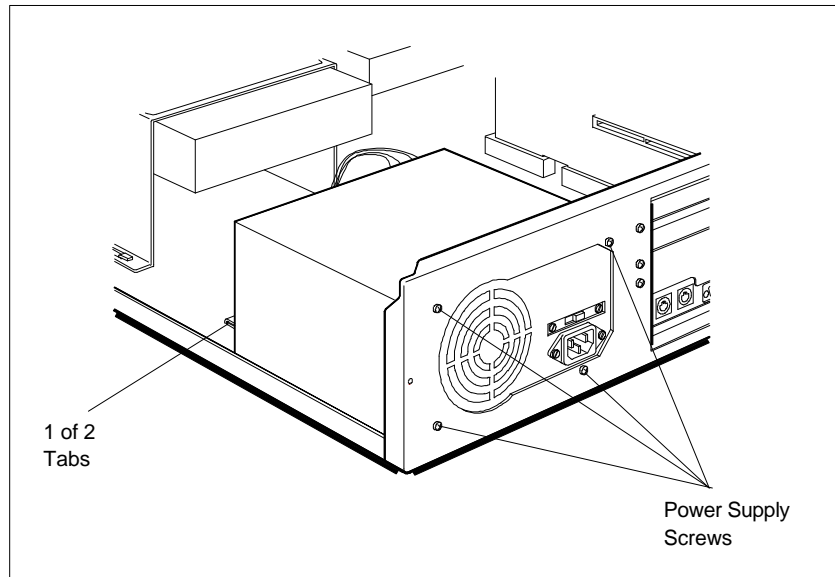


Figure Section 5-16 Power Supply Screws

System Board Removal

Use the following procedure to remove the system board.

1. Remove the following components as previously described.
 - top cover
 - 3 1/2-inch drive bracket
 - expansion slot boards
 - PCI/ISA-Bus backboard
 - SIMMs installed on the system board
 2. Remove and label all cables connected to the system board. Figure Section 5-17 provides the connector locations and Table Section 5-2 identifies the connector. Appendix A provides 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 out the side of the system unit.

Figure Section 5-17 System Board Connectors and Screws

Table Section 5-2 System Board Connectors

Connector	Connector Label
Power supply	J6
Fast IDE hard disk drive connector (IDE1)	J3
Standard IDE connector (IDE2)	J7
Diskette drive connector	J5
Speaker	J18
Keylock	J14
Turbo LED	J11
Turbo Switch	J12
Power lamp	J9
Hard disk drive busy lamp	JP15
Reset Button	J15

Battery Removal

Use the following procedure to remove the battery.

1. Remove the top cover and 3 1/2-inch drive bracket as previously described.
2. Locate the battery socket on the system board (see Figure Section 5-17).
3. Lift the battery spring clip and remove the battery (see Figure Section 5-18).

When replacing the battery, be sure that the positive side is facing up. Run the Setup utility (see Section 2) to set the time, date, etc.

Figure Section 5-18 Battery Replacement

Illustrated Parts Breakdown

This subsection contains the illustrated parts breakdown (IPB) and NEC part numbers for the PowerMate V486 Series desktop computers. Table Section 5-3 lists the field-replaceable parts for the computer. Figure Section 5-19 is the illustrated parts breakdown. In the U.S., call 1(800) 632-4525 to order NEC spare parts. To order options in the U.S., call the local sales office.

Table Section 5-3 PowerMate V486 Desktop Field-Replaceable Parts List*

Item	Description	Part Number
1	PowerMate V466 Logo	158-030580-009
	PowerMate V4100 Logo	158-030580-010
2	Power Lamp, Hard Disk Drive Busy Lamp, and Reset Button Assemblies	158-050685-004
3	3 1/2-inch x 1-inch, 540-MB Hard Disk	158-050395-322

* 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 42181169.

