Technical Service Handbook

Spring, 1999

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The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. The manual part number may change when extensive technical changes are incorporated.

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Third Edition	February, 1997
Fourth Edition	July, 1997
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HP Pavilion Technical Service Handbook, Spring 99

Part Number: 5967-9745

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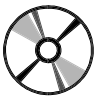
Preface

This document provides quick reference information for the current HP Pavilion product line. It is intended to be used by HP-qualified service personnel to help with the installation, servicing, and repair of HP Pavilion Multimedia PCs. HP Pavilion products covered by this handbook are listed below.

HP Pavilion 4400 Series PCs	• HP Pavilion 4402	Asia Pacific
	• HP Pavilion 4404	Asia Pacific
	• HP Pavilion 4405	Europe
	• HP Pavilion 4406	Asia Pacific
	• HP Pavilion 4407	Asia Pacific
	• HP Pavilion 4408	Asia Pacific
	• HP Pavilion 4409	Asia Pacific
	• HP Pavilion 4410	United Kingdom
	• HP Pavilion 4431	Mexico
	• HP Pavilion 4440	United Kingdom
	• HP Pavilion 4440	North America
	• HP Pavilion 4443	Walmart
	• HP Pavilion 4450	North America
	• HP Pavilion 4451	Mexico
	• HP Pavilion 4456	North America
HP Pavilion 6300 and 6400 Series PCs	• HP Pavilion 6353	Walmart
	• HP Pavilion 6356	Special
	• HP Pavilion 6357	Special
	• HP Pavilion 6403	Asia Pacific
	• HP Pavilion 6404	Asia Pacific
	• HP Pavilion 6405	Asia Pacific
	• HP Pavilion 6405	Europe
	• HP Pavilion 6407	Asia Pacific
	• HP Pavilion 6408	Asia Pacific
	• HP Pavilion 6409	Asia Pacific
	• HP Pavilion 6418	Asia Pacific
	• HP Pavilion 6460	North America
	• HP Pavilion 6466	North America
	• HP Pavilion 6470Z	North America
HP Pavilion 8400 Series PCs	• HP Pavilion 8418	Asia Pacific
	• HP Pavilion 8480Z	North America

Conventions

The following conventions are used in this manual:

A, E, S, etc.	Represent the actual keys that you have to press on the keyboard.
	**NOTE** Gives bits and pieces of additional information related to the current topic.
	**WARNING** Alerts you to any damage that might result from doing or not doing specific actions.
	**CAUTION** Suggests precautionary measures to avoid potential hardware or software problems.
	**VIDEO** Tells you it is time to review a section on the CD-ROM, "HP Pavilion Series Multimedia PC Service Training."
	**IMPORTANT** Reminds you to take specific action relevant to the accomplishment of the procedure at hand.
	**TIP** Tells how to accomplish a procedure with minimum steps through little shortcuts.

ESD Precautions

Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

Integrated circuits are extremely susceptible to electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.

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Section 1 - Spring '99 Product Line Overview

The following table shows the basic system components by system model.

Model	Processor and Speed	SDRAM Memory	Hard Disk Drive	CD/DVD Speed	Fax/ Modem	Graphics
4402 AP	AMD K6-2 300 MHz	32 MB (66 MHz)	2.1 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4404 AP	AMD K6-2 333 MHz	48 MB (66 MHz)	3.2 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4405 Europe	AMD K6-2 333 MHz	U.K. 32 MB (66 MHz) Fr 48 MB (66 MHz)	3.2 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4406 AP	Intel Celeron 333 MHz 128k L2 Cache	32 MB (66 MHz)	3.2 GB	32X max	56k	Rage IIC/4 MB SDRAM
4407 AP	Intel Celeron 366 MHz 128k L2 Cache	48 MB (66 MHz)	4.3 GB	32X max	56k	Rage IIC/4 MB SDRAM
4408 AP	AMD K6-2 366 MHz	48 MB (66 MHz)	4.3 GB	32X max	56k	SIS 5598 UMA 2D 2MB
4409 AP	Intel Celeron 366 MHz 128k L2 Cache	64 MB (66 MHz)	4.3 GB	32X max	56k	SIS SW 3D 2MB SDRAM
4410 U.K.	AMD K6-2 333 MHz	64 MB (66 MHz)	4.3 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4431 Mexico	AMD K6-2 333 MHz	48 MB (66 MHz)	3.2 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4440 U.K.	AMD K6-2 366 MHz	64 MB (66 MHz)	6.4 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4440 North America	AMD K6-2 333 MHz	64 MB (66 MHz)	4.3 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4443 Walmart	AMD K6-2 333 MHz	64 MB (66 MHz)	3.2 GB	32X max	56k	SIS 5598 UMA 2D 4MB
4450 North America	Intel Celeron 366 MHz 128k L2 Cache	64 MB (66 MHz)	6.4 GB	32X max	56k	Rage IIC/4 MB SDRAM
4451 Mexico	Intel Celeron 366 MHz 128k L2 Cache	64 MB (66 MHz)	6.4 GB	32X max	56k	Rage IIC/4 MB SDRAM
4456 North America	Intel Celeron 366 MHz 128k L2 Cache	48 MB (66 MHz)	5.1GB	32X max	56k	Rage IIC/4 MB SDRAM
6353 Walmart	Pentium II 350 MHz	64 MB (100 MHz)	6.4 GB	32X max	56k	ATI RagePro AGP 2X 3D 8 MB SDRAM TV Out
6356 Special	AMD K6-2 333 MHz	64 MB (66 MHz)	4.3 GB	24X max	56k	SIS 5598 UMA 2D 4MB
6357 Special	AMD K6-2 333 MHz	64 MB (66 MHz)	6.4 GB	24X max	56k	SIS 5598 UMA 2D 4MB

Table 1-1: Product Line Component Overview (continued on next page)

Model	Processor and Speed	SDRAM Memory	Hard Disk Drive	CD/DVD Speed	Fax/ Modem	Graphics
6403 AP	Pentium II 350 MHz	48 MB (100 MHz)	4.3 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6404 AP	Pentium II 350 MHz	48 MB (100 MHz)	6.4 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6405 AP	Pentium II 350 MHz	64 MB (100 MHz)	6.4 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6405 Europe	Intel Celeron 400 MHz 128k L2 Cache	64 MB (66 MHz)	6.4 GB	4X DVD	56k	ATI RagePro AGP 8MB SDRAM
6407 AP	Intel Celeron 400 MHz 128k L2 Cache	64 MB (66 MHz)	4.3 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6408 AP	Intel Celeron 400 MHz 128k L2 Cache	64 MB (66 MHz)	6.4 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6409 AP	Pentium II 400 MHz	64 MB (100 MHz)	6.4 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6418 AP	Pentium II 400 MHz	64 MB (100 MHz)	9.6 GB	4X DVD	56k	ATI RagePro AGP 8MB SDRAM
6460 North America	Intel Celeron 400 MHz 128k L2 Cache	96 MB (66 MHz)	9.6 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6466 North America	Intel Celeron 400 MHz 128k L2 Cache	96 MB (66 MHz)	12.7 GB	32X max	56k	ATI RagePro AGP 8MB SDRAM
6470Z North America	Pentium II 400 MHz	96 MB (100 MHz)	12.7 GB	32X Max	56k	ATI RagePro AGP 8MB SDRAM
8418 AP	Pentium II 450 MHz	128 MB (100 MHz)	9.6 GB	4X DVD	56k	ATI RagePro AGP 8MB SDRAM
8480Z U.S.	Pentium II 450 MHz	96 MB (100 MHz)	12.7 GB	32X Max	56k	ATI RagePro AGP 8MB SDRAM

Table 1-1: Product Line Component Overview (continued)

The following table is a cross-reference to locate technical information about various assemblies and subassemblies of the HP Pavilion personal computers:

System and Assembly	Section #	Part #
HP Pavilion 4402		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	
HP Pavilion 4404		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4405		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	
HP Pavilion 4406		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	3
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4407		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	3
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	3
Troubleshooting	15	
Monitors	16	
HP Pavilion 4408		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4409		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	3
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	3
Troubleshooting	15	
Monitors	16	
HP Pavilion 4410		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4431		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	
HP Pavilion 4440 (United Kingdom)		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4440 (North America)		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	
HP Pavilion 4443		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4450		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	3
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	3
Troubleshooting	15	
Monitors	16	
HP Pavilion 4451		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	3
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	3
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 4456		
Covers and bezels	2	1
Power supply and power switch	3	1
System fan	4	1
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	3
CD-ROM	6	1
3½" 1.44 Mbyte floppy drive	8	1
Hard disk drive	9	1
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	3
Troubleshooting	15	
Monitors	16	
HP Pavilion 6353		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	4
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6356		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	
HP Pavilion 6357		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	1
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
BIOS Setup Settings	14	1
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6403		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	
HP Pavilion 6404		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6405 (Asia Pacific)		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	
HP Pavilion 6405 (Europe)		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
DVD-ROM drive	7	1
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6407		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	
HP Pavilion 6408		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6409		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	
HP Pavilion 6418		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
DVD-ROM drive	7	1
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6460		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	
HP Pavilion 6466		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 6470Z		
Covers and bezels	2	2
Power supply and power switch	3	2
System fan	4	2
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM	6	2
3½" 1.44 Mbyte floppy drive	8	2
Hard disk drive	9	2
Fax/Modem	10	
Sound amplification adapter	11	1
Zip Drive	13	
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	
HP Pavilion 8418		
Covers and bezels	2	3
Power supply and power switch	3	3
System fan	4	3
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
DVD-ROM drive	7	2
3½" 1.44 Mbyte floppy drive	8	3
Hard disk drive	9	3
Fax/Modem	10	
Sound amplification adapter	11	1 or 2
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

System and Assembly	Section #	Part #
HP Pavilion 8480Z		
Covers and bezels	2	3
Power supply and power switch	3	3
System fan	4	3
Motherboard and all of its components (including microprocessor, system memory, video memory, cache memory, battery, jumpers, switch settings)	5	2
CD-ROM drive	6	3
3½" 1.44 Mbyte floppy drive	8	3
Hard disk drive	9	3
Fax/Modem	10	
Sound amplification adapter	11	1
Zip Drive	13	
BIOS Setup Settings	14	2
Troubleshooting	15	
Monitors	16	

Part 1 - HP Pavilion 4400 Series PCs

Shutting Down Windows '98

Before working on the system, you must properly shut down Windows '98 and turn off the power to the computer, monitor, and any other peripherals. Follow the procedure below to shut down Windows '98:

1. On the bottom left part of the Windows '98 main screen is the "Start" button. Click on it once.
2. Click on the "Shut Down..." command.
3. You will get the "Shut Down Windows" dialog box with the "Shut Down the computer?" selection currently selected. Click on the "Yes" button.
4. Wait a few seconds until the "It's now safe to turn off your computer" message appears. You can turn off the power to the computer.

WARNING
To avoid damage to the system board or power supply, do NOT exceed a total of 120 watts power draw.

NOTE
In geographical regions that are susceptible to electrical storms, it is strongly recommended that the system be plugged into a surge suppresser.

CAUTION
Do not overload the power supply by installing add-in boards that draw excessive current.

Removing the System Cover

1. Observe all Safety and ESD precautions stated in the Warnings and Cautions as noted above.
2. Turn off all peripherals connected to the system.
3. Turn off the power to the system.
4. Identify and tag all cables. Disconnect the cables from the system. Be sure to disconnect the modem cable BEFORE disconnecting the power cord.
5. At the back of the chassis, remove the 3 screws (1 on each side near the bottom and at the center of the top) on the back of the unit.

6. From the rear of the system, pull firmly on the cover to release it from the front bezel and the tabs on the chassis on the bottom (about 1 inch), then lift the cover straight up and off the unit.

Removing the Motherboard Access Panel

The right side of the computer, while facing the front of the system, is the Motherboard Access Panel. The system's motherboard is mounted to this panel and the panel must be opened slightly or removed to gain access to the right side of the inside chassis. To open the panel without removing it, follow the procedure below:

1. Remove the 4 screws that secure the Motherboard Access Panel to the chassis. 2 are on the right side, and 2 are on the back panel. See Figure 2-1 for their location.

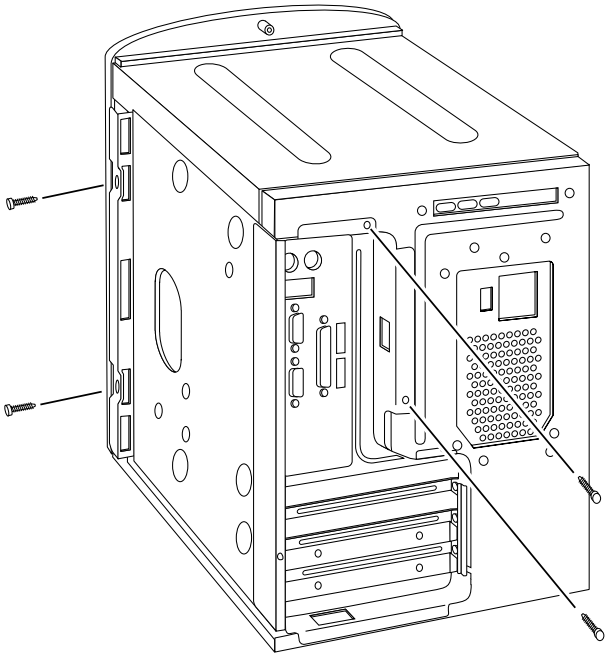

Figure 2-1: Motherboard Access Panel Screw locations

2. Grasp the opening near the front edge of the panel and pull it slightly away from the chassis (see Figure 2-2). The panel will pivot around a interlocking hinge point on the back panel. Pull panel out about 3-4 inches from the front edge of the chassis. You will now have access inside the chassis to remove drive bay screws on devices and the tabs for removing the drive bay filler bezel and the Front Panel locking tabs.

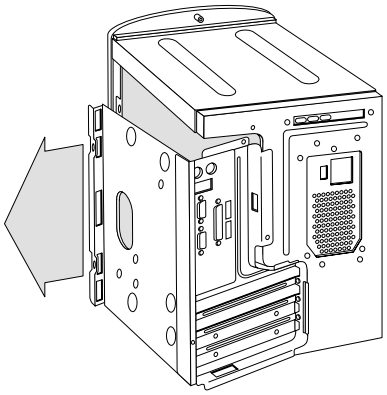

Figure 2-2: Pulling out the Motherboard Access Panel

To completely remove the Motherboard Access Panel, follow the procedure below:

1. Remove the 4 screws that secure the Motherboard Access Panel to the chassis. 2 are on the right side, and 2 are on the back panel. See Figure 2-1 for their location.
2. Grasp the opening near the front edge of the panel and pull it slightly away from the chassis (see Figure 2-2). The panel will pivot around a interlocking hinge point on the back panel. Pull panel out about 3-4 inches from the front edge of the chassis.
3. Reaching inside the chassis, remove all motherboard connectors. Carefully label each cable and note its location on the motherboard.
4. Continue to pivot out the panel until the hinge part of the panel can be disengaged from the flange on the rear chassis (see Figure 2-3). Pull the panel with the motherboard away from the chassis (see Figure 2-4).

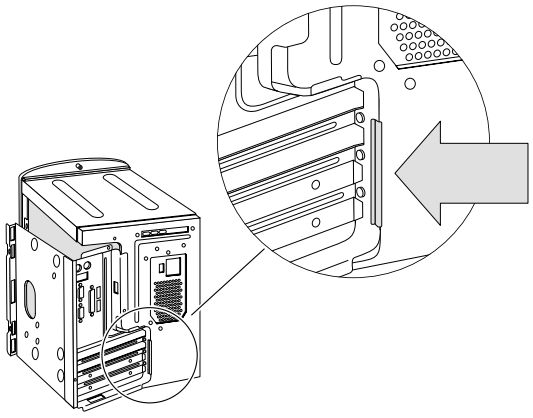

Figure 2-3: Motherboard Access Panel Interlocking Hinge

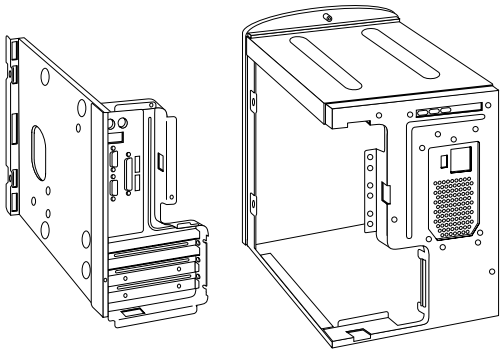

Figure 2-4: Motherboard Access Panel

Replacing the Motherboard Access Panel

To replace the Motherboard Access Panel follow the procedure below:

1. Holding the access panel at an angle to the chassis, slide the hinge part of the panel (on the back side, near the expansion board slots) into the flange on the back of the chassis (see Figure 2-3 for final interlocked positioning).
2. Pivot the panel closed, making sure the 2 parts of the hinge remain interlocked. Stop when the panel is at about a 45 degree angle from the side of the chassis.
3. Reconnect all cables to the motherboard.
4. Continue to pivot the panel closed.
5. Secure the panel in place using 4 screws.

Removing the Front Panel

To remove the power switch and front panel LEDs, you will first need to remove the front panel. Before removing the front panel, you will need to remove the device bay cover and the filler panel, which is below the CD-ROM drive.

1. Remove the 4 screws that secure the Motherboard Access Panel to the chassis and pivot the panel out to a 45 degree angle.
2. Remove the device bay cover by pressing down gently on the depression at the very top center of the cover, just below the CD-ROM drive. This will cause the cover to pop off.
3. With the device bay cover removed, you will have access to the filler panel. Remove the filler panel by releasing its 2 plastic tabs, one on each side of the chassis.

The front panel can now be removed The front panel is held in place by 6 tabs, 3 on each side on the inside of the chassis.

4. Depress the bottom tab on both sides at the same time and pull the panel away from the chassis slightly, preventing the tabs from snapping back in place.
5. Depress the middle tab on both sides at the same time and pull the panel away from the chassis slightly, preventing the tabs from snapping back in place.
6. Depress the top tab on both sides and pull the panel away from the chassis.

