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## Preface

This addendum to the *PowerMate® V & P Series Service and Reference Manual* (document number 819-181516-000) provides updated information on the computer's hardware for users who need an overview of system design.

This information applies to computers with the following model numbers:

- EM-2120-24853E
- EM-2120-24853CE
- EM-2130-24853E
- EM-2130-24853CE.

This addendum also includes updated procedures for setting up and installing the system and illustrated parts lists. The manual is written for NECCSD-trained customer engineers, system analysts, service center personnel, and dealers.

The manual is organized as follows:

**Section 1 — Technical Information**, provides information not available when the *PowerMate P ETC Series User's Guide* (819-181784-000) was printed. System specifications are listed including dimensions, weight, environment, safety compliance, power consumption, and memory.

**Section 2 — Setup and Installation**, includes procedures for installing application software and drivers and performing system backups. This section also provides information not available when the *PowerMate P ETC Series User's Guide* (819-181784-000) was printed.

**Section 3 — Illustrated Parts Breakdown**, provides an exploded view diagram of the system. Also included are updated parts lists for field-replaceable parts.

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## Section 1

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# Technical Information

This section describes features and components that are specific to the PowerMate® P ETC Series of NEC PowerMate V & P Series computers. For information that is general to all PowerMate V & P Series computers, see the *PowerMate V & P Series Service and Reference Manual* (part number 819-181516-000) or the *PowerMate V & P Series Service and Reference Manual Addendum* (part number 819-181667-000).

### SYSTEM OVERVIEW

PowerMate P ETC Series computers are configured with a different system board and come with a network interface board installed as standard equipment in one of the system unit expansion slots. Depending on the model, the system unit also contains a 1.2-GB or 2.1-GB Western Digital IDE hard disk.

PowerMate P ETC Series computers include the configurations identified in Table 1-1.

**Table 1-1 PowerMate P ETC Series System Configurations**

Model Number	Processor	Multimedia	System Memory	Video Memory	Hard Disk
EM-2120-24853E (PowerMate P2166)	166-MHz Intel® Pentium®	No	16 MB	2 MB SGRAM	2.1-GB IDE (Western Digital Caviar)
EM-2120-24853CE (PowerMate P2166)	166-MHz Pentium	Yes	16 MB	2 MB SGRAM	2.1-GB IDE (Western Digital Caviar)
EM-2130-24853E (PowerMate P2200)	200-MHz Pentium	No	16 MB	2 MB SGRAM	2.1-GB IDE (Western Digital Caviar)
EM-2130-24853CE (PowerMate P2200)	200-MHz Pentium	Yes	16 MB	2 MB SGRAM	2.1 GB IDE (Western Digital Caviar)

Multimedia systems come with audio components integrated on the system board. Multimedia systems also include an eight-speed CD-ROM reader installed in the system unit, 20-watt speakers, and a microphone.

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## SIMM UPGRADE

PowerMate P ETC Series system configurations come with 16 MB of main system memory. Six sockets on the system board support up to 384 MB of high-speed memory using the following industry-standard, tin-plated, single in-line memory modules (SIMMs):

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**NOTE:** You may install 60-ns, parity or nonparity, extended data output (EDO) SIMMs into the SIMM sockets.

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- 1-MB by 32- or 36-bit (4-MB stick)
- 2-MB by 32- or 36-bit (8-MB stick)
- 4-MB by 32- or 36-bit (16-MB stick)
- 8-MB by 32- or 36-bit (32-MB stick)
- 16-MB by 32- or 36-bit (64-MB stick).

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**CAUTION:** To avoid corrosion between different metals, only use tin-plated SIMM sticks.

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## Performing Memory Upgrades

Upgrade system memory as follows:

- locate memory sockets on system board
- check installed system memory
- install SIMMs.

## Locating SIMM Sockets.

Remove the system unit cover and locate the six SIMM sockets on the system board (see Section 3 of the *PowerMate V & P Series Service and Reference Manual*).

If any cables block access to the SIMM sockets, label and disconnect them. If any boards block access to the sockets, remove them.

## Checking System Memory

Use Table 1-2 to check the memory installed in the system and determine the SIMM configuration needed to increase memory.

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**NOTE:** SIMM memory must be installed in pairs of the same memory type.