Table Section 5-3 PowerMate V486 Desktop Field-Replaceable Parts List*

Item	Description	Part Number
	3 1/2-inch x 1-inch, 850-MB Hard Disk	158-050395-337
4	3 1/2-inch x 1-inch, 1.44-MB Diskette Drive	808-870954-101A
5	3 1/2-inch Drive Bracket	158-050685-109
6	Desktop Chassis	158-050685-002
7	PCI/ISA-Bus Backboard Bracket	158-050685-006
8	Diskette Drive Signal Cable	158-050690-001
9	Hard Disk Drive IDE Signal Cable	158-050691-000
10	CD-ROM IDE Signal Cable	158-050691-001
11	8-MB SIMM Stick (2 MB x 32-bit)	158-082553-070
	16-MB SIMM Stick (4 MB x 32-bit)	158-082556-070
12	System Board (without CPU)	158-050794-000A
13	Audio Cable	158-050824-000
14	Sound Board (Creative Labs 2261)	158-050797-000
15	PCI/ISA-Bus Backboard	158-050795-000A
16	Network Board (3COM – 3C509B)	158-050796-000
17	Top Cover	158-050685-001
18	Power Supply	158-050686-000
19	Speaker Kit with Cables (QS-815)	158-050801-000
20	AC Adapter for Speakers	158-050829-000
21	Heatsink for 486DX2-66 and 486DX4/100 CPUs	158-082534-000
22	486DX2-66 CPU (with write back)	158-082533-000
	486DX4/100 CPU	802-148892-003A
23	Battery	158-056137-000
24	Microphone	158-050692-000
25	5 1/4-inch Device cage	158-050685-011
26	Quad-Speed CD-ROM Reader (Mitsumi FX-400)	158-050817-000
27	Speaker Assembly (internal)	158-050685-003
28	Power Button Cover and Spring	158-050685-007
29	Front Panel	158-050685-007
30	5 1/4-inch Blank Panel	158-050685-010
31	Keyboard	158-050707-000
32	Power Cord	158-050697-000

Table Section 5-3 PowerMate V486 Desktop Field-Replaceable Parts List*

Item	Description	Part Number
33	NEC Mouse (PS/2-compatible)	158-050484-002

Figure Section 5-19 PowerMate V486 Desktop 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 42181169.

Table Section 5-4 lists the PowerMate V486 desktop options.

Table Section 5-4 PowerMate V486 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
256-KB Secondary Cache Kit	158-053745-000
1-MB Video DRAM	TBD
1.2-MB Diskette Drive Kit	158-053476-000
540-MB Hard Disk Drive Kit	158-050395-322
850-MB Hard Disk Drive Kit	158-050395-337

** All PowerMate V486 computers SIMM kits have tin edge connectors.

Table Section 5-5 lists PowerMate V486 desktop documentation and packaging.

Table Section 5-5 PowerMate V486 Desktop Documentation and Packaging*

Description	Part Number
PowerMate V486 Series System User's Guide	819-181119-000
PowerMate V486 Series Quick Setup	819-181143-000
PowerMate V486 Series Service and Reference Manual	819-181169-000
Network Card User's Guide	819-181173-000
PowerMate V486 Desktop Shipping Carton	158-040442-006
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 42181169.

Section 6

Repair

DISASSEMBLY AND REASSEMBLY

This section contains step-by-step disassembly procedures for the computer. The CD-ROM reader, hard disk drive, and 3 1/2-inch diskette drive are installed and 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 system are shown later in 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 V466 Minitower Disassembly Sequence

Sequence	Part	See Page
1	Top cover	6-3
2	Expansion board(s)	6-4
3	PCI/ISA-Bus backboard	6-6
4	Front panel assembly	6-7
5	Speaker assembly	6-9
6	Secondary cache and SIMM memory	6-10
7	3 1/2-inch diskette drive	6-11
8	3 1/2-inch hard disk drive	6-13
9	5 1/4-inch device cage	6-16
10	5 1/4-inch device	6-15
11	Power supply	6-17
12	System board	6-18
13	Battery	6-20

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 “Setup” in Section 2). If a fault occurs, verify that the reassembly was performed correctly. If the problem persists, see Section 4, Maintenance and Troubleshooting.