Replacing the Front Panel

To replace the front panel, reverse the procedure for removing the panel.

1. Position the panel's 6 tabs in chassis slots and press the panel forward making sure all 6 tabs snap into position.
2. Replace the top and bottom filler panel as appropriate making sure the 4 tabs, 2 on each side, snap into place in the device cage.
3. Replace the device bay cover, if appropriate.

Part 2 - HP Pavilion 6300 and 6400 Series PCs

Shutting Down Windows '98

Before working on the system, you must properly shut down Windows '98 and turn off the power to the computer, monitor, and any other peripherals. Follow the procedure below to shut down Windows '98:

1. On the bottom left part of the Windows '98 main screen is the "Start" button. Click on it once.
2. Click on the "Shut Down..." command.
3. You will get the "Shut Down Windows" dialog box with the "Shut Down the computer?" selection currently selected. Click on the "Yes" button.
4. Wait a few seconds while Windows '98 shuts down. When Windows '98 is safely shut down, the computer will turn itself off. DO NOT PRESS THE POWER SWITCH TO TURN OFF THE COMPUTER.

Removing and Replacing the System Covers

1. Observe all Safety and ESD precautions stated in the Warnings and Cautions notes stated in Part 1 of this section.
2. Turn off all peripherals connected to the system.
3. Turn off the power to the system by shutting down Windows '98.
4. Identify and tag all cables. Disconnect the cables from the system. Be sure to disconnect the modem cable BEFORE disconnecting the power cord.

Removing the Left Side Panel

To gain access to the inside of the system, you will need to first remove the left side panel. This is the panel that is on the left side of the system as you face the front of the system. The left panel is held in place by 2 screws. Unless you need to remove a front panel peripheral (such as disk drive, floppy drive, CD-ROM drive, etc.) you will not need to remove the right side panel.

1. Remove the 2 screws that secure the left side panel to the chassis.
2. From behind the unit, grab hold of the recessed grip on the left side panel, and pull towards the back of the unit until the panel separates from the front of the chassis.
3. Pull the now loose panel away from the system.

Replacing the Left Side Panel

Before replacing the left side panel, make sure that all cable connections have been made inside the computer. The panel contains 3 tabs on the top and bottom edges, and 6 tabs on the front edge.

NOTE
You may find it easier to replace the left side panel when the system is lying on its right side.

1. Align the 3 tabs of the top and bottom of the side panel with the corresponding slots in the chassis. Be sure that the side of the panel with 6 tabs is facing front.
2. Gently lock the top and bottom tabs into place by gently pushing on the panel into the chassis and slightly sliding toward the front.
3. Slide the panel towards the front panel, making sure the rear of the panel engages the chassis. The 6 front panel tabs will automatically lock into position.
4. Secure the panel to the chassis with 2 screws.

Removing the Right Side Panel

To remove of the front panel peripherals (such as disk drives, CD-ROM drive, etc.) or the power switch, you will need to remove the right side panel. This panel is on the right side as you face the front of the system. This panel is secured in place with 2 screws.

1. Remove the 2 screws that secure the right side panel to the chassis.
2. From behind the unit, grab hold of the recessed grip on the right side panel, and pull towards the back of the unit until the panel separates from the front of the chassis.
3. Pull the panel towards the back of the system and lift it off the system.

Replacing the Right Side Panel

Before replacing the right side panel, make sure that all front panel peripheral devices are secured in place. The panel contains 3 tabs on the top and bottom edges, and 6 tabs on the front edge.

NOTE
You may find it easier to replace the right side panel when the system is lying on its left side.

1. Align the 3 tabs of the top and bottom of the side panel with the corresponding slots in the chassis. Be sure that the side of the panel with 6 tabs is facing front.
2. Slide the panel toward the front until it snaps into place.
3. Secure the panel to the chassis with 2 screws.

Removing the Drive Cage

To remove a 3½" or 5¼" hard drive or to remove the front panel, you must first remove the drive cage.

1. Before removing the drive cage, you must first remove the left side panel. Follow the procedure above to remove the left side panel.
2. Label and remove all cables from all devices in the drive cage (CD-ROM or DVD Drive, Hard Disk Drive, Floppy Drive).
3. Remove the 1 screw that connects the drive cage to the chassis. The screw is located on the side of the cage, near the bottom right, where the 3½" floppy drive meets the front panel (see callout A in Figure 2-5 below).

NOTE
Some versions of HP Pavilion 6300 have a second screw on the other side of the drive cage. To remove this screw, you will first need to remove the right side panel.

4. Remove the screw that releases the metal trigger located near the top left of the cage (see callout B in Figure 2-5below).
5. With one hand, place a finger under the metal trigger, pull outward and hold the trigger in the out position. With the other hand, press firmly on the back of the cage toward the front of the system to slide the drive cage out of the chassis.

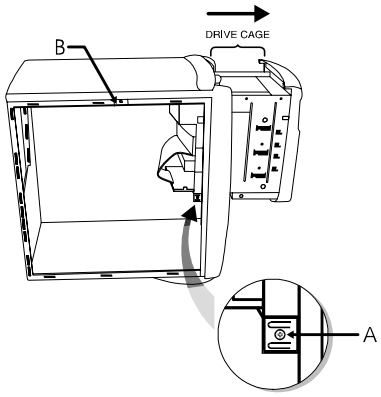

Figure 2-5: Removing the Drive Cage

Replacing the Drive Cage

1. Align the rails on the drive cage to the guides on the top of the chassis.
2. Slide the cage back into position until you hear the metal trigger snap into place.
3. Secure the drive cage to the chassis with 1 screw. Prevent the metal trigger from moving by screwing in 1 screw until it sits against the trigger, preventing it from moving.

Removing the Front Panel

To remove the power switch, you will need to remove the front panel. Before removing the front panel, both side panels and the drive cage must be removed. The front panel is held in place by 6 plastic tabs, 3 on each side of the unit.

1. Remove the left side panel, right side panel, and drive cage as described above.
2. Depress the bottom 2 tabs, one on each side. While depressing the tabs, apply light outward pressure against the front panel so the tabs won't reengage.
3. Move up to the middle 2 tabs and depress these tabs and continue to apply light outward pressure against the front panel.
4. Move up to the top 2 tabs. When depressing these 2 tabs, the pane, if none of the other 4 tabs have reengaged, the panel will come free from the chassis.

Replacing the Front Panel

To replace the front panel, reverse the procedure for removing the panel.

1. Position the panel's 6 tabs in chassis slots and press the panel forward making sure all 6 tabs snap into position.
2. Replace and secure the drive cage. Replace all cables to the drive cage devices.
3. Replace and secure the right side panel.
4. Replace and secure the left side panel.

Part 3 - HP Pavilion 8400 Series PCs

Shutting Down Windows '98 and the Computer

Before working on the system, you must properly shut down Windows '98. Properly shutting down Windows '98 will turn off the power to the computer. Also turn off the power to the monitor, and any other peripherals. Follow the procedure below to shut down Windows '98

1. On the bottom left part of the Windows '98 main screen is the "Start" button. Click on it once.
2. Click on the "Shut Down..." command.
3. You will get the "Shut Down Windows" dialog box with the "Shut Down the computer?" selection currently selected. Click on the "Yes" button.
4. Wait a few seconds while Windows '98 shuts down. When Windows '98 is safely shut down, the computer will turn itself off. DO NOT PRESS THE POWER SWITCH TO TURN OFF THE COMPUTER.

Removing and Replacing the System Covers

1. Observe all Safety and ESD precautions stated in the Warnings and Cautions notes stated in Part 1 of this section.
2. Turn off all peripherals connected to the system.
3. Turn off the power to the system by shutting down Windows '98.
4. Identify and tag all cables. Disconnect the cables from the system. Be sure to disconnect the modem cable BEFORE disconnecting the power cord.

Removing the Back Panel

1. Remove the 2 screws that secure the back panel to the chassis.

NOTE
To remove the lower back panel screw, you will need to use a #1 Phillips-head screwdriver with a thin shaft. Many replaceable bit screwdrivers will not fit the screw opening.

2. Once the screws have been removed, pull back and up on the back panel and the 2 clips on the bottom of the panel will naturally disengage.

Replacing the Back Panel

1. Holding the panel at an angle, tilted back from the top of the chassis, align the 2 plastic tabs on the bottom of the panel with the available slots on the chassis.
2. Then press forward on the top portion of the panel until it snaps into place.
3. Secure the panel in place with 2 screws.

Removing the Left Side Panel

To gain access to the inside of the system, you will need to first remove the back panel and then the left side panel. This is the panel that is on the left side of the system as you face the front of the system. The left panel has no screws or clips to remove. Unless you need to remove a front panel peripheral (such as disk drive, floppy drive, CD-ROM drive, etc.) you will not need to remove the right side panel.

1. Remove the back panel as described above.
2. Support the front edge of the left side panel with one hand while grasping the rear of the panel.
3. Pull towards the back of the system until the panel separates from the front of the chassis.
4. Pull the now loose panel away from the system.

Replacing the Left Side Panel

Before replacing the left side panel, make sure that all cable connections have been made inside the computer. The panel contains 3 tabs on the top and bottom edges, 4 tabs on the front edge, and 2 tabs on the back edge.

NOTE
You may find it easier to replace the left side panel when the system is lying on its right side.

1. Align the 3 tabs of the top and bottom of the side panel with the corresponding slots in the chassis. Be sure that the side of the panel with 4 tabs is facing front.
2. Gently lock the top and bottom tabs into place by gently pushing on the panel into the chassis and slightly sliding toward the front.
3. Slide the panel towards the front panel, making sure the rear of the panel engages the chassis. The 4 front panel tabs will automatically lock into position.

Removing the Right Side Panel

To remove of the front panel peripherals (such as disk drives, CD-ROM drive, etc.) you will need to remove the right side panel. This panel is on the right side as you face the front of the system. This panel is secured in place with 2 screws.

1. Remove the back panel as described above.
2. Remove the 2 screws that secure the right side panel to the chassis.
3. While supporting the front edge of the panel with one hand, grasp the back edge of the panel with the other hand.
4. Pull the panel towards the back of the system and lift it off the system.

Replacing the Right Side Panel

Before replacing the right side panel, make sure that all front panel peripheral devices are secured in place. The panel contains 3 tabs on the top and bottom edges, 4 tabs on the front edge, and 2 tabs on the back edge.

CAUTION
Before replacing the right side panel, make sure the back panel has been removed. The panel cannot be replaced properly with the back panel in place.

NOTE
You may find it easier to replace the right side panel when the system is lying on its left side.

1. Align the 3 tabs of the top and bottom of the side panel with the corresponding slots in the chassis. Be sure that the side of the panel with 4 tabs is facing front.
2. Slide the panel toward the front until it snaps into place.
3. Secure the panel to the chassis with 2 screws.

Removing the Top Bezel

To access the power supply, the top bezel will have to be removed. Before the top bezel can be remove, the back panel and both side panels must be removed.

1. Remove the back panel, left side panel, and right side panel as described above.
2. While facing the back of the system, press up on the tab that is on the underside of the back of the top bezel. The tab is just right of the center of the bezel.
3. While pressing up on the tab, pull back on the bezel until the front tabs slide out from the front bezel. Then lift bezel up and away.

Replacing the Top Bezel

The top bezel has 6 tabs that align with slots on the top of the chassis.

1. Align the tabs of the top bezel with the slots on the top of the chassis
2. Slide the top bezel forward until it snaps into place.

Removing the Front Panel

To remove the power switch and the 5¼" hard drive, you will first need to remove the front panel. Before removing the front panel, the back panel and both side panels must be removed. In addition, you will also need to remove the device bay cover and the top filler panel, which is below the CD-ROM drive, and the bottom filler panel bezel.

1. Remove the back panel, left side panel, right side panel as described above.
2. Remove the device bay cover by pressing down gently on the depression at the very top center of the cover, just below the CD-ROM drive. This will cause the cover to pop off.
3. With the device bay cover removed, you will have access to the top and bottom filler panels. Remove the top and bottom filler panels.

   The top and bottom filler panels both have 4 tabs that hold them in place. The tabs attach to the slots on the 5¼" device cage, 2 on each side. To remove a filler panel follow the procedure below:

   1. First, using a screwdriver, apply pressure to first 1 and then the other tab on one side of the panel and that end will come loose.
   2. Then apply pressure to the 2 tabs on the other side of the panel and the panel can then be removed.
   3. Repeat steps 1 and 2 for the other filler panel.

   The front panel can now be removed The front panel is held in place by 6 tabs, 3 on each side on the inside of the chassis.

4. Depress the bottom tab on both sides at the same time and pull the panel away from the chassis slightly, preventing the tabs from snapping back in place.
5. Depress the middle tab on both sides at the same time and pull the panel away from the chassis slightly, preventing the tabs from snapping back in place.
6. Depress the top tab on both sides and pull the panel away from the chassis.

Replacing the Front Panel

To replace the front panel, reverse the procedure for removing the panel.

1. Position the panel's 6 tabs in chassis slots and press the panel forward making sure all 6 tabs snap into position.
2. Replace the top and bottom filler panel as appropriate making sure the 4 tabs, 2 on each side, snap into place in the device cage.
3. Replace the device bay cover, if appropriate.

Section 3 - Power Supply and Power Switch

Part 1 - HP Pavilion 4400 Series PCs

About System Power

AC Input

Input Frequency: 50/60 Hz
Voltage: 120V (100-127V) ~ 3A
230V (200 - 240V) ~ 1.5A

Power Supply Output

DC Voltage	Current
+12V	2 A
+5V	10 A
+3.3V	6 A
-12V	0.2 A
+5VSB	0.72 A

About Power Management

The motherboard supports power management via System Management Mode (SMM) interrupts to the CPU and Advanced Power Management (APM Ver. 1.2). The APM capabilities will allow the system to be put into a power managed Stand By state by selecting Suspend from the Start Menu or by pressing the Suspend key on the multimedia keyboard.

Suspend is a quiet, power-saving state that still allows phone calls, faxes, and news updates to come through. Another feature of Suspend is that the computer, when reactivated, will resume normal operation much more quickly than when it is shut down and restarted.

WARNING
To avoid damage to the system board or power supply, do NOT exceed a total of 120 watts power draw.

NOTE
In geographical regions that are susceptible to electrical storms, it is strongly recommended that the system be plugged into a surge suppresser.

CAUTION
Do not overload the power supply by installing add-in boards that draw excessive current.

Removing and Replacing the Power Supply

To remove the Power Supply, follow the procedure below.

NOTE
Always replace the entire power supply. Never attempt to disassemble or repair the power supply itself.

1. Remove the system cover, as per procedure in Section 2, Part 1.
2. Before removing the power supply, label and remove all of the connectors from the motherboard, disk drive, CD-ROM drive, and any other devices that may be installed in the system.
3. Remove the 3 screws that secure the power supply to the rear of the chassis.
4. Remove the power supply by sliding it into the chassis from the back until the supply clears the chassis side edge. Then lift the supply out of the chassis.

To replace the power supply, reverse the above procedure.

Removing and Replacing the Power Switch and Front Panel LEDs

The power switch and front panel LEDs are on the same connector that connects to the motherboard. To remove the power switch and LEDs, follow the procedure below.

1. Before you can remove the power switch from the front of the chassis, you must first remove the front panel and hard disk drive and its mounting bracket. Refer to Section 2 for the front panel procedures and Section 9 for the disk drive procedures.
2. Detach the power switch/LEDs connector from the motherboard. Note the correct location on the motherboard. Although the connector is keyed, it is possible to place the connector on incorrectly.
3. From inside the chassis, grab and rotate the power switch 45 degrees counter clockwise. You will then be able to pull the switch into the chassis and clear of the chassis.
4. The LEDs each have 2 plastic flanges, one on each side. Squeeze on each flange simultaneously while pulling the LED through the chassis.

To replace the power switch and LEDs, reverse the above procedure.

Part 2 - HP Pavilion 6300 and 6400 Series PCs

About System Power

AC Input

Input Frequency: 50/60 Hz
Voltage: 120V (100-127V) ~ 4A
230V (200 - 240V) ~ 2A

Power Supply Output

DC Voltage	Current
+12V	3.5 A
+5V	10 A
+3.3V	4 A
-5V	0.3 A
-12V	0.8 A

About Power Management

The motherboard supports power management via System Management Mode (SMM) interrupts to the CPU and Advanced Power Management (APM Ver. 1.2). The APM capabilities will allow the system to be put into a power managed Stand By state by selecting Suspend from the Start Menu or pressing the Suspend key on the multimedia keyboard.

WARNING
To avoid damage to the system board or power supply, do NOT exceed a total of 120 watts power draw.

NOTE
In geographical regions that are susceptible to electrical storms, it is strongly recommended that the system be plugged into a surge suppresser.

CAUTION
Do not overload the power supply by installing add-in boards that draw excessive current.

Removing and Replacing the Power Supply

Before the Power Supply can be removed, remove the left side panel. Refer to Section 2 for the procedures for removing the cover panel. To remove the Power Supply, follow the procedure below.

NOTE
Always replace the entire power supply. Never attempt to disassemble or repair the power supply itself.

1. Before removing the power supply, remove all of the power connectors from the disk drives, CD-ROM drive, and any other devices that may be installed in the system. You will not be able to remove the power connectors to the motherboard until step 4 below.
2. Remove the 1 screw that secures the power supply to the rear of the chassis.
3. Push forward on the power supply where the securing screw was. The power supply will pivot inward toward the system. When the side edge of the power supply slides free of the chassis, pull the power supply straight out of the chassis.
4. Now you can remove the power supply connectors to the motherboard.

When replacing the power supply, be sure to set the AC Power Supply Voltage Switch to the appropriate line voltage for your location.

To replace the power supply, follow the procedure below:

1. Attach the power supply cables to the motherboard. The connectors from the power supply will only insert in one orientation because of the different hole sizes. Find the proper orientation and push down firmly making sure that the pins are aligned.
2. Insert the 3 tabs on the back of the power supply into the slots on the rear of the chassis.
3. Using the back edge of the power supply that has the tabs as a pivot point, swing the power supply into position and secure with 1 screw.
4. Connect power connectors to the drives as needed.