**Table 1-2 Recommended Memory Upgrade Path**

Total Memory	Bank 0		Bank 1		Bank 2	
	SIMM 1	SIMM 2	SIMM 3	SIMM 4	SIMM 5	SIMM 6
16 MB	4 MB	4 MB	4 MB	4 MB	Empty	Empty
16 MB*	8 MB	8 MB	Empty	Empty	Empty	Empty
24 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB
24 MB	8 MB	8 MB	4 MB	4 MB	Empty	Empty
32 MB	4 MB	4 MB	4 MB	4 MB	8 MB	8 MB
32 MB	8 MB	8 MB	8 MB	8 MB	Empty	Empty
32 MB	16 MB	16 MB	Empty	Empty	Empty	Empty
40 MB	8 MB	8 MB	8 MB	8 MB	4 MB	4 MB
40 MB	16 MB	16 MB	4 MB	4 MB	Empty	Empty
48 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB
48 MB	16 MB	16 MB	4 MB	4 MB	4 MB	4 MB
48 MB	16 MB	16 MB	8 MB	8 MB	Empty	Empty
56 MB	16 MB	16 MB	8 MB	8 MB	4 MB	4 MB
64 MB	16 MB	16 MB	8 MB	8 MB	8 MB	8 MB
64 MB	16 MB	16 MB	16 MB	16 MB	Empty	Empty
64 MB	32 MB	32 MB	Empty	Empty	Empty	Empty
72 MB	32 MB	32 MB	4 MB	4 MB	Empty	Empty
72 MB	16 MB	16 MB	16 MB	16 MB	4 MB	4 MB
80 MB	32 MB	32 MB	4 MB	4 MB	4 MB	4 MB
80 MB	16 MB	16 MB	16 MB	16 MB	8 MB	8 MB
80 MB	32 MB	32 MB	8 MB	8 MB	Empty	Empty
88 MB	32 MB	32 MB	8 MB	8 MB	4 MB	4 MB
96 MB	32 MB	32 MB	8 MB	8 MB	4 MB	4 MB
96 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB
96 MB	32 MB	32 MB	16 MB	16 MB	Empty	Empty

\*Standard configuration.

**Table 1-2 Recommended Memory Upgrade Path**

<b>Total Memory</b>	<b>Bank 0</b>		<b>Bank 1</b>		<b>Bank 2</b>	
	<b>SIMM 1</b>	<b>SIMM 2</b>	<b>SIMM 3</b>	<b>SIMM 4</b>	<b>SIMM 5</b>	<b>SIMM 6</b>
112 MB	32 MB	32 MB	16 MB	16 MB	8 MB	8 MB
128 MB	32 MB	32 MB	32 MB	32 MB	Empty	Empty
128 MB	32 MB	32 MB	16 MB	16 MB	16 MB	16 MB
136 MB	32 MB	32 MB	32 MB	32 MB	4 MB	4 MB
144 MB	32 MB	32 MB	32 MB	32 MB	8 MB	8 MB
160 MB	32 MB	32 MB	32 MB	32 MB	16 MB	16 MB
192 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB
256 MB	64 MB	64 MB	64 MB	64 MB	Empty	Empty
384 MB	64 MB	64 MB	64 MB	64 MB	64 MB	64 MB

### **Installing SIMMS**

After determining the system memory upgrade path, install SIMMs using the installation procedure provided in Section 3 of the *PowerMate V & P Series Service and Reference Manual*.

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## INTEGRATED GRAPHICS

The system has an ATI GT-B PCI 64-bit 3D multimedia graphics and video controller integrated on the system board. State of the art techniques are used for optimizing performance in computer graphic intensive applications and graphical user interfaces (GUI). Features include:

- DDC rev 2b compliance
- video acceleration and 3D rendering
- full screen Native video playback
- 2-MB of synchronous graphics random-access memory (SGRAM).

### ***Video Memory***

PowerMate P ETC Series systems have 1 MB of SGRAM on the system board and a 1-MB video upgrade module installed.

### ***Video Resolutions and Refresh Rates***

The computer supports the following video resolutions and refresh rates (see Table 1-3).

**Table 1-3 Video Resolutions and Refresh Rates**

RESOLUTIONS	SUPPORTED COLORS	REFRESH RATE (HZ)
<b>2 MB video SGRAM</b>		
640 x 480	16/256/16-bit/24-bit/32-bit	120 Hz
800 x 600	256/16-bit/24-bit/32-bit	120 Hz
1024 x 768	256/16-bit	120 Hz
1152 x 864	256/16-bit	120 Hz
1280 x 1024	256	85 Hz

## INTERRUPT CONTROLLER

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

The interrupt levels are described in Table 1-4. Interrupt level assignments 0 through 15 are in order of decreasing priority. See Section 2 of the *PowerMate V & P Series Service and Reference Manual* for information on changing the interrupts using Setup.