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

Top Cover Removal

Use the following procedure to remove the top cover.

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 three cover screws.

Figure Section 6-1 Top Cover Screws

3. Slide the top cover toward the front about one inch.
4. Lift the top cover up and off the system unit chassis.

Figure Section 6-2 Removing the Top Cover

Expansion Board Removal

Use the following procedure to remove the installed expansion board.

1. Remove the top cover as previously described.
2. Disconnect any cables leading from the expansion board.
3. Remove the screw from the expansion slot bracket.

Figure Section 6-3 Expansion Slot Screw

PCI/ISA-BUS Backboard Removal

Use the following procedure to remove the PCI/ISA-Bus backboard.

1. Remove the top cover and all expansion boards as previously described.
2. Remove the two PCI/ISA-Bus backboard bracket screws.
3. Pull the backboard and bracket and out of the system unit.

Figure Section 6-4 PCI/ISA-Bus Backboard Bracket Screws

4. Separate the PCI/ISA-Bus backboard from the bracket by removing the two screws shown in Figure Section 6-5.

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

Front Panel Assembly Removal

Use the following procedure to remove the front panel assembly .

1. Remove the top cover as previously described.
2. Remove the seven front panel screws from inside the top cover.
3. Feed the two lamp and reset cables through the hole in the front of system unit chassis when removing the front panel assembly.
4. Separate the lamps and reset button from the front panel assembly by pulling them out from their socket in the panel assembly.

Figure Section 6-6 Front Panel Screws

Power Button Cover Removal

Use the following procedure to remove the power button cover.

1. Remove the top cover 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.
3. Remove the power button from the front of the panel.

Figure Section 6-7 Power Button Tabs

Speaker Assembly Removal

Use the following procedure to remove the speaker.

1. Remove the top cover as previously described.
2. Unplug the speaker 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.

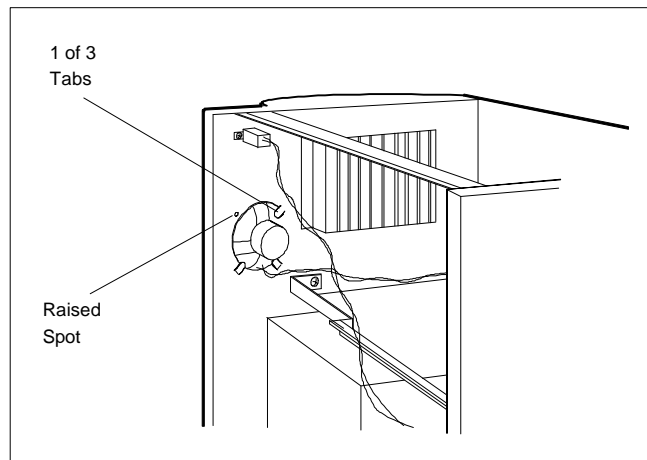


Figure Section 6-8 Speaker Tabs

SIMM Removal

Use the following procedure to remove the SIMM sticks.

1. Remove the top cover and any full size expansion boards as previously described.
2. Spread apart the two clips at each end of the SIMM stick (the clips are part of the system board's connectors). Tilt the SIMM stick forward, allowing the post to slide out of the hole in the SIMM stick.
3. Remove the SIMM stick from the system board. Repeat step 2 for each SIMM to be removed.

NOTE: If more detailed information is needed, see the installation instructions in Section 3, Options.

Figure Section 6-9 Removing a SIMM

3 1/2-inch Diskette Drive Removal

Use the following procedure to remove the 3 1/2-inch diskette drive.

1. Remove the top cover as previously described.
2. Unplug the diskette drive power cable and signal cable from the diskette drive.