Removing and Replacing the Power Switch

The power switch and front panel LEDs are on the same connector that connects to the motherboard. To remove the power switch and LEDs, follow the procedure below.

1. Before you can remove the power switch from the front of the chassis, you must first remove the front panel. Refer to Section 2 for the front panel procedures.
2. Detach the power switch/LEDs connector from the motherboard. Note the correct location on the motherboard. Although the connector is keyed, it is possible to place the connector on incorrectly.
3. Remove the screw that secures the power switch to the front of the chassis.
4. Rotate and remove the power switch from the chassis.
5. Push on the 2 LEDs from the front of the unit, and guide them out. Remove the switch, LEDs and connector from the system.

To replace the power switch, reverse the above procedure.

Part 3 - HP Pavilion 8400 Series PCs

About System Power

AC Input

Input Frequency: 50/60 Hz
Voltage: 120V (100-127V) ~ 4A
230V (200 - 240V) ~ 2A

Power Supply Output

DC Voltage	Current
+12V	4.2A
+5V	18A
+3.3V	13A
-5V	0.3A
-12V	0.8A

About Power Management

The motherboard supports power management via System Management Mode (SMM) interrupts to the CPU and Advanced Power Management (APM Ver. 1.2). The APM capabilities will allow the system to be put into a power managed Stand By state by selecting Suspend from the Start Menu or pressing the Suspend key on the multimedia keyboard.

WARNING
To avoid damage to the system board or power supply, do NOT exceed a total of 120 watts power draw.

NOTE
In geographical regions that are susceptible to electrical storms, it is strongly recommended that the system be plugged into a surge suppresser.

CAUTION
Do not overload the power supply by installing add-in boards that draw excessive current.

Removing and Replacing the Power Supply

Before the Power Supply can be removed, the back panel, both side panels and the top bezel must be removed. Refer to Section 2 for the procedures for removing the cover panels. To remove the Power Supply, follow the procedure below.

NOTE
Always replace the entire power supply. Never attempt to disassemble or repair the power supply itself.

1. Before removing the power supply, label and remove all of the power connectors from the motherboard, disk drives, CD-ROM drive, and any other devices that may be installed in the system.
2. Remove the 4 screws that secure the power supply to the rear of the chassis and 1 screw from the top of the power supply.
3. Remove the power supply by sliding it to the side and out of the chassis.

When replacing the power supply, be sure to set the AC Power Supply Voltage Switch to the appropriate line voltage for your location.

To replace the power supply, follow the procedure below:

1. Slide the power supply in position.
2. Attach the power supply to the chassis by securing the 4 screws on the back of the chassis and 1 screw on the top.
3. Attach the power cables to the various media devices.
4. Attach the power cable to the motherboard. The plug from the power supply will only insert in one orientation because of the different hole sizes. Find the proper orientation and push down firmly making sure that the pins are aligned.

Removing and Replacing the Power Switch

To remove the Power Switch, follow the procedure below.

1. Before you can remove the power switch from the front of the chassis, you must first remove the front panel. Refer to Section 2 for the front panel procedures.
2. Detach the power switch connector from the motherboard. Note the correct location as the connector is not keyed.
3. Remove the screw that secures the power switch to the front of the chassis.
4. Remove the power switch and its cable.

To replace the power switch, reverse the above procedure.

Section 4 - Fan Assemblies

Part 1 - HP Pavilion 4400 Series PCs

Removing and Replacing the System Fan

The system fan for all HP Pavilion 4400 Series PCs is the fan that is part of the power supply. If the fan needs to be replaced, the entire power supply must be replaced. The fan can not be replaced by itself. Refer to Section 3, Part 1 above for the procedure for replacing the power supply.

Part 2 - HP Pavilion 6300 and 6400 Series PCs

Removing and Replacing the System Fan

The system fan for all HP Pavilion 6300 and 6400 Series PCs is the fan that is part of the power supply. If the fan needs to be replaced, the entire power supply must be replaced. The fan can not be replaced by itself. Refer to Section 3, Part 2 above for the procedure for replacing the power supply.

Part 3 - HP Pavilion 8400 Series PCs

The system comes with 2 fans; the main fan, which is part of the power supply, and the auxiliary fan and scoop which is above the motherboard. The power supply fan is not replaceable. If it fails, the entire power supply must be replaced.

To remove the auxiliary fan and scoop, either to replace it or to gain greater access to the motherboard, the back panel and left side panel (when facing the system from the front) must first be removed. To remove the auxiliary fan and scoop, follow the procedure below.

1. Remove the back panel and left side panel.
2. From inside the chassis, above the fan housing, pull inward on the retaining clip.
3. Slide the housing towards the open side of the chassis until the 4 tabs can be removed from their corresponding holes on the chassis' back panel.
4. Detach the fan cable connector from the motherboard.

To remove the auxiliary fan from the housing, follow the procedure below.

1. Pull up 2 of the plastic tabs that hold the fan in place.
2. Pull the fan from the assembly.

To replace the auxiliary fan into the assembly and the assembly into chassis, reverse the above procedures.

CAUTION
When installing the fan, it is important that the label be facing into the fan housing when installation is complete. This is because of the air flow. If the label is facing out, the air flow through the computer will not be correct.

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Part 1 - HP Pavilion 4402, HP Pavilion 4404, HP Pavilion 4405, HP Pavilion 4408, HP Pavilion 4410, HP Pavilion 4431, HP Pavilion 4440, HP Pavilion 4443, HP Pavilion 6356, and the HP Pavilion 6357 PCs.

About the AMD K6-2 Processor

These systems are designed to operate with either the AMD K6-2 Processor. This processor delivers leading edge, sixth-generation RISC86® superscalar performance for running both 16-bit and 32-bit code, enabling leading-edge performance on the Microsoft Windows '98 and Windows NT operating systems, as well the installed base of x86 software.

Table 5-1 below shows the specific processor chip speed and SDRAM RAM included for each system. The processor, in addition to its expanded data and addressing capabilities, includes the following features:

- Sixth-generation performance competitive with the Pentium® II processor
- High performance on Windows '98 and Windows NT operating systems
- Advanced, six-issue RISC86® superscalar microarchitecture
  - Seven parallel execution units
  - Multiple sophisticated x86-to-RISC86 instruction decoders
  - Advanced two-level branch prediction
  - Speculative execution
  - Full out-of-order execution
  - Register renaming and data forwarding
- Large 64-Kbyte on-chip L1 caches
  - 32-Kbyte instruction cache plus predecode cache
  - 32-Kbyte writeback dual-ported data cache
  - MESI protocol for cache coherency
- High-performance IEEE 754-compatible floating-point unit (FPU)
- High-performance, industry-standard MMX(TM) instructions
- Fully compatible system management mode (SMM)
- Socket 7 compatibility enabling PC manufacturers and resellers to leverage low-cost infrastructure and system designs
- 32 KB Level 1 cache
- Secondary cache of 512 KB on the motherboard
- SDRAM memory expandable to 256 Mbytes

HP Pavilion System	Microprocessor Speed	System Memory
HP Pavilion 4402	AMD K6-2 300 MHz	32 Mbytes SDRAM
HP Pavilion 4404	AMD K6-2 333 MHz	48 Mbytes SDRAM
HP Pavilion 4405	AMD K6-2 333 MHz	32 Mbytes SDRAM
HP Pavilion 4408	AMD K6-2 366 MHz	48 Mbytes SDRAM
HP Pavilion 4410	AMD K6-2 333 MHz	48 Mbytes SDRAM
HP Pavilion 4431	AMD K6-2 333 MHz	48 Mbytes SDRAM
HP Pavilion 4440 Europe	AMD K6-2 366 MHz	48 Mbytes SDRAM
HP Pavilion 4440 North America	AMD K6-2 333 MHz	64 Mbytes SDRAM
HP Pavilion 4443	AMD K6-2 333 MHz	32 Mbytes SDRAM
HP Pavilion 6356	AMD K6-2 333 MHz	64 Mbytes SDRAM
HP Pavilion 6357	AMD K6-2 333 MHz	64 Mbytes SDRAM

Table 5-1: Microprocessor Speed and System Memory

The microprocessor is mounted directly on Socket 7 socket on the motherboard (see Figure 5-1 for its location).

About System Memory

The motherboard has two dual in-line memory module (DIMM) sockets. Minimum memory size is 8 MB; maximum memory size is 256 MB. The BIOS automatically detects memory type, size, and speed.

The motherboard supports the following memory features:

- 168-pin DIMMs with gold-plated contacts
- 66 MHz SDRAM only
- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only
- Single- or double-sided DIMMs in 8, 16, 32, 64 or 128 Mbyte per DIMM

SDRAM

Synchronous DRAM (SDRAM) improves memory performance through memory access that is synchronous with the memory clock. This simplifies the timing design and increases memory speed because all timing is dependent on the number of memory clock cycles.

NOTE
To function properly, SDRAM DIMMs used on this motherboard must meet the Intel 4-clock, 66 MHz, unbuffered SDRAM specification for either 64-bit or 72-bit SDRAM.

IDE Support

The motherboard provides 2 independent high performance bus-mastering PCI IDE interfaces capable of supporting PIO Mode 3, Mode 4, ATAPI devices (e.g., CD-ROM), and Ultra DMA/33 synchronous-DMA mode transfers. The system BIOS supports logical block addressing (LBA) and extended cylinder sector head (ECSH) translation modes. IDE device transfer rate and translation mode are automatically detected by the system BIOS.

Usually programmed I/O operations require a substantial amount of processor bandwidth. However, in multitasking operating systems, the bandwidth freed by bus mastering IDE can be devoted to other tasks while disk transfers are occurring.

Universal Serial Bus (USB) Support

The motherboard features 2 USB ports that permit the direct connection of 2 USB peripherals, one to each port. For more than 2 USB devices, an external hub can be connected to either of the built-in ports. The motherboard fully supports the universal host controller interface (UHCI) and uses software drivers that are UHCI-compatible. Features of USB include:

- Self-identifying peripherals that can be hot-plugged
- Automatic mapping of function to driver and configuration
- Support for isochronous and asynchronous transfer types over the same set of wires
- Support for up to 127 physical devices
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, and other applications
- Error-handling and fault-recovery mechanisms built into the protocol

Removing and Replacing the Motherboard

CAUTION
When removing the motherboard, you must be sure the power cord is not connected to the computer. Although the computer may be turned off, if the power cord is attached to the computer and plugged into the wall, there is power to the motherboard. Removing connectors, components, expansion boards, etc. while the computer is plugged in will damage the motherboard.
Be sure to always wear a properly connected grounding strap while working on the computer.

Motherboards

To remove the motherboard, follow the steps below:

1. Remove the modem cable and then the power cord from the wall and the power connector on the computer. Label and remove all other cables from the back of the computer.
2. Remove the system cover.
3. Remove all I/O cards from the system (voice/fax/modem card, sound adapter, etc.) Be sure to put them in a safe, anti-static location.
4. Remove all cable connectors, being sure to label each one as it is removed.
5. Remove the Motherboard Access Panel as described in Section 2.
6. Remove the 6 screws that attach the motherboard to the access panel.
7. Carefully lift and remove the access panel.

To replace the motherboard, reverse the above procedure.

System Board Layout for the HP Pavilion 4402, 4404, 4405, 4408, 4410, 4431, 4440, and the 4443 PCs.

The system board has the following major components:

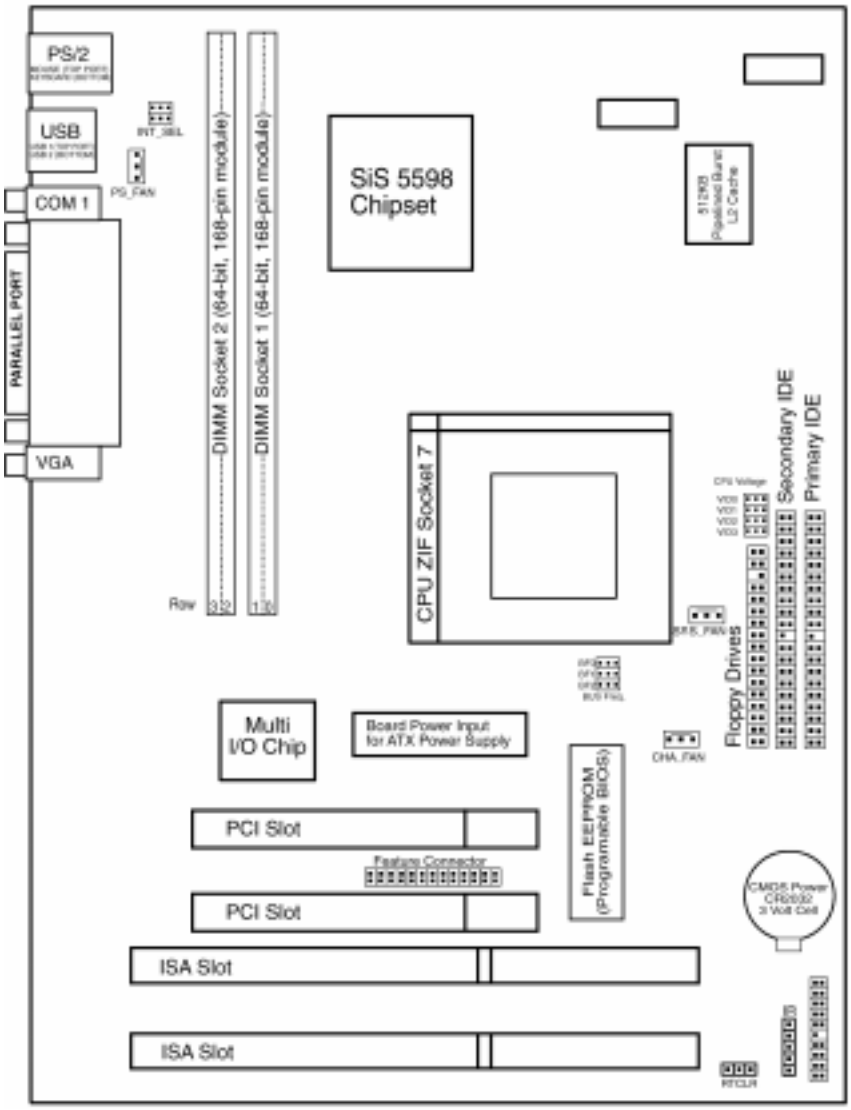


Figure 5-1: System Board Layout

System Board Layout for the HP Pavilion 6356 and 6357 PCs.

The system board has the following major components:

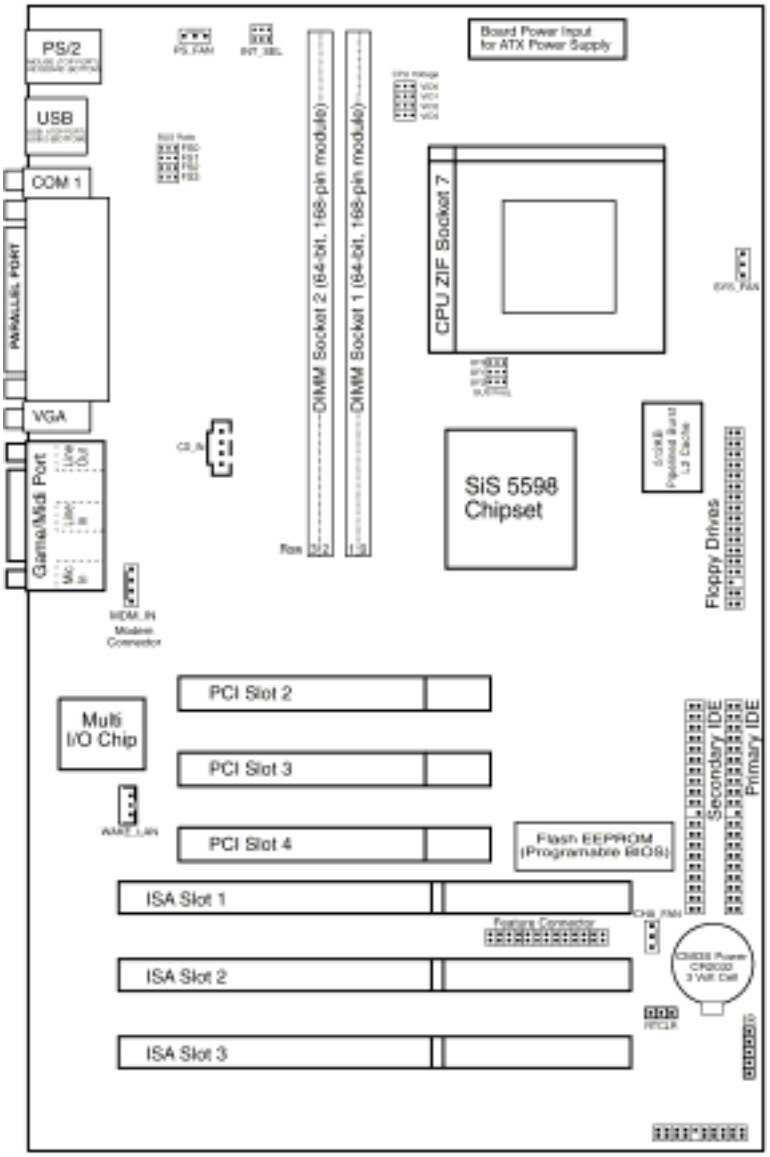


Figure 5-2: System Board Layout

CAUTION
Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

CAUTION
Integrated circuits are extremely susceptible to electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.

Replacing the Microprocessor

Follow these steps to install a replacement CPU:

1. Be sure to follow all ESD procedures!
2. Locate the CPU socket on the motherboard. Refer to Figure 5-3 for location of the CPU socket.
3. Depress the heat sink clip that runs across the assembly. The clip will unlock. Then pull the clip free from the heat sink assembly. Remove the heat sink.
4. Pull out and lift the socket lever attached to the socket connector.