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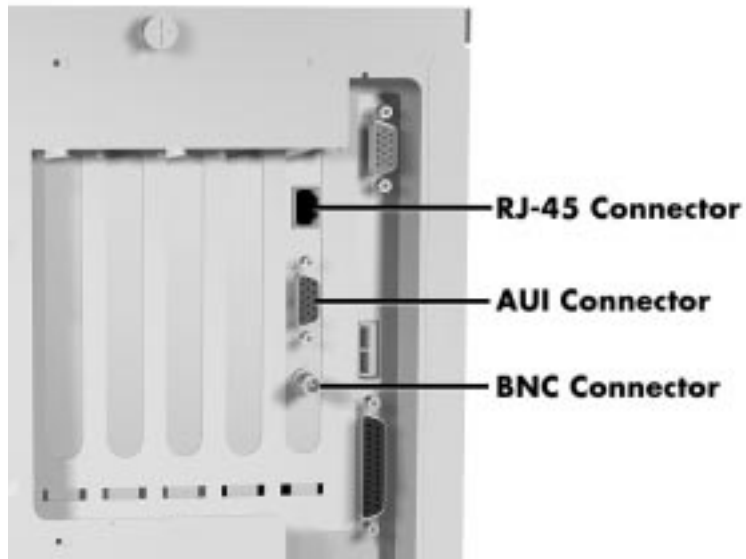
**Table 1-4 Interrupt Level Assignments**

Interrupt	Assignment
IRQ 0	Counter/Timer
IRQ 1	Keyboard
IRQ 2(9)	Cascade (INT output from slave)
IRQ 3	COM2 and COM4
IRQ 4	COM1 and COM3
IRQ 5	Parallel Port 2/Audio (if present)
IRQ 6	Diskette Drive Controller
IRQ 7	Parallel Port 1
IRQ 8	Real-time clock
IRQ 10	Available/Audio (if present)
IRQ 11	Network Interface Board
IRQ 12	PS/2 mouse
IRQ 13	Coprocessor
IRQ 14*	Primary IDE
IRQ 15*	Secondary IDE

## **NETWORK INTERFACE**

The computer comes equipped with a network interface board installed in one of the expansion slots in the system unit. The three connectors on the board allow connection to an Ethernet network and communication with other computers. Access to the connectors is provided at the rear of the system unit. Figure 1-1 shows the location of the network interface board and the three connectors. For more information, see Section 2 of this addendum.

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**Figure 1-1 Network Interface Board**

## HARD DISK SPECIFICATIONS

The PowerMate P ETC Series computer contains a 2.1-GB Western Digital IDE hard disk. The following table provides hard disk specifications.

**Table 1-5 Hard Disk Drive Specifications**

Features	2.1-GB Hard Disk (WD Caviar AC22100)
<b>Physical Configuration</b>	
Formatted Capacity	2.11 GB
Actuator Type	Voice coil
Number of Disks	2
Data Heads	4
Servo Type	Embedded
Tracks per Inch (tpi)	TBD
Bytes per Sector	512
Maximum Data Rate from Media	104 MB/s

**Table 1-5 Hard Disk Drive Specifications**

<b>Features</b>	<b>2.1-GB Hard Disk (WD Caviar AC22100)</b>
Dimensions	
Height	1.00 in. (25.4 mm)
Length	5.75 in. (146.0 mm)
Width	4.00 in. (101.6 mm)
Weight	1.1 lb (.50 kg)
<b>Performance</b>	
Track-to-track seek	3.0
Average seek	TBD
Maximum seek	22 ms
Average Latency	5.76 ms
Rotation Speed	5200 rpm
Data Transfer Rate (buffer to disk)	104 MB/s
Data Transfer Rate (buffer to host)	16.66 MB/s max (PIO Mode 4 or DMA Mode 2)
Start/Stop Cycles	40,000
Buffer Size	128
Interface	IDE

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**SYSTEM SPECIFICATIONS**

System specifications are included in Table 1-6.