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 6-10 3 1/2-Inch Diskette Drive Cables

3. Remove the two 3 1/2-inch diskette drive bracket screws.

Figure Section 6-11 Diskette Drive Bracket Screws

4. Slide the 3 1/2-inch diskette drive with bracket out of the system unit. (The bracket works like a drawer and will stop when fully out.)
 5. Remove the four 3 1/2-inch diskette drive screws; two on each side (see Figure Section 6-13).
 6. Remove diskette the drive out from the front of the chassis.
-

3 1/2-inch Hard Disk Drive Removal

Use the following procedure to remove the 3 1/2-inch hard disk drive.

1. Remove the top cover as previously described.
2. 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.

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

3. Remove the four 3 1/2-inch hard disk drive screws; two on each side.
4. Remove the 3 1/2-inch hard disk drive out from inside the chassis.

Figure Section 6-13 Removing a 3 1/2-Inch Device

5 1/4-Inch Device Removal

Use the following procedure to remove a 5 1/4-inch device from the 5 1/4-inch device cage.

1. Remove the top cover as previously described.
2. Unplug all signal and power cables from the device(s) in the 5 1/4-inch device cage.
3. Remove the four 5 1/4-inch hard disk drive screws; two on each side.
4. Remove the device out of the 5 1/4-inch device cage from the front of the system unit.

Figure Section 6-14 Removing a 5 1/4-Inch Device

5 1/4-Inch Device Cage Removal

Use the following procedure to remove the 5 1/4-inch device cage from the system unit.

1. Remove the top cover as previously described.
2. Unplug all signal and power cables from the device(s) in the 5 1/4-inch device cage.
3. Remove the four device cage screws from the front of the device cage (see Figure Section 6-15).
4. Pull the device cage out from the front of the system unit. Devices in the device cage do not need to be removed to remove the device cage.

Figure Section 6-15 5 1/4-Inch Device Cage Screws

Power Supply Removal

Use the following procedure to remove the power supply.

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.

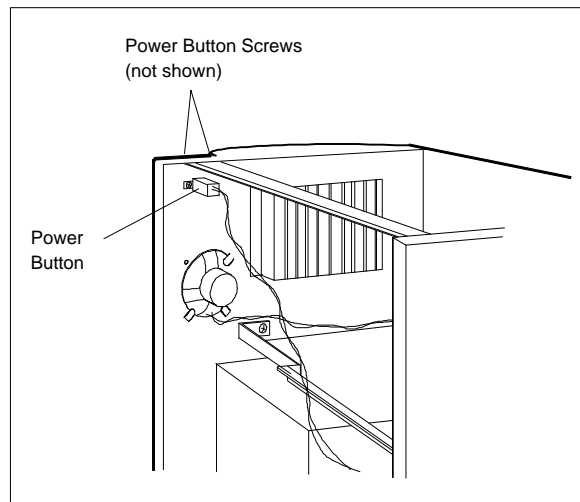


Figure Section 6-16 Power Button Screws

5. Remove the five screws securing the power supply to the system unit and remove the power supply.

Figure Section 6-17 Power Supply Screws

System Board Removal

Use the following procedure to remove the system board.

1. Remove the following components as previously described.
 - top cover
 - expansion slot boards
 - PCI/ISA-Bus backboard
 - Secondary cache (if installed, see Section 3, Options)
 - SIMMs installed on the system board
 2. Remove the two 3 1/2-inch diskette drive bracket screws from the front of the system unit (see Figure Section 6-15).
 3. Slide the 3 1/2-inch diskette drive with bracket out of the system unit. (The bracket works like a drawer and will stop when fully out.)
-

4. Remove and label all cables connected to the system board. Figure Section 6-18 provides the general locations of the connectors for the system board. Table Section 6-2 identifies the correct connector. Appendix A provides the pin assignments for each connector.
5. Remove the seven screws that hold the system board to the system unit chassis. Remove the system board out the side of the system unit.