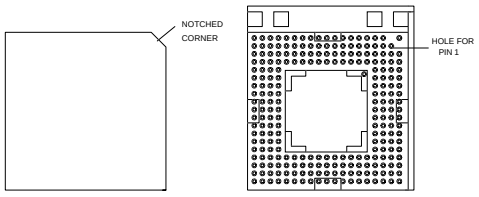


Figure 5-3: Pin 1 Indicator on the CPU and Socket

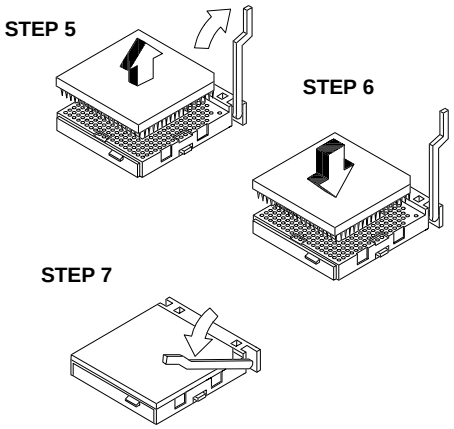


Figure 5-4: Installing an Upgrade CPU

5. Remove the CPU installed in the upgrade socket.
6. Insert the new CPU chip into the CPU connector. Make sure that pin 1 of the CPU corresponds to hole 1 of the connector (refer to the CD-ROM if you are unsure). The flat corner on the CPU indicates pin 1.
7. Push the lever down to lock the chip into the socket.
8. Replace the heat sink on the CPU chip and then replace the heat sink clip.

Installing Memory

The computer comes with 32, 48 or 64 Mbytes of RAM, configured as base (conventional) and extended memory. Operating systems such as DOS and Windows '98 and all application programs use base memory. For better performance, the HP Pavilion has been configured to allow Windows '98 utilize part of extended memory, thus freeing up part of base memory for other programs.

The motherboard provides two 168-pin SDRAM sites for memory expansion. The sockets support 8, 16, 32, 64 and 128 Mbyte SDRAM modules. Minimum memory size is 8 Mbytes and maximum memory size, using two 128 Mbyte SDRAM modules, is 256 Mbytes.

When installing additional memory, choose one of the SDRAM configurations listed in Table 5-2.

Because the SDRAM modules are mounted vertically and not at an angle like traditional DIMMs, you can install DIMMs in any order. Follow these steps to install a DIMM:

1. The DIMM has 2 small notches on the lower edge that fit into raised bumps in the DIMM socket. Hold the DIMM perpendicular to the socket, aligning the notches with the bumps.

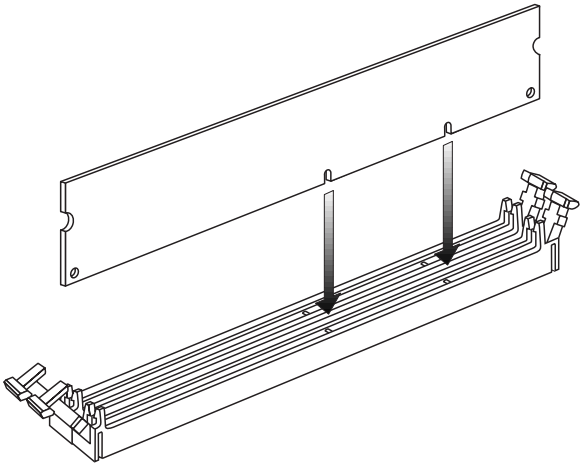


Figure 5-5: Insert DIMM module into connector with proper notch alignment

2. Push straight down on top of the DIMM until it is fully seated in the socket. The retaining clips on the ends of the socket will automatically lock into place when the DIMM is fully inserted.

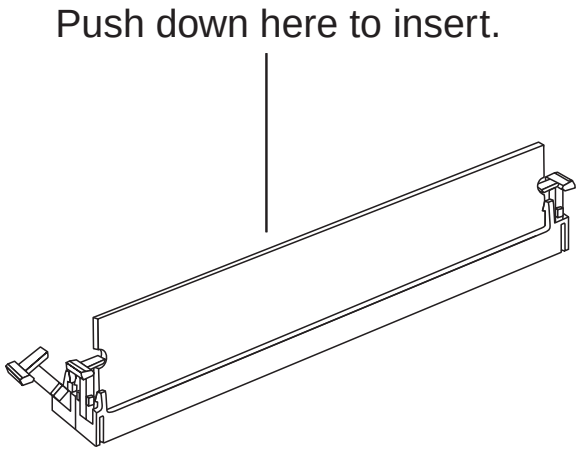


Figure 5-6: Push DIMM straight down until it is fully seated

3. Check that the DIMM is securely seated in its slot and that both ends are locked to the socket.

Follow these steps to remove a DIMM:

1. Press down on the holding clips on both sides of the DIMM until the DIMM pops out of the socket.

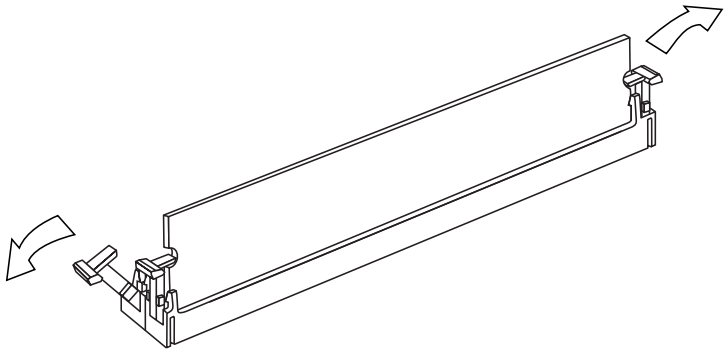


Figure 5-7: Press on holding clips to release DIMM module

After installing or removing system memory, the system will automatically detect the amount of memory installed. There is no need to change any configurations. You can run Setup to view the new value for total system memory to confirm proper RAM installation.

Replacing the Battery

The Setup information is stored in CMOS RAM and is backed up by a battery when power to the system is off. The battery also keeps the system clock current. As long as the internal battery remains good and is connected, the clock continues to keep the date and time accurately and the Setup information will remain intact.

WARNING
Danger of explosion if the battery is not correctly replaced

Replace the battery with the same manufacturer's 3V Lithium battery, type CR2032. Discard the used battery according to the manufacturer's instructions. The location of the battery on the motherboard can be found in Figure 5-1 or 5-2.

System Memory Configuration

SDRAM in Bank 0	SDRAM in Bank 1	Total System Memory
Empty	8 MB	8 MB
8 MB	8 MB	16 MB
Empty	16 MB	16 MB
Empty	32 MB	32 MB
Empty	64 MB	64 MB
Empty	128 MB	128 MB
8 MB	Empty	8 MB
8 MB	8 MB	16 MB
8 MB	16 MB	24 MB
8 MB	32 MB	40 MB
8 MB	64 MB	72 MB
8 MB	128 MB	136 MB
16 MB	Empty	16 MB
16 MB	8 MB	24 MB
16 MB	16 MB	32 MB
16 MB	32 MB	48 MB
16 MB	64 MB	80 MB
16 MB	128 MB	144 MB
32 MB	Empty	32 MB
32 MB	8 MB	40 MB
32 MB	16 MB	48 MB
32 MB	32 MB	64 MB
32 MB	64 MB	96 MB
32 MB	128 MB	160 MB
64 MB	Empty	64 MB
64 MB	8 MB	72 MB
64 MB	16 MB	80 MB
64 MB	32 MB	96 MB
64 MB	64 MB	128 MB
64 MB	128 MB	192 MB
128 MB	Empty	128 MB
128 MB	8 MB	136 MB
128 MB	16 MB	144 MB
128 MB	32 MB	160 MB
128 MB	64 MB	192 MB
128 MB	128 MB	256 MB

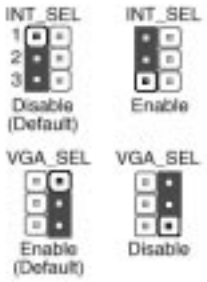
Table 5-2: System Memory Configuration

Jumper Locations and Functions

Refer to Figure 5-1 or 5-2 above for the location of the jumpers listed below.

VGA Interrupt Selection (INT_SEL) and VGA Setting (VGA_SEL)

The INT_SEL jumper allows you to set the VGA interrupt method. The default disables the chipset's internal interrupt routing. Some TV-Tuner or MPEG cards may require that the interrupt be assigned by the onboard chipset, in which case enable INT_SEL. The VGA_SEL jumper allows you to enable or disable the onboard VGA. Disable the onboard VGA if you are using a VGA card on the expansion slot.



Setting	INT_SEL
Enable	[1-2]
Disable	[2-3] (def)

Setting	VGA_SEL
Enable	[2-3] (def)
Disable	[1-2]

Figure 5-8: INT_SEL and VGA_SEL Jumper Settings

Real Time Clock (RTC) RAM (RTCLR)

The CMOS RAM is powered by the onboard button cell battery. To clear the RTC data:

1. Turn off the computer and remove the AC power.
2. Move this jumper to "Clear Data"
3. Move the jumper back to "Operation"
4. Turn on the computer
5. Press the F1 key during the boot-up process and enter BIOS setup to re-enter the user password.

Battery Test Jumper (RTCLR)

You can test the battery's current by removing this jumper and attaching a current meter to the "Operation" pins.

WARNING
You must unplug the power cord to the power supply to ensure that there is no power to the motherboard. The CMOS RAM containing BIOS setup information may be cleared by this action. You should enter BIOS to "Load Setup Defaults" and re-enter any user information after removing and reapplying this jumper.

RTC RAM	RTCLR
Normal	[1-2] (default)
Clear Data	[2-3] (momentarily)

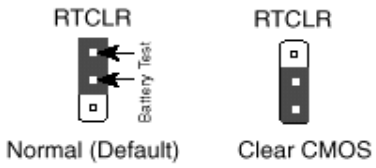


Figure 5-9: RTCLR Jumper

CPU External (BUS) Frequency Selection (FS0, FS1, FS2, FS3)

These jumpers tell the clock generator what frequency to send to the CPU. These allow the selection of the *CPU's External* frequency *(or BUS Clock)*. The BUS Clock times the BUS Ratio equals the CPU's Internal frequency (the advertised CPU speed).

CPU to BUS Frequency Ratio (BF0, BF1, BF2)

These jumpers set the frequency ratio between the *Internal* frequency of the CPU and the *External* frequency (called the *BUS Clock*) within the CPU. These must be set together with the above jumpers *CPU External (BUS) Frequency Selection*.

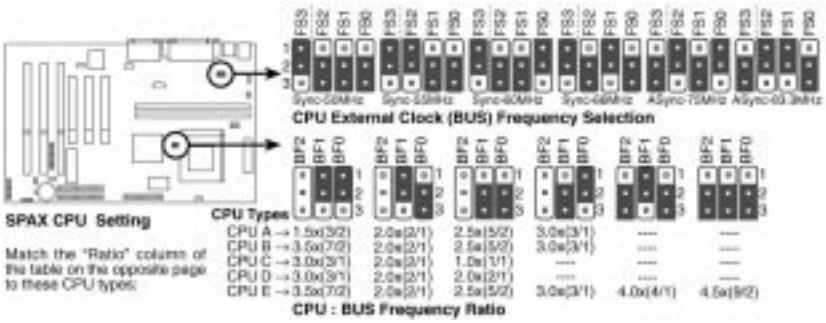


Figure 5-10: CPU-to-BUS Frequency Ratio Jumper Settings (CPU E is the CPU type for AMD K6 processors)

Voltage Regulator Output Selection (VID0, 1, 2, 3)

These jumpers set the voltage supplied to the CPU.

Manufacturer	CPU Type	Single Phase	Dual Plane	VID3	VID2	VID1	VID0
Intel	P54C/P54CS	3.5V(VRE)	-----	2-3	2-3	2-3	2-3
AMD	K5	3.5V(VRE)	-----	2-3	2-3	2-3	2-3
IBM/Cyrix	6x86	3.5V(VRE)	-----	2-3	2-3	2-3	2-3
Intel	P54C/P54CS	3.4V(STD)	-----	2-3	2-3	2-3	1-2
AMD	K5	3.4V(STD)	-----	2-3	2-3	2-3	1-2
AMD (.35micron)	K6-PR233	-----	3.2V(Dual)	2-3	2-3	1-2	1-2
AMD (.35micron)	K6-166,200	-----	2.9V(Dual)	2-3	1-2	1-2	2-3
IBM/Cyrix	6x86MX	-----	2.9V(Dual)	2-3	1-2	1-2	2-3
Intel	P55C-MMX	-----	2.8V(Dual)	2-3	1-2	1-2	1-2
AMD (.25micron)	K6-233,266,300	-----	2.1V(Dual)	1-2	1-2	2-3	1-2

Table 5-3: Voltage Regulator Output Jumper Settings

Connectors

Refer to Figure 5-1 or 5-2 above for the location of the connectors listed below.

Power Supply Connectors

SPAX ATX POWER CONNECTOR

Pin	*Signal Name*	*Pin*	*Signal Name*
1	+3.3 V	11	+3.3 V
2	+3.3 V	12	-12 V
3	Ground	13	Ground
4	+5 V	14	PW_ON
5	Ground	15	Ground
6	+5 V	16	Ground
7	Ground	17	Ground
8	PWRGD (Power Good)	18	-5 V
9	+5 VSB (Standby for real-time clock)	19	+5 V
10	+12 V	20	+5 V

Table 5-4: SPAX ATX Power Connector

POWER SUPPLY FAN CONNECTOR

Pin	*Signal Name*
1	Ground
2	+12 V (suspend)
3	Ground

Table 5-5: Power Supply Fan Connector

CHASSIS FAN CONNECTOR (not used on HP Pavilion 6300 PCs)

Pin	*Signal Name*
1	Ground
2	+12 V
3	Rotation

Table 5-6: Chassis Fan Connector

SYSTEM FAN CONNECTOR (not used on HP Pavilion 6300 PCs)

Pin	*Signal Name*
1	Ground
2	+12 V
3	Rotation

Table 5-7: System Fan Connector

Front Panel Connector

The front panel connector includes headers for the following connections; Speaker, Reset switch, Power LED, Hard drive activity LED (HDD LED), Infrared (IrDA) port, Sleep switch, Power switch.

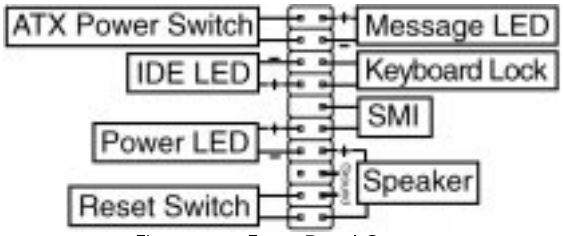


Figure 5-11: Front Panel Connector

Back Panel I/O Connectors

PS/2 KEYBOARD & MOUSE PORTS

Pin	*Signal Name*
1	Data
2	No Connect
3	Ground
4	+5 Vcc (fused)
5	Clock
6	No Connect

Table 5-8: PS/2 Keyboard and Mouse Ports

USB CONNECTORS (USB 1 AND USB 2)

Pin	*Signal Name*
1	Power
2	USBP0# (USBP1#)
3	USBP0 (USBP1)
4	Ground

Table 5-9: USB Connectors

SERIAL PORT CONNECTOR

Pin	*Signal Name*
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring indicator

Table 5-10: Serial Port Connector

PARALLEL PORT

Signal Name	*Pin*	*Pin*	*Signal Name*
STROBE-	1	14	AUTO FEED
Data Bit 0	2	15	ERROR*
Data Bit 1	3	16	INIT*
Data Bit 2	4	17	SELECT IN*
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACK*	10	23	Ground
BUSY	11	24	Ground
Error	12	25	Ground
SELECT	13		

Table 5-11: Parallel Port Connector

Peripherals

IDE CONNECTORS

Signal Name	*Pin*	*Pin*	*Signal Name*
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DDRQ0(DDRQ1)	21	22	Ground
I/O Write	23	24	Ground
I/O Read	25	26	Ground
IORDY	27	28	Vcc pull-up
DDACK0(DDACK1)	29	30	Ground
IRQ14(IRQ15)	31	32	Reserved
Addr 1	33	34	Reserved
Addr 0	35	32	Addr 2
Chip Select 1P(1S)	37	38	Chip Select 3P (3S)
Activity	39	40	Ground

Table 5-12: IDE Connectors

FLOPPY CONNECTOR

Signal Name	*Pin*	*Pin*	*Signal Name*
Ground	1	2	DENSEL
Ground	3	4	Reserved
Key	5	6	FDEDIN
Ground	7	8	Index
Ground	9	10	Motor Enable A
Ground	11	12	Drive Select B
Ground	13	14	Drive Select A
Ground	15	16	Motor Enable B
MSEN1	17	18	DIR
Ground	19	20	STEP
Ground	21	22	Write Data
Ground	23	24	Write Enable
Ground	25	26	Track 00
MSEN0	27	28	Write Protect
Ground	29	30	Read Data
Ground	31	32	Side 1 Select
Ground	33	34	Diskette Change

Table 5-13: Floppy Connector

Miscellaneous Connectors

WAKE ON LAN CONNECTOR (ONLY ON THE HP PAVILION 63XX SYSTEMS)

Pin	*Signal Name*
1	+5 V Standby
2	Ground
3	PME

Table 5-14: Wake On LAN Connector

STEREO AUDIO IN CONNECTOR (CD_IN) (ONLY ON THE HP PAVILION 63XX SYSTEMS)

This connector allows the CD-ROM drive's audio out signals to be connected to the motherboard in order to listen to Audio CDs in the CD-OM drive through the motherboard's onboard audio chipset. Without this connection, Audio CDs can only be heard through the CD-ROM's front panel audio jack.

Pin	*Signal Name*
1	CD-Right
2	Ground
3	Ground
4	CD-Left

Table 5-15: CD-ROM Audio Interface

MODEM INPUT CONNECTOR

This connector supports a voice modem audio connection in order to send and receive voice using the motherboard's onboard audio chipset and compatible voice modems.