**Table 1-6 System Specifications**

Item	Specification
Dimensions and Weight	
System Unit	Width: 8.5 inches (21.59 cm) Depth: 18.5 inches (46.99 cm) Height: 14.5 inches (36.83 cm) Weight: 20.5 lb (9.23 kg), dependent upon options
Keyboard	Width: 19.0 inches (48.3 cm) Depth: 8.4 inches (21.3 cm) Height: 1.6 inches (4.1 cm) Weight: 3.5 to 4.0 lb. (1.6 to 1.8 kg)
Device Slots	Four accessible slots: — one 1-inch high 3 1/2-inch front access slot (contains standard 1.44-MB diskette drive) — three 1.6-inch high 5 1/4-inch slots (some models contain a CD-ROM reader)  Two internal 3 1/2-inch slots (one contains a hard disk)
Expansion Slots	Five in the minitower: — two 8-/16-bit ISA slots — one shared 8-/16-bit ISA/32-bit PCI slot — two 32-bit PCI slots  One ISA slot contains a network interface board.
Network Interface	3COM 3C509B ISA 10 Megabit board with adapter (RJ-45, AUI, 10BASE-T)  Access to the connectors is provided at the rear of the system unit. All configurations come with Ethernet drivers preloaded on the hard drive.
Peripheral Interface	PS/2-style 6-pin keyboard connector (mini DIN), rear panel PS/2-style 6-pin mouse connector (mini DIN), rear panel Two RS-232C serial ports using 165550 UART, rear panel Two USB ports, rear panel Parallel printer port (25-pin), rear panel VGA port (6-pin D-shell), rear panel
Front Panel	Power button Power indicator lamp Hard disk drive busy indicator lamp Suspend button Reset button

**Table 1-6 System Specifications**

<b>Item</b>	<b>Specification</b>
Microprocessor	Intel Pentium (processor type dependent on system)
PowerMate P2166	166-MHz Pentium
PowerMate P2200	200-MHz Pentium
Cache Memory	16 KB of primary cache (8 KB data, 8 KB instruction) integrated in the processor, 256 KB secondary cache built-in on system board
Flash ROM	128-KB (28F001) Flash ROM
Chip Set	Intel 82430HX PCI Chip Set
System Memory	16 MB standard, expandable to 384 MB using 72-pin SIMM sockets on system board and optional SIMM modules
Optional SIMMs	4-, 8-, 16-, 32-, and 64-MB; 32-bit, non-parity, 60-ns or 70-ns SIMMs
Integrated Graphics	ATI-based, DDC 2B compliant controller PCI GUI Accelerator and Motion Video Playback Controller PCI-Bus Video 2 MB SGRAM standard (upgradable to 4 MB with 3-MB upgrade module installed) Maximum resolution 1600 x 1200 pixels (with 3-MB upgrade module installed)
Battery	Replaceable coin-type battery
Power Supply	200-Watt, 115 V/230V switch selectable Input 100 V to 120 V – 5.0 A Input 200 V to 240 V – 3.0 A Output +12 V – 8 A Output +5 V – 23 A Output -12 V – 0.5 A Output -12 V – 0.5 A
CD-ROM Reader (multimedia systems only)	See Appendix D of the service and reference manual for specifications
Integrated Sound	Creative Labs Vibra 16C standard in multimedia systems Stereo jacks for microphone in and line out Sound Blaster <sup>®</sup> compatible FM synthesis Ad Lib, MPC II, Multimedia PC Level 2 compliance Built-in MPU-401 MIDI and game port interface

**Table 1-6 System Specifications**

<b>Item</b>	<b>Specification</b>
20-Watt Speakers	Standard in multimedia models Magnetically shielded 20-watt stereo speakers Power on/off switch, power lamp, volume control Treble and bass tone control Built-in stereo amplifier 20W RMS power output 2-way speaker system 2-inch tweeter 4-inch woofer Subwoofer output jack External DC jack Headphone jack AC adapter — 120V to +15V, - 15V Dimensions — 5 in. (12.7cm) D x 4.5 in. (11.5 cm) W x 11 in. (28 cm) H
Recommended Operating Environment	Temperature – 50°F to 95°F Relative Humidity – 20% to 80%
Administrative Compliance	UL 1950 – safety CSA C22.2 No. 950-m89 TUV EN60950: 1988 FCC part 15, Subpart J, Class B – emissions FCC part 68 C.R.C., c.1374 Non-multimedia systems are Energy Star compliant IEC 950 – safety VDE 0871/6.78, Class B – emissions