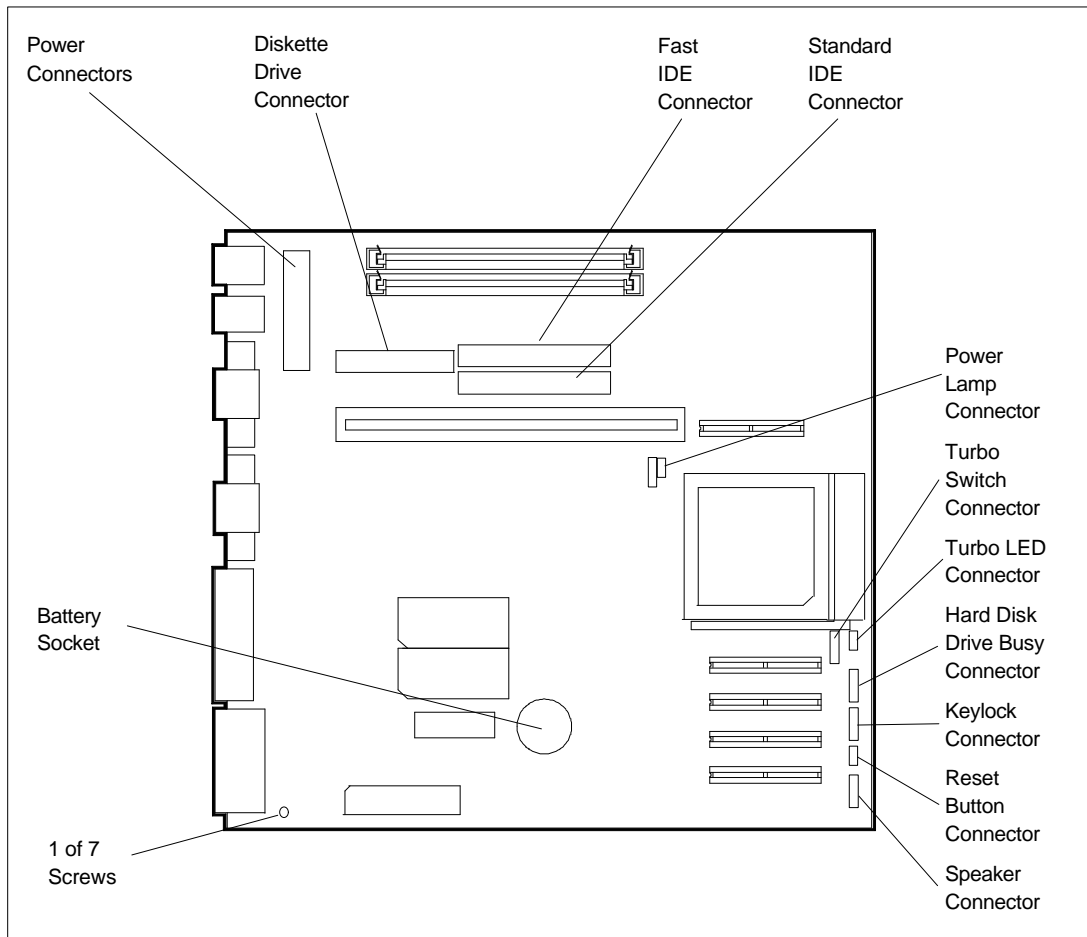


Figure Section 6-18 System Board Connectors and Screws

Table Section 6-2 System Board Connectors

Connector	Connector Label
Power supply	J6
Fast IDE hard disk drive connector (IDE1)	J3
Standard IDE connector (IDE2)	J7
Diskette drive connector	J5
Speaker	J18
Keylock	J14
Turbo LED	J11
Turbo Switch	J12
Power lamp	J9
Hard disk drive busy lamp	JP15
Reset Button	J15

Battery Removal

Use the following procedure to remove the battery.