Pin	*Signal Name*
1	Modem_OUT (to external device)
2	Ground
3	Ground
4	Modem_IN (from external device)

Table 5-16: Modem Input Connector

Part 2 - HP Pavilion 6403, HP Pavilion 6404, HP Pavilion 6405, HP Pavilion 6407, HP Pavilion 6408, HP Pavilion 6409, HP Pavilion 6418, HP Pavilion 6460, HP Pavilion 6466, HP Pavilion 6470Z, HP Pavilion 8418, and the HP Pavilion 8480Z PCs

About the Intel Pentium II or Celeron Processor with MMX Technology™

These systems are designed to operate with the Intel Pentium II or Celeron Processor running at 350, 400 or 450 MHz. The microprocessor implements MMX™ technology and maintains full backward compatibility with the 8086, 80286, Intel386™, Intel486™, Pentium processor, and Pentium Pro processors. The board comes installed with 48, 64, 96 or 128 Mbytes of SDRAM memory.

Table 5-17 below shows the specific Intel microprocessor chip speed and SDRAM RAM included for each system. The processor, in addition to its expanded data and addressing capabilities, includes the following features:

- On-chip numeric co-processor (compatible with the Intel 486™ DX processor and compliant with ANSI/IEEE standard 754-1985)
- 32 KB Level 1 cache (16 KB for data, 16 KB for code)
- 512 KB Pipeline Burst Level 2 cache in the Pentium II cartridge (the Celeron processor chips come with 128 KB L2 cache)
- Read and write burst mode bus cycles
- ATI RagePro AGP 3D Graphics Controller with 8 Mbytes SDRAM
- Intel 440ZX AGP chipset and PCI/IDE Interface
- SDRAM memory expandable to 256 Mbytes

HP Pavilion System	Microprocessor Speed	System Memory
HP Pavilion 6403	Intel Pentium II 350 MHz	48 Mbytes, 100 MHz SDRAM
HP Pavilion 6404)	Intel Pentium II 350 MHz	48 Mbytes, 100 MHz SDRAM
HP Pavilion 6405 (Asia Pacific)	Intel Pentium II 350 MHz	64 Mbytes, 100 MHz SDRAM
HP Pavilion 6405 (Europe)	Intel Celeron 400 MHz	48 Mbytes, 66 MHz SDRAM
HP Pavilion 6407	Intel Celeron 400 MHz	64 Mbytes, 66 MHz SDRAM
HP Pavilion 6408	Intel Celeron 400 MHz	64 Mbytes, 66 MHz SDRAM
HP Pavilion6409	Intel Pentium II 400 MHz	64 Mbytes, 100 MHz SDRAM
HP Pavilion 6418	Intel Pentium II 400 MHz	64 Mbytes, 100 MHz SDRAM
HP Pavilion 6460	Intel Celeron 400 MHz	96 Mbytes, 66 MHz SDRAM
HP Pavilion 6466	Intel Celeron 400 MHz	96 Mbytes, 66 MHz SDRAM
HP Pavilion 6470Z	Intel Pentium II 400 MHz	96 Mbytes, 100 MHz SDRAM
HP Pavilion 8418	Intel Pentium II 450 MHz	128 Mbytes, 100 MHz SDRAM
HP Pavilion 8480Z	Intel Pentium II 450 MHz	96 Mbytes, 100 MHz SDRAM

Table 5-17: Microprocessor Speed and System Memory

The flexible design of the motherboard will accept processors operating at 350 MHz to 450 MHz. The memory subsystem is designed to support up to 256 MB of SDRAM (for improved performance) in the form of two DIMM sockets that support 8-128 MB 168-pin 3.3 Volt SDRAM memory modules.

The motherboard features Intel's 440ZX AGPset with I/O subsystem. The onboard VGA that features an onboard RagePro AGP with 8MB SDRAM.

PCI and ISA expansion slots are supported by connectors on the motherboard. The motherboard comes with 4 PCI slots, 1 ISA slot and 1 AGP slot.

In addition to superior hardware capabilities, a full set of software drivers and utilities are available to allow advanced operating systems such as Windows '98 to take full advantage of the hardware capabilities. Features such as bus mastering IDE, Windows '98-ready Plug 'N' Play, and glitchless bi-directional audio are all provided by available software.

Accelerated Graphics Port (A.G.P.)

The Accelerated Graphics Port (A.G.P.) is a high-performance interconnect for graphic-intensive applications, such as 3D applications. A.G.P. is independent of the PCI bus and is intended for exclusive use with graphical-display devices. A.G.P. provides these performance features:

- Pipelined-memory read and write operations that hide memory access latency
- Demultiplexing of address and data on the bus for near 100 percent bus efficiency
- AC timing for 133 MHz data transfer rates, allowing data throughput of 500 MB/sec

A.G.P. complies with the 66 MHz PCI specification.

About System Memory

The motherboard has two dual in-line memory module (DIMM) sockets. Minimum memory size is 8 MB, maximum memory size is 256 MB. The BIOS automatically detects memory type, size, and speed.

The motherboard supports the following memory features:

- 168-pin DIMMs with gold-plated contacts
- 66 or 100 MHz SDRAM, depending on system
- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only

SDRAM

Synchronous DRAM (SDRAM) improves memory performance through memory access that is synchronous with the memory clock. This simplifies the timing design and increases memory speed because all timing is dependent on the number of memory clock cycles.

IDE Support

The motherboard provides 2 independent high performance bus-mastering PCI IDE interfaces capable of supporting PIO Mode 3, Mode 4, ATAPI devices (e.g., CD-ROM), and Ultra DMA/33 synchronous-DMA mode transfers. The system BIOS supports logical block addressing (LBA) and extended cylinder sector head (ECSH) translation modes. IDE device transfer rate and translation mode are automatically detected by the system BIOS.

Usually programmed I/O operations require a substantial amount of processor bandwidth. However, in multitasking operating systems, the bandwidth freed by bus mastering IDE can be devoted to other tasks while disk transfers are occurring.

Universal Serial Bus (USB) Support

The motherboard features 2 USB ports that permit the direct connection of 2 USB peripherals, one to each port. For more than 2 USB devices, an external hub can be connected to either of the built-in ports. The motherboard fully supports the universal host controller interface (UHCI) and uses software drivers that are UHCI-compatible. Features of USB include:

- Self-identifying peripherals that can be hot-plugged
- Automatic mapping of function to driver and configuration
- Support for isochronous and asynchronous transfer types over the same set of wires
- Support for up to 127 physical devices
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, and other applications
- Error-handling and fault-recovery mechanisms built into the protocol

Removing and Replacing the Motherboard

CAUTION
When removing the motherboard, you must be sure the power cord is not connected to the computer. Although the computer may be turned off, if the power cord is attached to the computer and plugged into the wall, there is power to the motherboard. Removing connectors, components, expansion boards, etc. while the computer is plugged in will damage the motherboard.
Be sure to always wear a properly connected grounding strap while working on the computer.

To remove the motherboard, follow the steps below:

1. Remove the modem cable and then the power cord from the wall and the power connector on the computer. Label and remove all other cables from the back of the computer.
2. Remove the system cover(s) as specified in Section 2 to gain access to the inside of the chassis.

3. Remove all I/O cards from the system (voice/fax/modem card, sound adapter, etc.) Be sure to put them in a safe, anti-static location.
4. Remove the auxiliary fan and scoop on the HP Pavilion 8400 systems.
5. Remove the processor module, which is located in the processor slot on the motherboard (see Removing the Processor Module below).
6. Remove all cable connectors, being sure to label each one as it is removed.
7. Remove the 10 screws that attach the motherboard to the chassis.
8. Carefully lift and remove the motherboard from the chassis.

To replace the motherboard, reverse the above procedure.

Removing the Processor Module

To remove the processor module, follow the steps below and refer to Figure 5-12 on the next page:

1. Remove the modem cable and then the power cord from the wall and the power connector on the computer. Label and remove all other cables from the back of the computer.
2. Remove the back panel and left side panel, then lay the system on its right side, open side up.
3. Pressing in on the retaining clip, remove the power supply connector from the motherboard.

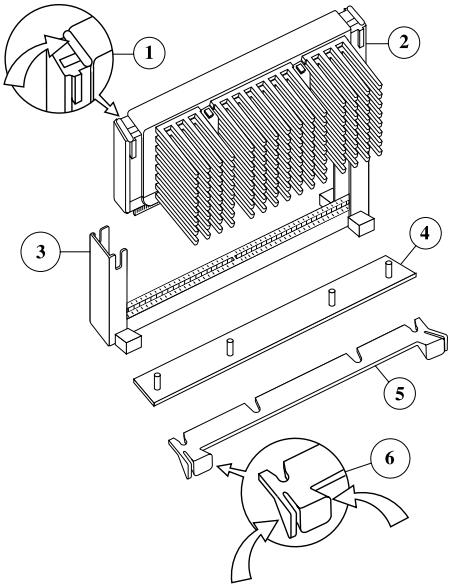


Figure 5-12: Processor Module

The processor module has a retaining brace that must be removed before the module can be removed from the motherboard.

4. Remove the retaining brace (#5 in Figure 5-12) by pressing the retaining clips (#6) on both ends toward the center and pulling the brace away from the processor module (#2). When it comes free, pull it up and out of the system.
5. Press in on the two locking clips (#1), one on each end of the top of the processor module, until you hear each one snap.
6. Pull the processor module up and away from the motherboard.

To install the processor module, follow the procedure below.

1. Slide the processor module down through the guides posts (#3) and press it firmly in to the connector.
2. Press the two locking clips (#1) on the top of the processor module out to the sides until they release.
3. Carefully position the retaining brace (#5) in the bottom grove of the processor module's heat sink and slide it into position on the mounting block (#4). Press towards the processor module at the ends until each side snaps into place.
4. Replace the power supply cable connector to the appropriate connector on the motherboard.

When Replacing the Motherboard

The motherboard for computers that have the Pentium II processor does not come with the processor module or the module guide rails. Be sure to remove the guide rails from the old motherboard and install them on the new motherboard before mounting the motherboard in the chassis.

Before installing the motherboard, verify that switch settings and jumpers are in the correct positions. Switch settings and jumper information can be found later in this section.

When you get a replacement motherboard to install in a computer, you will need to use a "Pavilion Tattoo Disk" to burn the serial number into the ROM on the new motherboard.

To obtain the latest files to create the appropriate Pavilion Tattoo Disk, USA resellers should check the HP Reseller Resource Center at http://partner.americas.hp.com (click on "Service and Support" and search for "Pavilion").

After reassembling the computer, put the Pavilion Tattoo Disk in the 3.5" floppy drive and then turn on the computer. The Pavilion Tattoo Disk is a boot disk. To complete the upgrade process, carefully follow the instructions on the screen. DO NOT SKIP ANY STEPS.

System Board Layout

The system board has the following major components:

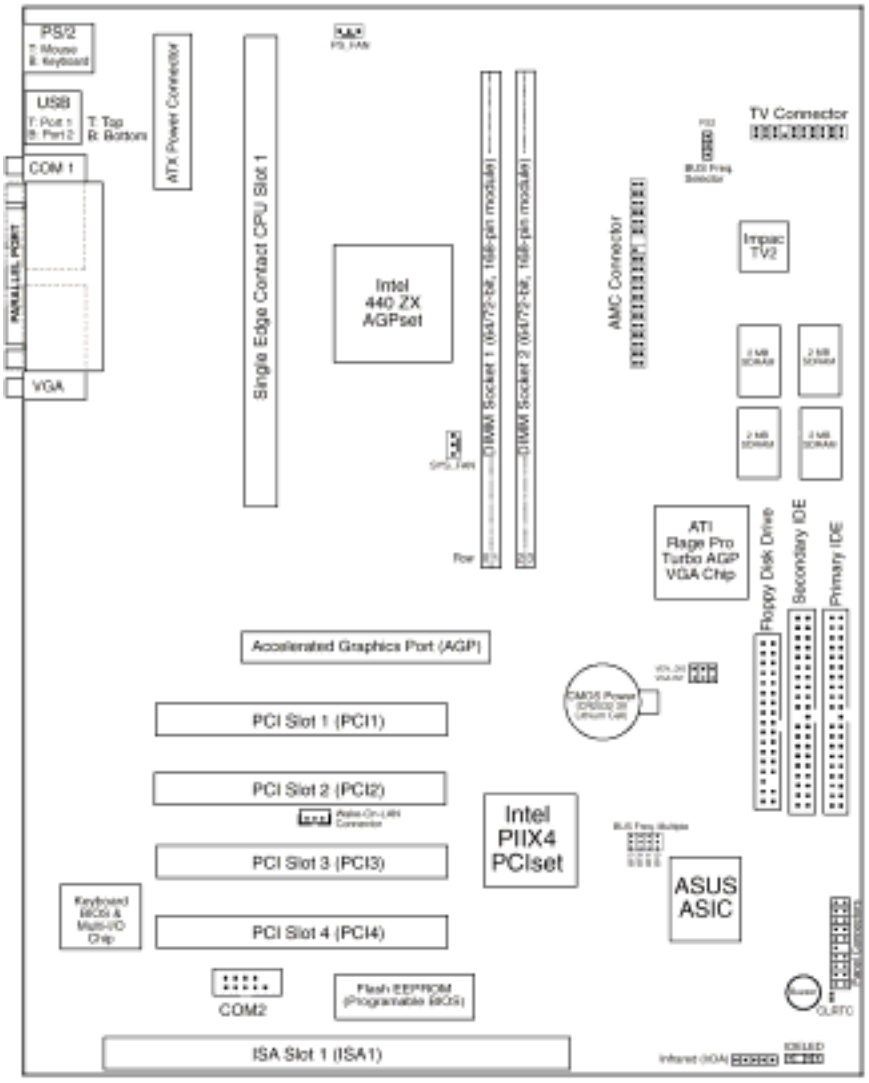


Figure 5-13: System Board Layout

CAUTION
Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

CAUTION
Integrated circuits are extremely susceptible to electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.

Installing Memory

The computer comes with 48, 64, 96 or 128 Mbytes of RAM, configured as base (conventional) and extended memory. Operating systems such as DOS and Windows '98 and all application programs use base memory. For better performance, the HP Pavilion has been configured to allow Windows '98 utilize part of extended memory, thus freeing up part of base memory for other programs.

The motherboard provides two 168-pin SDRAM sites for memory expansion. The sockets support 8, 16, 32, 64 and 128 Mbyte SDRAM modules. Minimum memory size is 8 Mbytes and maximum memory size, using two 128 Mbyte SDRAM modules, is 256 Mbytes.

When installing additional memory, choose one of the SDRAM configurations listed in Table 5-18.

Because the SDRAM modules are mounted vertically and not at an angle like traditional SIMMs, you can install DIMMs in any order. Follow these steps to install a DIMM:

1. The DIMM has 2 small notches on the lower edge that fit into raised bumps in the DIMM socket. Hold the DIMM perpendicular to the socket, aligning the notches with the bumps.

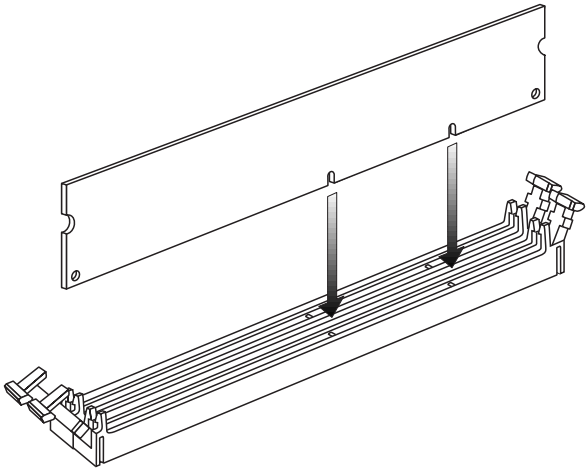


Figure 5-14: Insert DIMM module into connector with proper notch alignment

2. Push straight down on top of the DIMM until it is fully seated in the socket. The retaining clips on the ends of the socket will automatically lock into place when the DIMM is fully inserted.

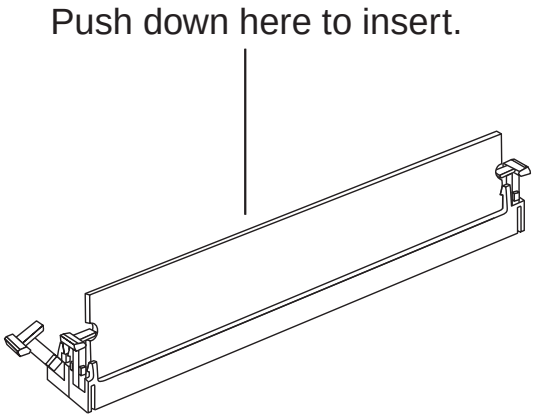


Figure 5-15: Push DIMM straight down until it is fully seated

3. Check that the DIMM is securely seated in its slot and that both ends are locked to the socket.

Follow these steps to remove a DIMM:

1. Press down on the holding clips on both sides of the DIMM until the DIMM pops out of the socket.

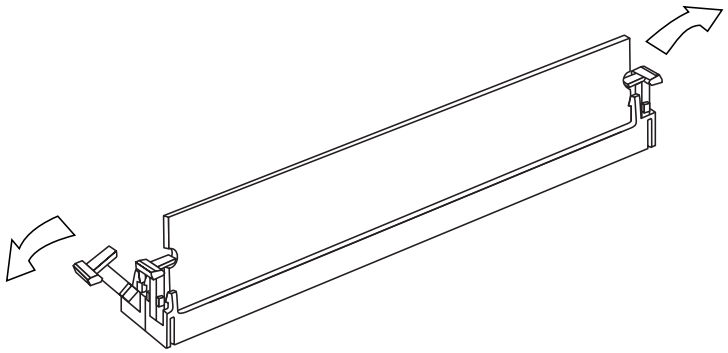


Figure 5-16: Press on holding clips to release DIMM module

After installing or removing system memory, the system will automatically detect the amount of memory installed. There is no need to change any configurations. You can run Setup to view the new value for total system memory to confirm proper RAM installation.

Replacing the Battery

The Setup information is stored in CMOS RAM and is backed up by a battery when power to the system is off. The battery also keeps the system clock current. As long as the internal battery remains good and is connected, the clock continues to keep the date and time accurately and the Setup information will remain intact.