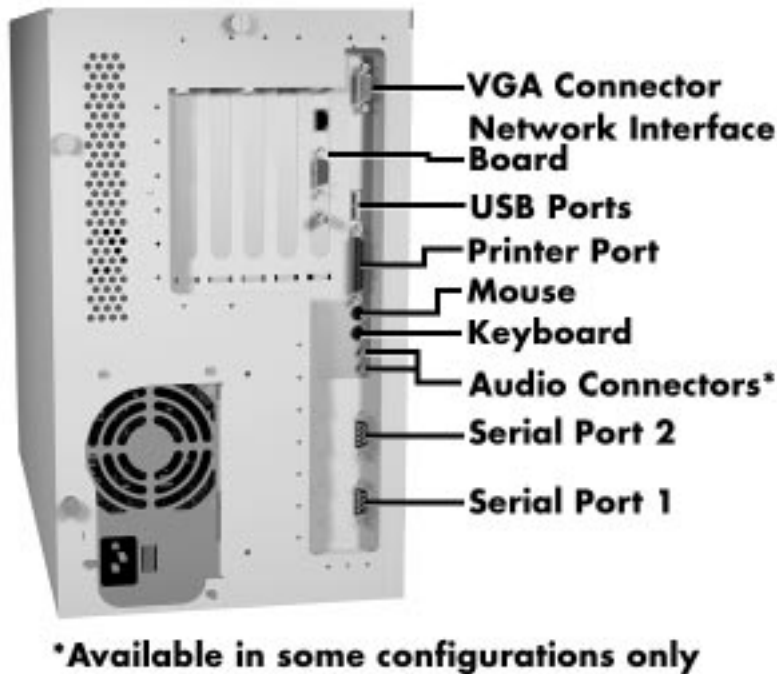
## Section 2

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# Setup and Installation

This section contains information on setting up PowerMate® P ETC Series systems.

The following figure shows the location of the interface ports on the rear of the system unit for configuring PowerMate P ETC Series hardware. Use the procedures described in Section 2 of the *PowerMate V & P Series Service and Reference Manual* to set up the system hardware. For other setup information, see the *PowerMate V & P Series Service and Reference Manual Addendum*.

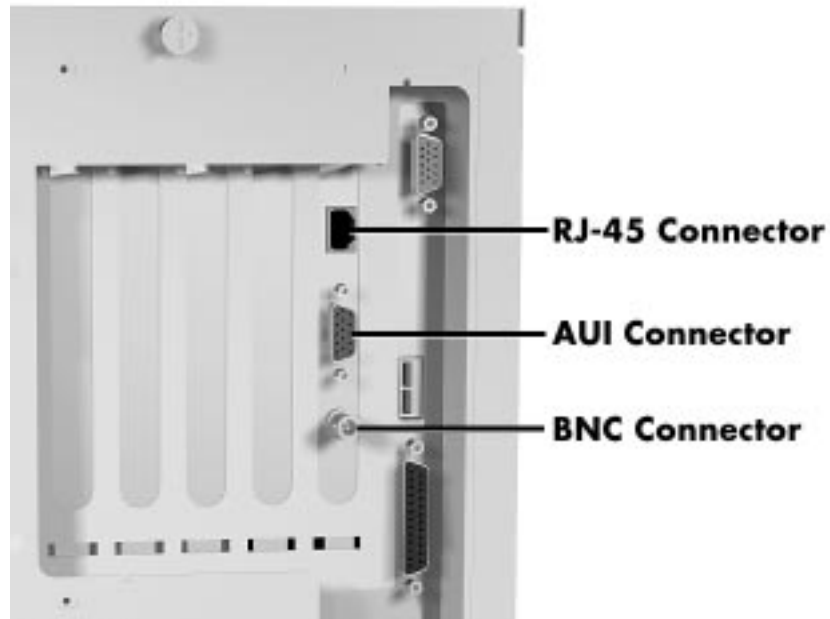


**Figure 2-1 Rear Panel I/O Ports**

In addition, refer to the following figure for the location of the network interface board connectors.

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**Figure 2-2 Network Interface Board Connectors**

The network board has connectors for coaxial and twisted-pair network cabling:

- The BNC connector supports thin coaxial cables.
- The AUI connector supports thick coaxial cables.
- The RJ-45 connector supports twisted-pair 10BASE-T cables.