1. Remove the top cover as previously described.
2. Remove the two 3 1/2-inch diskette drive bracket screws from the front of the system unit (see Figure Section 6-15).
3. Slide the 3 1/2-inch diskette drive with bracket out of the system unit. (The bracket works like a drawer and will stop when fully out.)
4. Lift the battery spring clip securing the battery in the battery socket on the system board.

CAUTION: When replacing the battery be sure to insert the battery so that the positive side is facing up.

Figure Section 6-19 Battery Replacement

5. After installing a new battery, the time, date, etc. may need to be reset. Run the Setup utility that came with the system (see Section 2).

Illustrated Parts Breakdown

This subsection contains the illustrated parts breakdown (IPB) and NEC part numbers for the PowerMate V466 minitower computer. Table Section 6-3 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 6-3 PowerMate V466 Minitower Field-Replaceable Parts List*

Item	Description	Part Number
1	3 1/2-inch x 1-inch, 540-MB Hard Disk	158-050395-322
2	5 1/4-inch Device cage	158-050698-011
3	3 1/2-inch x 1-inch, 1.44-MB Diskette Drive	808-870954-101A
4	3 1/2-inch Drive Bracket	158-050698-009
5	PCI/ISA-Bus Backboard	158-050798-000A
6	Network Board	158-050796-000
7	8-MB SIMM Stick (2 MB x 32-bit)	158-082553-070
8	Battery	158-056137-000
9	System Board (without CPU)	158-050794-000A
10	Diskette Drive Signal Cable	158-050690-001
11	Hard Disk Drive IDE Signal Cable	158-050691-000
12	5 1/4-inch Blank Panel	158-050698-010
13	Front Panel	158-050698-007
14	Power Button Cover and Spring	158-050698-008
15	PowerMate V466 Logo	158-030581-004
16	Top Cover	158-050698-001
17	Power Lamp, Hard Disk Drive Busy Lamp, and Reset Button Assembly	158-050698-004
18	486DX2-66 CPU	158-082533-000
19	Heatsink for 486DX2-66 CPU	158-060219-002
20	Power Supply	158-050699-000
21	Minitower Chassis	158-050698-002

* 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 42181169.

Table Section 6-3 PowerMate V466 Minitower Field-Replaceable Parts List*

Item	Description	Part Number
22	NEC Mouse (PS/2-compatible)	158-050484-002
23	Keyboard	158-050707-000
24	Speaker Assembly (internal)	158-050698-003
25	Power Cord	158-050697-000
26	PCI/ISA-Bus Backboard Bracket	158-050698-006

* 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 42181169.

Figure Section 6-20 PowerMate V466 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 42181169.

Table Section 6-4 lists the PowerMate V466 minitower options.

Table Section 6-4 PowerMate V466 Minitower 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
256-KB Secondary Cache Kit	158-053745-000
1-MB Video DRAM Module	TBD
1.2-MB Diskette Drive Kit	158-053476-000
540-MB Hard Disk Drive Kit	158-050395-322
850-MB Hard Disk Drive Kit	158-050395-337
NEC SVGA Monitor	158-053605-000
MultiSync 3FGe Color Monitor	08119705
MultiSync 4FGe Color Monitor	08119709
MultiSync 5FGe Color Monitor	08119343
MultiSync 6FG Color Monitor	08119337
Printer Cable	808-857782-001A
RS-232C Cable	808-857781-001A

** All PowerMate V486 Series SIMM kits have tin edge connectors.

* 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 42181169.

Table Section 6-5 lists PowerMate V466 minitower documentation and packaging.

Table Section 6-5 PowerMate V466 Minitower Documentation and Packaging*

Description	Part Number
PowerMate V486 Series System User's Guide	819-181119-000
PowerMate V486 Series Quick Setup	819-181143-000
PowerMate V486 Series Service and Reference Manual	819-181169-000
Network Card User's Guide	819-181183-000
PowerMate V466 Minitower Shipping Carton	158-040446-006
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 42181169.

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(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 Sections 5 and 6 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.