WARNING
Danger of explosion if the battery is not correctly replaced

Replace the battery with the same manufacturer's 3V Lithium battery, type CR2032. Discard the used battery according to the manufacturer's instructions. The location of the battery on the motherboard can be found in Figure 5-13.

System Memory Configuration

SDRAM in Bank 0	SDRAM in Bank 1	Total System Memory
0 MB	8 MB	8 MB
0 MB	16 MB	16 MB
0 MB	32 MB	32 MB
0 MB	64 MB	64 MB
0 MB	128 MB	128 MB
8 MB	8 MB	16 MB
8 MB	16 MB	24 MB
8 MB	32 MB	40 MB
8 MB	64 MB	72 MB
8 MB	128 MB	136 MB
...	...	...
128 MB	128 MB	256 MB

Table 5-18: System Memory Configuration

Jumper Settings and Functions

Jumper Settings

VGA Interrupt Selection (VGA- INT) and VGA Setting (VEN_ DIS)

The VGA- INT jumper allows you to set the VGA interrupt method. The default enables the chipset's internal interrupt routing for TV- Tuner or MPEG cards that may require interrupt assignment by the onboard chipset.

The VEN_ DIS jumper allows you to enable or disable the onboard VGA. Disable the onboard VGA if you are using a VGA card on the expansion slot.

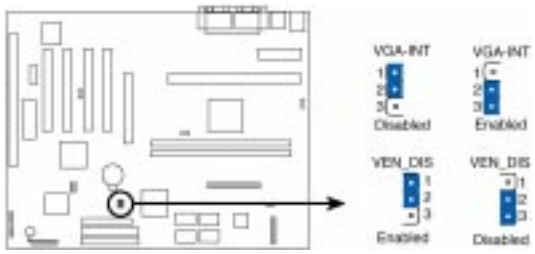


Figure 5-17: VGA Interrupt Jumper Settings

Real Time Clock (RTC) RAM (CLRTC)

The CMOS RAM is powered by the onboard button cell battery. To clear the RTC data:

1. Unplug your computer
2. Short solder points
3. Turn on your computer
4. Hold down F1 during bootup and enter BIOS setup to re- enter user preferences.

RTC RAM	CLRTC
Clear CMOS	[short solder points momentarily]

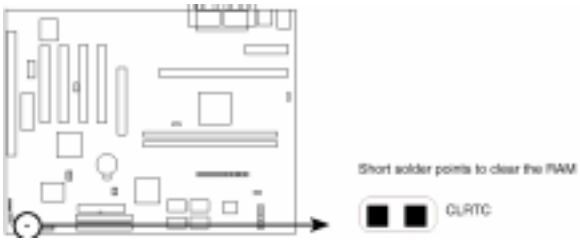


Figure 5-18: Real Time Clock RAM (CLRTC)

CPU BUS Frequency (FS2)

This option tells the clock generator what frequency to send to the CPU, DRAM, and the AGPset. This allows the selection of the CPU's *External* frequency (or *BUS Clock*). The BUS Clock multiplied by the BUS Ratio equals the CPU's *Internal* frequency (the advertised CPU speed).

CPU Core: BUS Frequency Multiple (BF0, BF1, BF2, BF3)

This option sets the frequency ratio between the *Internal* frequency of the CPU and the CPU's External frequency. These must be set in conjunction with the CPU *Bus Frequency*.

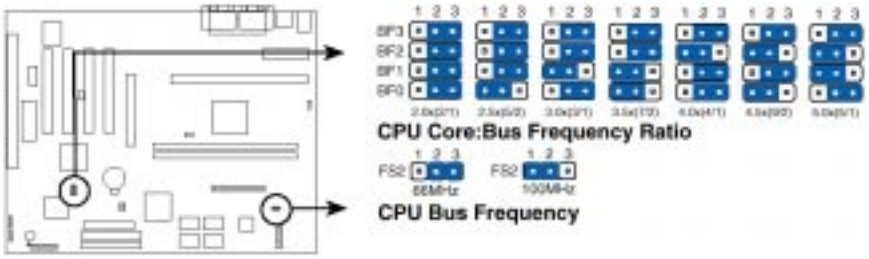


Figure 5-19: P2B-VE CPU Jumpers

CPU Freq. (MHz)	Ratio	Bus Freq. (MHz)	BUS Frequency FS2	Frequency Ratio			
				BF3	BF2	BF1	BF0
450	4.5x	100	1-2	2-3	1-2	1-2	1-2
400	4.0x	100	1-2	2-3	1-2	2-3	2-3
350	3.5x	100	1-2	2-3	2-3	1-2	1-2
333	5.0x	66	2-3	2-3	1-2	1-2	2-3
300	4.5x	66	2-3	2-3	1-2	2-3	1-2
266	4.0x	66	2-3	2-3	1-2	2-3	2-3
233	3.5x	66	2-3	2-3	2-3	1-2	1-2

Table 5-19: CPU Jumper Settings

Connectors

Power Supply Connectors

PRIMARY POWER

Pin	*Signal Name*	*Pin*	*Signal Name*
1	+3.3 V	11	+3.3 V
2	+3.3 V	12	-12 V
3	Ground	13	Ground
4	+5 V	14	PW_ON
5	Ground	15	Ground
6	+5 V	16	Ground
7	Ground	17	Ground
8	PWRGD (Power Good)	18	-5 V
9	+5 VSB (Standby for real-time clock)	19	+5 V
10	+12 V	20	+5 V

Table 5-20: Primary Power Connector

POWER SUPPLY FAN CONNECTOR

Pin	*Signal Name*
1	Ground
2	+12 V
3	Ground

Table 5-21: Power Supply Fan Connector

SYSTEM FAN CONNECTOR

Pin	*Signal Name*
1	+12 V
2	Ground
3	FAN_SEN

Table 5-22: System Fan Connector

Front Panel Connector

The front panel connectors includes headers for the following connections; Power LED, Power switch., IDE LED.

Pin	*Connector*
1	Power Switch
2	Power Switch
3	IDE LED
4	IDE LED
5	no connection
6	Power LED
7	no connection
8	Power LED
9	Reset Switch
10	Reset Switch
11	Speaker
12	Ground
13	Ground
14	Speaker
15	SMI
16	SMI
17	Keyboard Lock
18	Keyboard Lock
19	Message LED
20	Message LED

Table 5-23: Front Panel Connector

Pin	*Connector*
1	+5V
2	no connection
3	IDE Signal
4	+5V

Table 5-24: IDE LED Connector

Back Panel I/O Connectors

PS/2 KEYBOARD & MOUSE PORTS

Pin	*Signal Name*
1	Data
2	No Connect
3	Ground
4	+5 Vcc (fused)
5	Clock
6	No Connect

Table 5-25: PS/2 Keyboard and Mouse Ports

USB CONNECTORS (USB 0 AND USB 1)

Pin	*Signal Name*
1	Power
2	USBPO# (USBP1#)
3	USBPO (USBP1)
4	Ground

Table 5-26: USB Connectors

SERIAL PORT CONNECTOR

Pin	*Signal Name*
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring indicator

Table 5-27: Serial Port Connector

PARALLEL PORT

Signal Name	*Pin*	*Pin*	*Signal Name*
STROBE-	1	14	AUTO FEED
Data Bit 0	2	15	ERROR*
Data Bit 1	3	16	INIT*
Data Bit 2	4	17	SELECT IN*
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACK*	10	23	Ground
BUSY	11	24	Ground
Error	12	25	Ground
SELECT	13		

Table 5-28: Parallel Port Connector

Peripherals

IDE CONNECTORS

Signal Name	*Pin*	*Pin*	*Signal Name*
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DDRQ0(DDRQ1)	21	22	Ground
I/O Write	23	24	Ground
I/O Read	25	26	Ground
IORDY	27	28	Vcc pull-up
DDACK0(DDACK1)	29	30	Ground
IRQ14(IRQ15)	31	32	Reserved
Addr 1	33	34	Reserved
Addr 0	35	32	Addr 2
Chip Select 1P(1S)	37	38	Chip Select 3P (3S)
Activity	39	40	Ground

Table 5-29: IDE Connectors

FLOPPY CONNECTOR

Signal Name	*Pin*	*Pin*	*Signal Name*
Ground	1	2	DENSEL
Ground	3	4	Reserved
Key	5	6	FDEDIN
Ground	7	8	Index
Ground	9	10	Motor Enable A
Ground	11	12	Drive Select B
Ground	13	14	Drive Select A
Ground	15	16	Motor Enable B
MSEN1	17	18	DIR
Ground	19	20	STEP
Ground	21	22	Write Data
Ground	23	24	Write Enable
Ground	25	26	Track 00
MSEN0	27	28	Write Protect
Ground	29	30	Read Data
Ground	31	32	Side 1 Select
Ground	33	34	Diskette Change

Table 5-30: Floppy Connector

Part 3 – HP Pavilion 4406, HP Pavilion 4407, HP Pavilion 4409, HP Pavilion 4450, HP Pavilion 4451, and HP Pavilion 4456 PCs

About the Intel Celeron Processor with MMX Technology™

These systems are designed to operate with the Intel Celeron Processor running at 366 MHz. The microprocessor implements MMX™ technology and maintains full backward compatibility with the 8086, 80286, Intel386™, Intel486™, Pentium processor, and Pentium Pro processors. The board comes installed with 32, 48 or 64 Mbytes of SDRAM memory.

Table 5-31 below shows the specific Intel microprocessor chip speed and SDRAM RAM included for each system. The processor, in addition to its expanded data and addressing capabilities, includes the following features:

- Ready for the next generation OverDrive processor
- On-chip numeric co-processor
- 32 KB Level 1 cache (16 KB for data, 16 KB for code)
- 128 KB Pipeline Burst Level 2 cache
- Read and write burst mode bus cycles
- ATI Rage IIC AGP Graphics Controller with 4 Mbytes SDRAM
- Intel 440ZX AGP chipset and PCI/IDE Interface
- SDRAM memory expandable to 256 Mbytes

HP Pavilion System	Microprocessor Speed	System Memory
HP Pavilion 4406	Intel Celeron 333 MHz	32 Mbytes, 66 MHz SDRAM
HP Pavilion 4407	Intel Celeron 366 MHz	32 Mbytes, 66 MHz SDRAM
HP Pavilion 4409	Intel Celeron 366 MHz	64 Mbytes, 66 MHz SDRAM
HP Pavilion 4450	Intel Celeron 366 MHz	64 Mbytes, 66 MHz SDRAM
HP Pavilion 4451	Intel Celeron 366 MHz	64 Mbytes, 66 MHz SDRAM
HP Pavilion 4456	Intel Celeron 366 MHz	48 Mbytes, 66 MHz SDRAM

Table 5-31: Microprocessor Speed and System Memory

The flexible design of the motherboard will accept processors operating at 333 or 366 MHz. The memory subsystem is designed to support up to 256 MB of SDRAM (for improved performance) in the form of two DIMM sockets that support 8-128 MB 168-pin 3.3 Volt SDRAM memory modules.

The motherboard features Intel's 440ZX AGPset with I/O subsystem. The onboard VGA that features an onboard ATI Rage IIC with 4MB SDRAM.

PCI and ISA expansion slots are supported by connectors on the motherboard. The motherboard comes with 2 PCI slots and 1 ISA slot.

In addition to superior hardware capabilities, a full set of software drivers and utilities are available to allow advanced operating systems such as Windows '98 to take full advantage of the hardware capabilities. Features such as bus mastering IDE, Windows

'98-ready Plug 'N' Play, and glitchless bi-directional audio are all provided by available software.

About System Memory

The motherboard has two dual in-line memory module (DIMM) sockets. Minimum memory size is 8 MB; maximum memory size is 256 MB. The BIOS automatically detects memory type, size, and speed.

The motherboard supports the following memory features:

- 168-pin DIMMs with gold-plated contacts
- 66 MHz SDRAM only
- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only
- Single- or double-sided DIMMs in the following sizes:

SDRAM

Synchronous DRAM (SDRAM) improves memory performance through memory access that is synchronous with the memory clock. This simplifies the timing design and increases memory speed because all timing is dependent on the number of memory clock cycles.

NOTE
To function properly, SDRAM DIMMs must meet the Intel 4-clock, 66 MHz, unbuffered SDRAM specification for either 64-bit or 72-bit SDRAM.

IDE Support

The motherboard provides 2 independent high performance bus-mastering PCI IDE interfaces capable of supporting PIO Mode 3, Mode 4, and ATAPI devices (e.g., CD-ROM). The system BIOS supports logical block addressing (LBA) and extended cylinder sector head (ECSH) translation modes. IDE device transfer rate and translation mode are automatically detected by the system BIOS.

Usually programmed I/O operations require a substantial amount of processor bandwidth. However, in multitasking operating systems, the bandwidth freed by bus mastering IDE can be devoted to other tasks while disk transfers are occurring.

Accelerated Graphics Port (A.G.P.)

The Accelerated Graphics Port (A.G.P.) is a high-performance interconnect for graphic-intensive applications, such as 3D applications. A.G.P. is independent of the PCI bus and is intended for exclusive use with graphical-display devices. A.G.P. provides these performance features:

- Pipelined-memory read and write operations that hide memory access latency
- Demultiplexing of address and data on the bus for near 100 percent bus efficiency
- AC timing for 133 MHz data transfer rates, allowing data throughput of 500 MB/sec

A.G.P. complies with the 66 MHz PCI specification.

Universal Serial Bus (USB) Support

The motherboard features 2 USB ports that permit the direct connection of 2 USB peripherals, one to each port. For more than 2 USB devices, an external hub can be connected to either of the built-in ports. The motherboard fully supports the universal host controller interface (UHCI) and uses software drivers that are UHCI-compatible.

Features of USB include:

- Self-identifying peripherals that can be hot-plugged
- Automatic mapping of function to driver and configuration
- Support for isochronous and asynchronous transfer types over the same set of wires
- Support for up to 127 physical devices
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, and other applications
- Error-handling and fault-recovery mechanisms built into the protocol

Removing and Replacing the Motherboard

CAUTION
When removing the motherboard, you must be sure the power cord is not connected to the computer. Although the computer may be turned off, if the power cord is attached to the computer and plugged into the wall, there is power to the motherboard. Removing connectors, components, expansion boards, etc. while the computer is plugged in will damage the motherboard.
Be sure to always wear a properly connected grounding strap while working on the computer.

To remove the motherboard, follow the steps below:

1. Remove the modem cable and then the power cord from the wall and the power connector on the computer. Label and remove all other cables from the back of the computer.
2. Remove the system cover as described in Section 2.
3. Remove all I/O cards from the system (voice/fax/modem card, sound adapter, etc.) Be sure to put them in a safe, anti-static location.
4. Remove all cable connectors, being sure to label each one as it is removed.
5. Remove the Motherboard Access Panel as described in Section 2.
6. Remove the 8 screws that attach the motherboard to the chassis.
7. Carefully lift and remove the motherboard from the access panel.

To replace the motherboard, reverse the above procedure.

System Board Layout

The system board has the following major components:

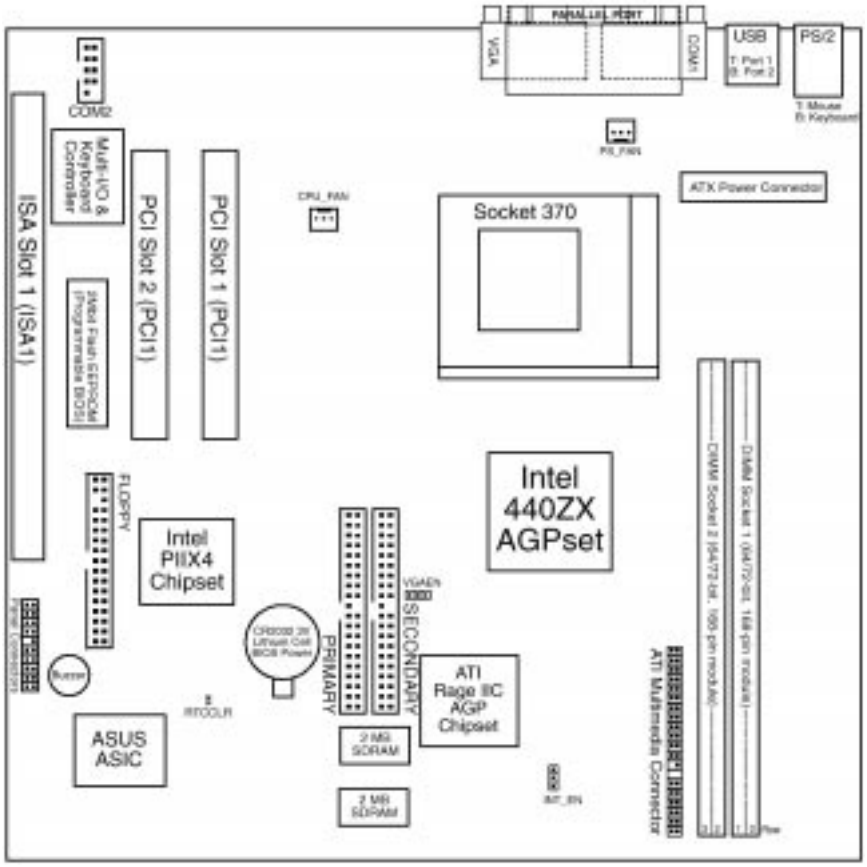


Figure 5-20: System Board Layout

CAUTION
Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

CAUTION
Integrated circuits are extremely susceptible to electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.

Installing Memory

The computer comes with 32, 48 or 64 Mbytes of RAM, configured as base (conventional) and extended memory. Operating systems such as DOS and Windows '98 and all application programs use base memory. For better performance, the HP Pavilion has been configured to allow Windows '98 utilize part of extended memory, thus freeing up part of base memory for other programs.

The motherboard provides two 168-pin SDRAM sites for memory expansion. The sockets support 8, 16, 32, 64 and 128 Mbyte SDRAM modules. Minimum memory size is 8 Mbytes and maximum memory size, using two 128 Mbyte SDRAM modules, is 256 Mbytes.