Connect the network cable to one of these connectors (depending on the type of network). The PowerMate P ETC Series computer has Ethernet network drivers pre-loaded on the hard disk.

## Section 3

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# Illustrated Parts Breakdown

This section contains updated parts lists and an exploded-view diagram for the PowerMate P ETC Series minitower system.

The information in this section applies to the following models:

- EM-2120-24853E
- EM-2120-24853CE
- EM-2130-24853E
- EM-2139-24853CE.

Table 3-1 lists the field-replaceable parts for the computer\*. Figure 3-1 provides the illustrated parts breakdown.

To order parts or obtain technical help, call 1-888-ETC-SUPT (1-888-382-7878).

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\* This data was prepared July 1997. For an up-to-date listing of spare parts, please call FaxFlash™ at 1-888-329-0088 (or 1-508-635-6090 outside the U.S.) and order document number 42181820.

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**Table 3-1 PowerMate P ETC Series Field-Replaceable Parts List\***

Item	Description	Part Number
1	Serial interface cable	158-050454-002
2	LED power cable	158-052170-001
3	Hard disk power cable	158-052169-000
4	Sleep switch cable assembly	158-050895-004
5	Reset switch cable assembly	158-050685-031
6	Mouse, PS/2-style	158-052115-000
7	Keyboard, Chicony	158-052121-000
8	Microphone, with green connector (multimedia models only)	158-052116-001
9	Reset/sleep button	158-050896-003
10	Front bezel with IR (PowerMate P2166 and P2200 models)	158-050129-000
11	Fan assembly, 2-wire	158-050865-006
12	Power supply, 200 watt, HIPRO (PowerMate P2166 and P2200 models)	158-050-684-002
13	Speakers, 20-watt (multimedia models only)	158-050979-000
14	Floppy drive signal cable, 655 mm 3-connector	158-050857-001
15	IDE signal cable, split, 3-connector	158-050836-002
16	IDE signal cable, 2-connector, 10-inch (multimedia models only)	158-050562-004
17	Audio cable, CD-ROM, 2-connector (multimedia models only)	158-050824-000
18	ISA/PCI backplane (minitower)	158-026232-000A
19	Heatsink w/clip	158-060324-001
20a	166-MHz Pentium processor (PowerMate P2166)	158-082502-017
20a	200-MHz Pentium processor (PowerMate P2200)	158-082502-019
21	8-MB EDO SIMM (2MB x 32)	158-082630-060

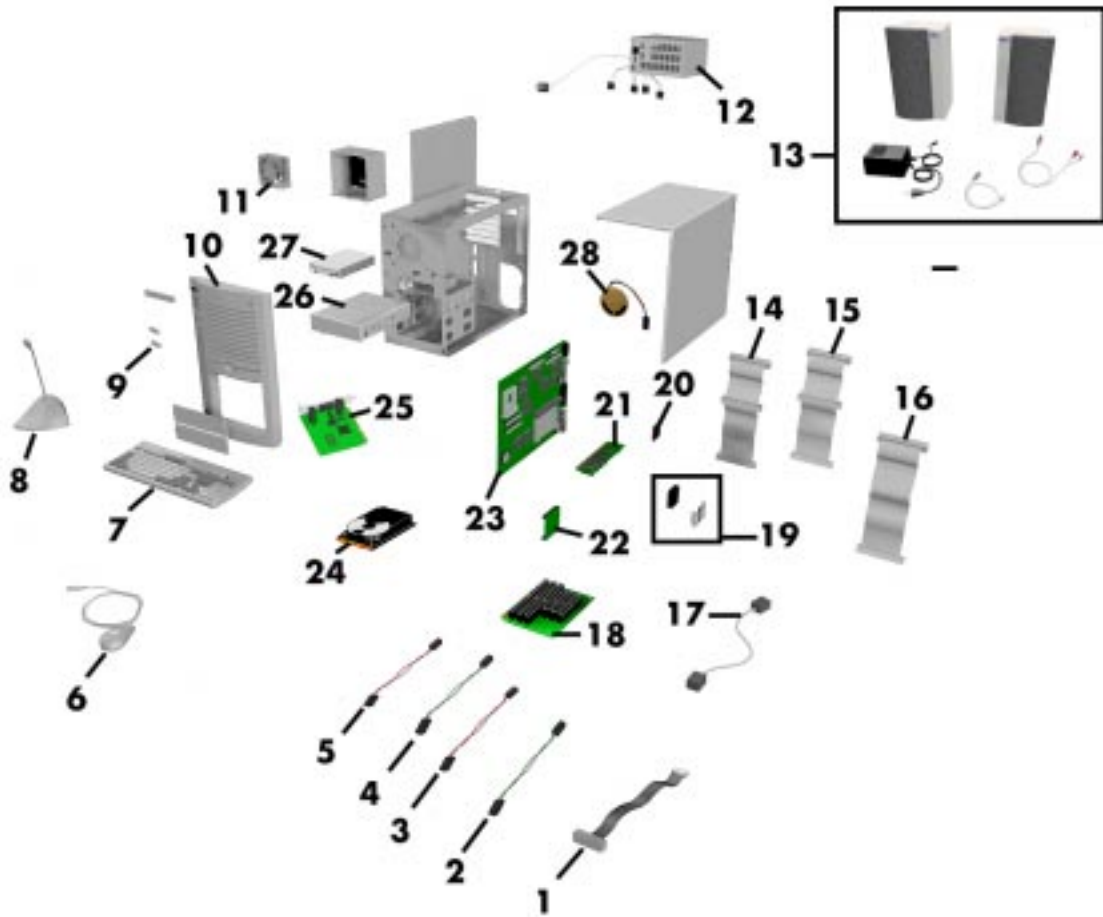
\* This data was prepared July 1997. For an up-to-date listing of spare parts, please call FaxFlash™ at 1-888-329-0088 (or 1-508-635-6090 outside the U.S.) and order document number 42181820.