When installing additional memory, choose one of the SDRAM configurations listed in Table 5-32.

Because the SDRAM modules are mounted vertically and not at an angle like traditional SIMMs, you can install DIMMs in any order. Follow these steps to install a DIMM:

1. The DIMM has 2 small notches on the lower edge that fit into raised bumps in the DIMM socket. Hold the DIMM perpendicular to the socket, aligning the notches with the bumps.

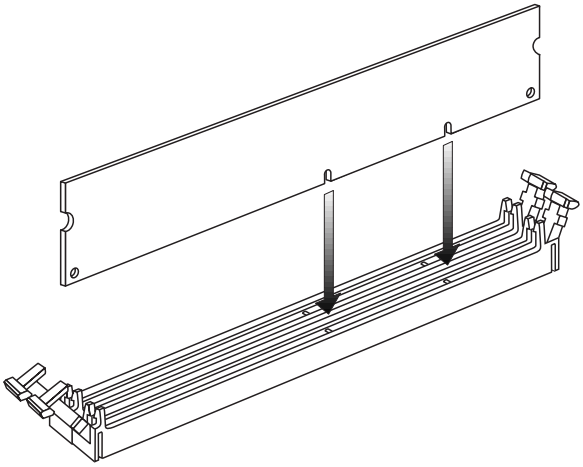


Figure 5-21: Insert DIMM module into connector with proper notch alignment

2. Push straight down on top of the DIMM until it is fully seated in the socket. The retaining clips on the ends of the socket will automatically lock into place when the DIMM is fully inserted.

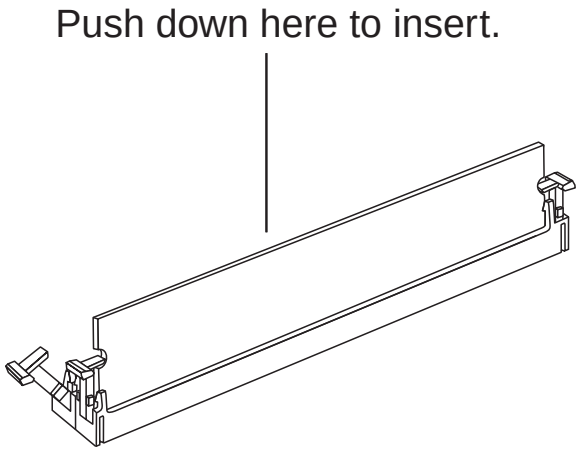


Figure 5-22: Push DIMM straight down until it is fully seated

3. Check that the DIMM is securely seated in its slot and that both ends are locked to the socket.

Follow these steps to remove a DIMM:

1. Press down on the holding clips on both sides of the DIMM until the DIMM pops out of the socket.

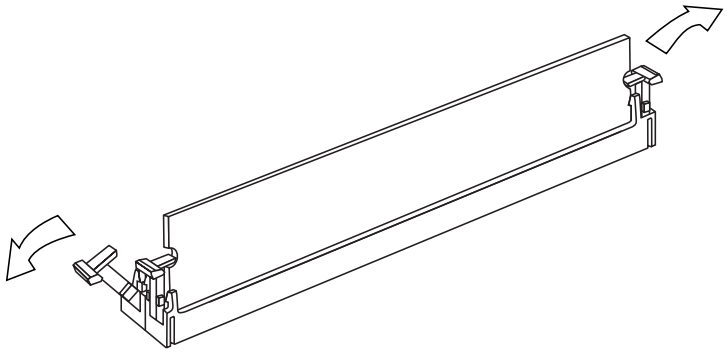


Figure 5-23: Press on holding clips to release DIMM module

After installing or removing system memory, the system will automatically detect the amount of memory installed. There is no need to change any configurations. You can run Setup to view the new value for total system memory to confirm proper RAM installation.

Replacing the Battery

The Setup information is stored in CMOS RAM and is backed up by a battery when power to the system is off. The battery also keeps the system clock current. As long as the internal battery remains good and is connected, the clock continues to keep the date and time accurately and the Setup information will remain intact.

WARNING
Danger of explosion if the battery is not correctly replaced

Replace the battery with the same manufacturer's 3V Lithium battery, type CR2032. Discard the used battery according to the manufacturer's instructions. The location of the battery on the motherboard can be found in Figure 5-20.

System Memory Configuration

SDRAM in Bank 0	SDRAM in Bank 1	Total System Memory
Empty	8 MB	8 MB
8 MB	8 MB	16 MB
Empty	16 MB	16 MB
Empty	32 MB	32 MB
Empty	64 MB	64 MB
Empty	128 MB	128 MB
8 MB	Empty	8 MB
8 MB	8 MB	16 MB
8 MB	16 MB	24 MB
8 MB	32 MB	40 MB
8 MB	64 MB	72 MB
8 MB	128 MB	136 MB
16 MB	Empty	16 MB
16 MB	8 MB	24 MB
16 MB	16 MB	32 MB
16 MB	32 MB	48 MB
16 MB	64 MB	80 MB
16 MB	128 MB	144 MB
32 MB	Empty	32 MB
32 MB	8 MB	40 MB
32 MB	16 MB	48 MB
32 MB	32 MB	64 MB
32 MB	64 MB	96 MB
32 MB	128 MB	160 MB
64 MB	Empty	64 MB
64 MB	8 MB	72 MB
64 MB	16 MB	80 MB
64 MB	32 MB	96 MB
64 MB	64 MB	128 MB
64 MB	128 MB	192 MB
128 MB	Empty	128 MB
128 MB	8 MB	136 MB
128 MB	16 MB	144 MB
128 MB	32 MB	160 MB
128 MB	64 MB	192 MB
128 MB	128 MB	256 MB

Table 5-32: System Memory Configuration

Jumper Locations and Functions

Jumper Settings

VGA Interrupt Selection (INT_EN) and VGA Setting (VGAEN)

INT_ EN allows you to set the VGA interrupt method. The default disables the chipset's internal interrupt routing. Some TV tuners or MPEG cards may require the interrupt be assigned by the onboard chipset, in which case INT_ EN must be enabled. VGAEN allows you to enable or disable the onboard VGA. Disable the on-board VGA if you are using a VGA card on the expansion slot.

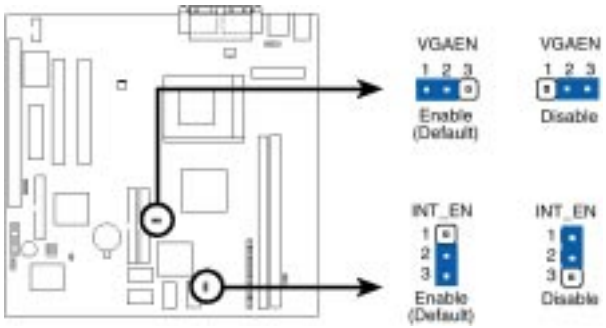


Figure 5-24: VGA Interrupt Jumper Location and Settings

INT_EN	Setting
Disable	2-3 (default)
Enable	1-2

Table 5-33: VGA Interrupt Jumper Settings

VGAEN	Setting
Enable	1-2 (default)
Disable	2-3

Table 5-34: VGA Enable Jumper Settings

Real Time Clock (RTC) RAM (RTCCLR)

The CMOS RAM is powered by the onboard button cell battery. To clear the RTC data:

1. Unplug your computer
2. Short solder points momentarily using a small metallic object
3. Turn on your computer
4. Hold down F1 during bootup and enter BIOS setup to re- enter user preferences.

RTC_RAM RTCCLR
Clear CMOS (short solder points momentarily)

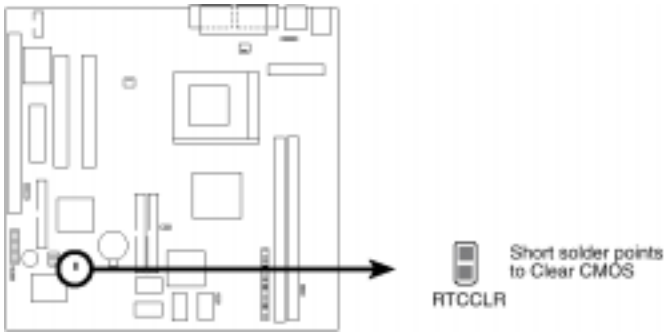


Figure 5-25: Real Time Clock Clear Jumper

Connectors

Location of the motherboard connectors can be found on Figure 5-20 above.

Power Supply Connectors

PRIMARY POWER

Pin	*Signal Name*	*Pin*	*Signal Name*
1	+3.3 V	11	+3.3 V
2	+3.3 V	12	-12 V
3	Ground	13	Ground
4	+5 V	14	PW_ON
5	Ground	15	Ground
6	+5 V	16	Ground
7	Ground	17	Ground
8	PWRGD (Power Good)	18	-5 V
9	+5 VSB (Standby for real-time clock)	19	+5 V
10	+12 V	20	+5 V

Table 5-35: Primary Power Connector

POWER SUPPLY FAN CONNECTOR

Pin	*Signal Name*
1	Ground
2	+12 V (Suspend)
3	Ground

Table 5-36: Power Supply Fan Connector

CPU FAN CONNECTOR

Pin	*Signal Name*
1	Rotation
2	+12 V
3	Ground

Table 5-37: CPU Fan Connector

Front Panel Connector

The front panel connector includes headers for the following connections; Power LED, Speaker, Reset switch, Power switch., Sleep switch.

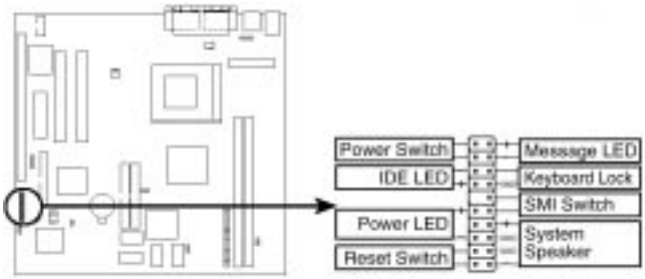


Figure 5-26: Front Panel Connector

Back Panel I/O Connectors

PS/2 KEYBOARD & MOUSE PORTS

Pin	*Signal Name*
1	Data
2	No Connect
3	Ground
4	+5 Vcc (fused)
5	Clock
6	No Connect

Table 5-38: PS/2 Keyboard and Mouse Ports

USB CONNECTORS

Pin	*Signal Name*
1	Power
2	USBP0# (USBP1#)
3	USBP0 (USBP1)
4	Ground

Table 5-39: USB Connectors

SERIAL PORT CONNECTOR

Pin	*Signal Name*
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring indicator

Table 5-40: Serial Port Connector

PARALLEL PORT

Signal Name	*Pin*	*Pin*	*Signal Name*
STROBE-	1	14	AUTO FEED
Data Bit 0	2	15	ERROR*
Data Bit 1	3	16	INIT*
Data Bit 2	4	17	SELECT IN*
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACK*	10	23	Ground
BUSY	11	24	Ground
Error	12	25	Ground
SELECT	13		

Table 5-41: Parallel Port Connector

Peripherals

IDE CONNECTORS

Signal Name	*Pin*	*Pin*	*Signal Name*
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DDRQ0(DDRQ1)	21	22	Ground
I/O Write	23	24	Ground
I/O Read	25	26	Ground
IORDY	27	28	Vcc pull-up
DDACK0(DDACK1)	29	30	Ground
IRQ14(IRQ15)	31	32	Reserved
Addr 1	33	34	Reserved
Addr 0	35	32	Addr 2
Chip Select 1P(1S)	37	38	Chip Select 3P (3S)
Activity	39	40	Ground

Table 5-42: IDE Connectors

FLOPPY CONNECTOR

Signal Name	*Pin*	*Pin*	*Signal Name*
Ground	1	2	DENSEL
Ground	3	4	Reserved
Key	5	6	FDEDIN
Ground	7	8	Index
Ground	9	10	Motor Enable A
Ground	11	12	Drive Select B
Ground	13	14	Drive Select A
Ground	15	16	Motor Enable B
MSEN1	17	18	DIR
Ground	19	20	STEP
Ground	21	22	Write Data
Ground	23	24	Write Enable
Ground	25	26	Track 00
MSEN0	27	28	Write Protect
Ground	29	30	Read Data
Ground	31	32	Side 1 Select
Ground	33	34	Diskette Change

Table 5-43: Floppy Connector

Part 4 - HP Pavilion 6353 PC

About the Intel Pentium II Processor

Th1s system is designed to operate with the Intel Pentium II Processor running at 350, MHz. The microprocessor implements MMX™ technology and maintains full backward compatibility with the 8086, 80286, Intel386™, Intel486™, Pentium processor, and Pentium Pro processors. The board comes installed with 64 Mbytes of 100 MHz SDRAM memory.

The processor, in addition to its expanded data and addressing capabilities, includes the following features:

- Ready for the next generation OverDrive processor
- On-chip numeric co-processor (compatible with the Intel 486™ DX processor and compliant with ANSI/IEEE standard 754-1985)
- 32 KB Level 1 cache (16 KB for data, 16 KB for code)
- 512 KB Pipeline Burst Level 2 cache in the Pentium II cartridge
- Read and write burst mode bus cycles
- ATI RagePro AGP 3D Graphics Controller with 8 Mbytes SDRAM
- Intel 440BX AGP chipset and PCI/IDE Interface
- SDRAM memory expandable to 384 Mbytes

The flexible design of the motherboard will accept processors operating at 300 MHz to 450 MHz. The memory subsystem is designed to support up to 384 MB of SDRAM (for improved performance) in the form of three DIMM sockets that support 8-128 MB 168-pin 3.3 Volt SDRAM memory modules.

The motherboard features Intel's 440BX AGPset with I/O subsystem. The onboard ATI-AGP-VGA that features an onboard ATI VGA chipset with 8MB DRAM.

PCI and ISA expansion slots are supported by connectors on the motherboard. The motherboard comes with 3 PCI slots, 1 ISA slots and 1 shared PCI/ISA slot.

In addition to superior hardware capabilities, a full set of software drivers and utilities are available to allow advanced operating systems such as Windows '98 to take full advantage of the hardware capabilities. Features such as bus mastering IDE, Windows '98-ready Plug 'N' Play, and glitchless bi-directional audio are all provided by available software.

About System Memory

The motherboard has three dual in-line memory module (DIMM) sockets. Minimum memory size is 8 MB; maximum memory size is 384 MB. The BIOS automatically detects memory type, size, and speed.

The motherboard supports the following memory features:

- 168-pin DIMMs with gold-plated contacts
- 66 or 100 MHz SDRAM depending on system

- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only
- Single- or double-sided DIMMs in the following sizes:

SDRAM

Synchronous DRAM (SDRAM) improves memory performance through memory access that is synchronous with the memory clock. This simplifies the timing design and increases memory speed because all timing is dependent on the number of memory clock cycles.

IDE Support

The motherboard provides 2 independent high performance bus-mastering PCI IDE interfaces capable of supporting PIO Mode 3, Mode 4, and ATAPI devices (e.g., CD-ROM). The system BIOS supports logical block addressing (LBA) and extended cylinder sector head (ECSH) translation modes. IDE device transfer rate and translation mode are automatically detected by the system BIOS.

Usually programmed I/O operations require a substantial amount of processor bandwidth. However, in multitasking operating systems, the bandwidth freed by bus mastering IDE can be devoted to other tasks while disk transfers are occurring.

Universal Serial Bus (USB) Support

The motherboard features 2 USB ports that permit the direct connection of 2 USB peripherals, one to each port. For more than 2 USB devices, an external hub can be connected to either of the built-in ports. The motherboard fully supports the universal host controller interface (UHCI) and uses software drivers that are UHCI-compatible.

Features of USB include:

- Self-identifying peripherals that can be hot-plugged
- Automatic mapping of function to driver and configuration
- Support for isochronous and asynchronous transfer types over the same set of wires
- Support for up to 127 physical devices
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, and other applications
- Error-handling and fault-recovery mechanisms built into the protocol

Removing and Replacing the Motherboard

CAUTION
When removing the motherboard, you must be sure the power cord is not connected to the computer. Although the computer may be turned off, if the power cord is attached to the computer and plugged into the wall, there is power to the motherboard. Removing connectors, components, expansion boards, etc. while the computer is plugged in will damage the motherboard.
Be sure to always wear a properly connected grounding strap while working on the computer.

To remove the motherboard, follow the steps below:

1. Remove the modem cable and then the power cord from the wall and the power connector on the computer. Label and remove all other cables from the back of the computer.
2. Remove the left side panel, then lay the system on its right side, open side up.
3. Remove all I/O cards from the system (voice/fax/modem card, sound adapter, etc.) Be sure to put them in a safe, anti-static location.
4. Remove the processor module, which is located in the processor slot on the motherboard (see Removing the Processor Module below).
5. Remove all cable connectors, being sure to label each one as it is removed.
6. Remove the 10 screws that attach the motherboard to the chassis.
7. Carefully lift and remove the motherboard from the chassis.

To replace the motherboard, reverse the above procedure.

Removing the Processor Module

To remove the processor module, follow the steps below and refer to Figure 5-27:

1. Remove the modem cable and then the power cord from the wall and the power connector on the computer. Label and remove all other cables from the back of the computer.
2. Remove the back panel and left side panel, then lay the system on its right side, open side up.
3. Pressing in on the retaining clip, remove the power supply connector from the motherboard.

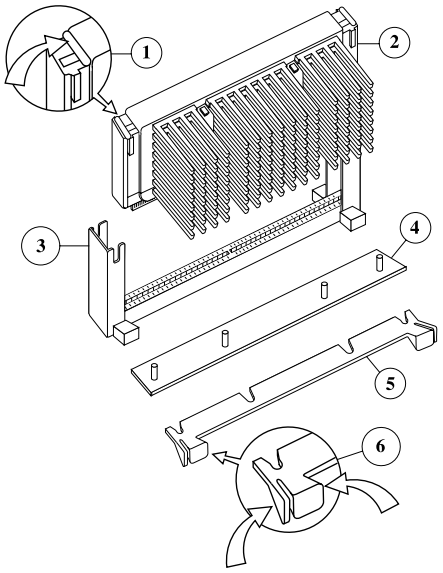


Figure 5-27: Processor Module

The processor module has a retaining brace that must be removed before the module can be removed from the motherboard.