**Table 3-1 PowerMate P ETC Series Field-Replaceable Parts List\***

Item	Description	Part Number
22	1-MB SGRAM video memory module (non-multimedia models only)	158-052137-100A
23a	System board, without audio	158-056561-000
23b	System board, with audio	158-056562-000
24	3 1/2-inch, 2.1-GB IDE hard disk, WD Caviar AC22100	215-00031
25	Network interface card (NIC)	158-050796-000
26	IDE CD-ROM reader (8-speed)	CDR-1450A/BR
27	3-1/2 inch 1.44-MB diskette drive, without bezel, with LVR	158-056414-000
28	Speaker assembly, internal, with cable, 381mm, DT	158-050865-008
29	Rail kit†	158-050893-000
30a	I/O plate without LAN, without audio†	158-030782-021
30b	I/O plate without LAN, with audio†	158-030782-019

† Not shown in Figure 3-1.

\* This data was prepared July 1997. For an up-to-date listing of spare parts, please call FaxFlash™ at 1-888-329-0088 (or 1-508-635-6090 outside the U.S.) and order document number 42181820.



**Figure 3-1 PowerMate P ETC Series Illustrated Parts Breakdown\***

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\* This data was prepared July 1997. For an up-to-date listing of spare parts, please call FaxFlash™ at 1-888-329-0088 (or 1-508-635-6090 outside the U.S.) and order document number 42181820.

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Table 3-2 lists PowerMate P ETC Series documentation and packaging part numbers.

**Table 3-2 PowerMate P ETC Series Documentation and Packaging\***

<b>Description</b>	<b>Part Number</b>
<i>PowerMate P ETC Series User's Guide</i>	819-181784-000
<i>PowerMate V &amp; P Series Service and Reference Manual</i>	819-181519-000
<i>PowerMate V &amp; P Series Service and Reference Manual Addendum</i>	819-181667-000
<i>PowerMate P ETC Series Addendum to the PowerMate V &amp; P Series Service and Reference Manual</i>	819-181820-000
Corner blocks (requires 4)	158-040395-004
Shipping carton (multimedia)	158-040563-001
Shipping carton (non-multimedia)	158-040562-001

\* This data was prepared July 1997. For an up-to-date listing of spare parts, please call FaxFlash™ at 1-888-329-0088 (or 1-508-635-6090 outside the U.S.) and order document number 42181820.

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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 shielded and properly grounded I/O and power cables to ensure compliance of this unit to the specified limits of the rules.

(For Canadian Use Only)

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.



## BATTERY REPLACEMENT

A lithium battery in your computer maintains system configuration information. In the event that the battery fails to maintain system configuration information, NEC recommends that you replace the battery. See Chapter 4 in the *PowerMate V & P Series Service and Reference Manual* 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-hydrate 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.