4. Remove the retaining brace (#5 in Figure 5-27) by pressing the retaining clips (#6) on both ends toward the center and pulling the brace away from the processor module (#2). When it comes free, pull it up and out of the system.
5. Press in on the two locking clips (#1), one on each end of the top of the processor module, until you hear each one snap.
6. Pull the processor module up and away from the motherboard.

To install the processor module, follow the procedure below.

1. Slide the processor module down through the guides posts (#3) and press it firmly in to the connector.
2. Press the two locking clips (#1) on the top of the processor module out to the sides until they release.
3. Carefully position the retaining brace (#5) in the bottom grove of the processor module's heat sink and slide it into position on the mounting block (#4). Press towards the processor module at the ends until each side snaps into place.
4. Replace the power supply cable connector to the appropriate connector on the motherboard.

When Replacing the Motherboard

The motherboard for computers that have the Pentium II processor does not come with the processor module or the module guide rails. Be sure to remove the guide rails from the old motherboard and install them on the new motherboard before mounting the motherboard in the chassis.

Before installing the motherboard, verify that switch settings and jumpers are in the correct positions. Switch settings and jumper information can be found later in this section.

When you get a replacement motherboard to install in a computer, you will need to use a "Pavilion Tattoo Disk" to burn the serial number into the ROM on the new motherboard.

To obtain the latest files to create the appropriate Pavilion Tattoo Disk, USA resellers should check the HP Reseller Resource Center at http://partner.americas.hp.com (click on "Service and Support" and search for "Pavilion").

After reassembling the computer, put the Pavilion Tattoo Disk in the 3½" floppy drive and then turn on the computer. The Pavilion Tattoo Disk is a boot disk. To complete the upgrade process, carefully follow the instructions on the screen. DO NOT SKIP ANY STEPS.

System Board Layout

The system board has the following major components:

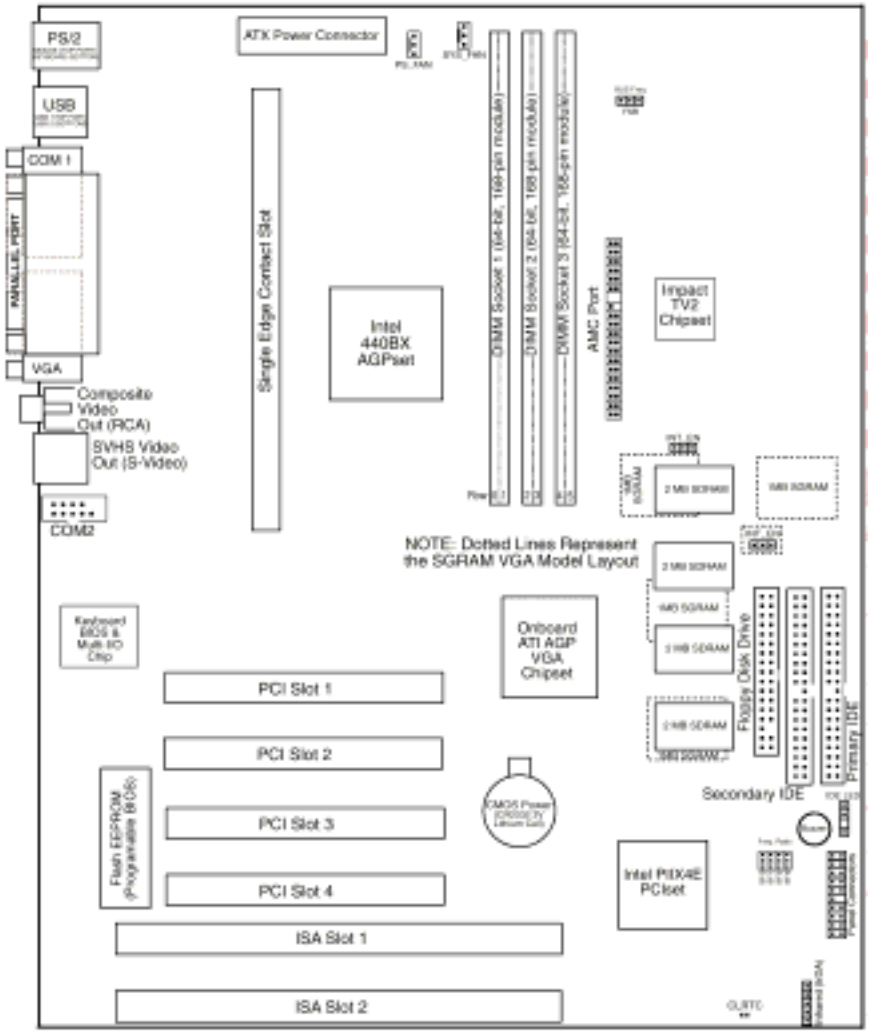


Figure 5-28: System Board Layout

CAUTION
Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

CAUTION
Integrated circuits are extremely susceptible to electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.

Installing Memory

This system comes with 64 Mbytes of RAM, configured as base (conventional) and extended memory. Operating systems such as DOS and Windows '98 and all application programs use base memory. For better performance, the HP Pavilion has been configured to allow Windows '98 utilize part of extended memory, thus freeing up part of base memory for other programs.

The motherboard provides three 168-pin SDRAM sites for memory expansion. The sockets support 8, 16, 32, 64 and 128 Mbyte SDRAM modules. Minimum memory size is 8 Mbytes and maximum memory size, using three 128 Mbyte SDRAM modules, is 384 Mbytes.

When installing additional memory, choose one of the SDRAM configurations listed in Table 5-44.

Because the SDRAM modules are mounted vertically and not at an angle like traditional DIMMs, you can install DIMMs in any order. Follow these steps to install a DIMM:

1. The DIMM has 2 small notches on the lower edge that fit into raised bumps in the DIMM socket. Hold the DIMM perpendicular to the socket, aligning the notches with the bumps.

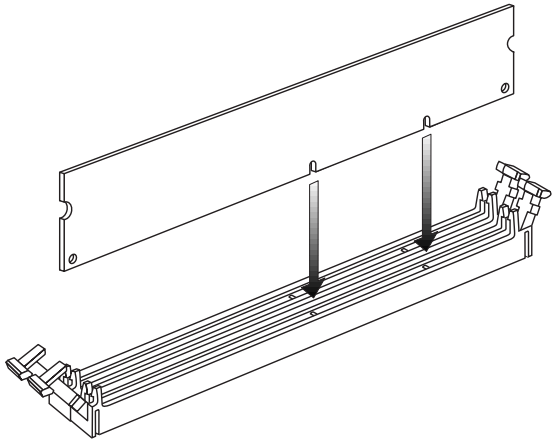


Figure 5-29: Insert DIMM module into connector with proper notch alignment

2. Push straight down on top of the DIMM until it is fully seated in the socket. The retaining clips on the ends of the socket will automatically lock into place when the DIMM is fully inserted.

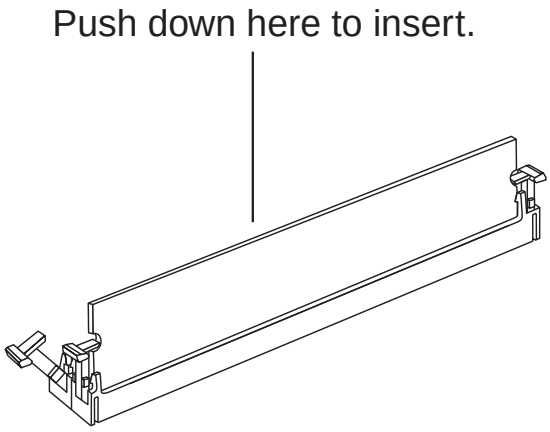


Figure 5-30: Push DIMM straight down until it is fully seated

3. Check that the DIMM is securely seated in its slot and that both ends are locked to the socket.

Follow these steps to remove a DIMM:

1. Press down on the holding clips on both sides of the DIMM until the DIMM pops out of the socket.

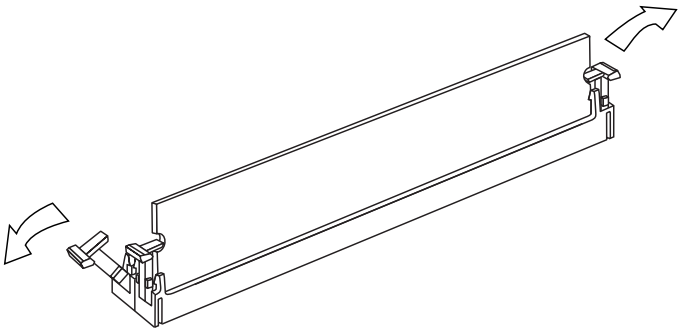


Figure 5-31: Press on holding clips to release DIMM module

After installing or removing system memory, the system will automatically detect the amount of memory installed. There is no need to change any configurations. You can run Setup to view the new value for total system memory to confirm proper RAM installation.

Replacing the Battery

The Setup information is stored in CMOS RAM and is backed up by a battery when power to the system is off. The battery also keeps the system clock current. As long as the internal battery remains good and is connected, the clock continues to keep the date and time accurately and the Setup information will remain intact.

WARNING
Danger of explosion if the battery is not correctly replaced

Replace the battery with the same manufacturer's 3V Lithium battery, type CR2032. Discard the used battery according to the manufacturer's instructions. The location of the battery on the motherboard can be found in Figure 5-28.

System Memory Configuration

DIMM 0 (Bank 1)	DIMM 1 (Bank 2)	DIMM 2 (Bank 3)	Total System Memory
Empty	Empty	8 MB	8 MB
Empty	8 MB	8 MB	16 MB
8 MB	8 MB	8 MB	24 MB
Empty	Empty	16 MB	16 MB
Empty	8 MB	16 MB	24 MB
8 MB	8 MB	16 MB	32 MB
Empty	16 MB	16 MB	32 MB
8 MB	16 MB	16 MB	40 MB
16 MB	16 MB	16 MB	48 MB
Empty	Empty	32 MB	32 MB
Empty	8 MB	32 MB	40 MB
8 MB	8 MB	32 MB	48 MB
Empty	16 MB	32 MB	48 MB

Table 5-44: System Memory Configuration (continued on next page)

DIMM 0 (Bank 1)	DIMM 1 (Bank 2)	DIMM 2 (Bank 3)	Total System Memory
8 MB	16 MB	32 MB	56 MB
16 MB	16 MB	32 MB	64 MB
Empty	32 MB	32 MB	64 MB
8 MB	32 MB	32 MB	72 MB
16 MB	32 MB	32 MB	80 MB
32 MB	32 MB	32 MB	96 MB
Empty	Empty	64 MB	64 MB
Empty	8 MB	64 MB	72 MB
8 MB	8 MB	64 MB	80 MB
Empty	16 MB	64 MB	80 MB
8 MB	16 MB	64 MB	88 MB
16 MB	16 MB	64 MB	96 MB
Empty	32 MB	64 MB	96 MB
8 MB	32 MB	64 MB	104 MB
16 MB	32 MB	64 MB	112 MB
32 MB	32 MB	64 MB	128 MB
Empty	64 MB	64 MB	128 MB
8 MB	64 MB	64 MB	136 MB
16 MB	64 MB	64 MB	144 MB
32 MB	64 MB	64 MB	160 MB
64 MB	64 MB	64 MB	192 MB
Empty	Empty	128 MB	128 MB
Empty	8 MB	128 MB	136 MB
8 MB	8 MB	128 MB	142 MB
Empty	16 MB	128 MB	142 MB
8 MB	16 MB	128 MB	152 MB
16 MB	16 MB	128 MB	160 MB
Empty	32 MB	128 MB	160 MB
8 MB	32 MB	128 MB	168 MB
16 MB	32 MB	128 MB	176 MB
32 MB	32 MB	128 MB	192 MB
Empty	64 MB	128 MB	192 MB
8 MB	64 MB	128 MB	200 MB
16 MB	64 MB	128 MB	208 MB
32 MB	64 MB	128 MB	224 MB
64 MB	64 MB	128 MB	256 MB
Empty	128 MB	128 MB	256 MB
8 MB	128 MB	128 MB	264 MB
16 MB	128 MB	128 MB	272 MB
32 MB	128 MB	128 MB	288 MB
64 MB	128 MB	128 MB	320 MB
128 MB	128 MB	128 MB	384 MB

Table 5-44: System Memory Configuration (continued)

Jumper Locations and Functions

Jumper Settings

CPU Bus Frequency (FSB)

This option tells the clock generator what frequency to send to the CPU. This allows the selection of the CPU's *External* frequency (or *BUS Clock*). The BUS Clock multiplied by the BUS Ratio equals the CPU's *Internal* frequency (the advertised CPU speed).

CPU Core: BUS Frequency Multiple (BF0, BF1, BF2, BF3)

This option sets the frequency ratio between the Internal frequency of the CPU and the CPU's External frequency. These must be set in conjunction with the CPU Bus Frequency.

WARNING
Frequencies above 100 MHz exceed the specifications for the onboard Intel Chipset and are not guaranteed to be stable.

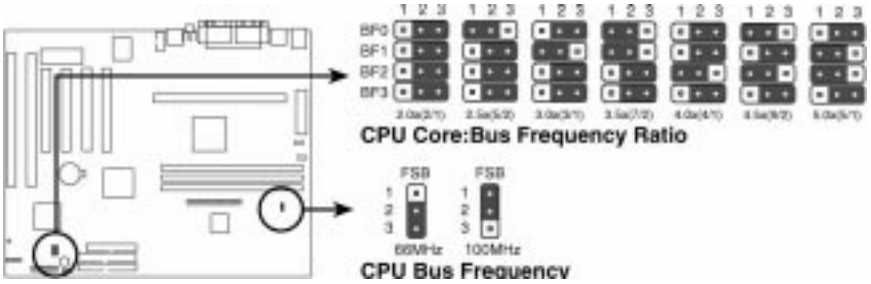


Figure 5-32: CPU Frequency and Frequency Ratio Jumper Locations and Settings

CPU Freq. (MHz)	Ratio	BUS Freq. (MHz)	FSB	BF0	BF1	BF2	BF3
450	4.5 x	100	1-2	1-2	2-3	1-2	2-3
400	4.0 x	100	1-2	2-3	2-3	1-2	2-3
350	3.5 x	100	1-2	1-2	1-2	2-3	2-3
300	3.0 x	100	1-2	2-3	1-2	2-3	2-3
330	5.0 x	66	2-3	2-3	1-2	1-2	2-3
300	4.5 x	66	2-3	1-2	2-3	1-2	2-3
266	4.0 x	66	2-3	2-3	2-3	1-2	2-3
233	3.5 x	66	2-3	1-2	1-2	2-3	2-3

Table 5-45: Jumper Settings

VGA Interrupt Setting (VIRQ)

This jumper allows you to set the VGA interrupt method. The default disables the chipset's internal interrupt routing. Some specialized display cards such as video capture cards may require that the interrupt be assigned by the onboard chipset (enable).

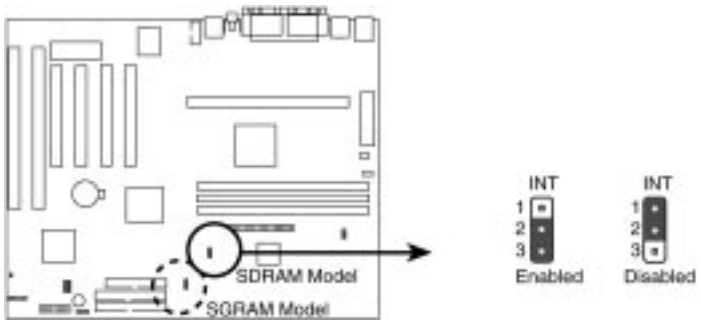


Figure 5-33: VGA Interrupt Setting Jumper Location and Settings

VIRQ	Setting
Disable	1-2 (default)
Enable	2-3

Table 5-46: VGA Interrupt Settings

Connectors

Location of the motherboard connectors can be found on Figure 5-28 above.

Power Supply Connectors

PRIMARY POWER

Pin	*Signal Name*	*Pin*	*Signal Name*
1	+3.3 V	11	+3.3 V
2	+3.3 V	12	-12 V
3	Ground	13	Ground
4	+5 V	14	PW_ON
5	Ground	15	Ground
6	+5 V	16	Ground
7	Ground	17	Ground
8	PWRGD (Power Good)	18	-5 V
9	+5 VSB (Standby for real-time clock)	19	+5 V
10	+12 V	20	+5 V

Table 5-47: Primary Power Connector

POWER SUPPLY FAN CONNECTOR

Pin	Signal Name
1	Ground
2	+12 V (Suspend)
3	Ground

Table 5-48: Power Supply Fan Connector

SYSTEM FAN CONNECTOR

Pin	Signal Name
1	+12 V
2	Ground
3	Rotation

Table 5-49: System Fan Connector

Front Panel Connector

The front panel connector includes headers for the following connections; Message LED, SMI, Speaker, Power switch, IDE LED, Power LED, Reset switch.

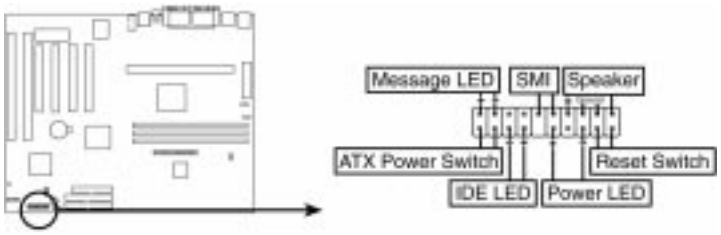


Figure 5-34: Front Panel Connector

Back Panel I/O Connectors

PS/2 KEYBOARD & MOUSE PORTS

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

Table 5-50: PS/2 Keyboard and Mouse Ports

USB CONNECTORS (USB 0 AND USB 1)

Pin	Signal Name
1	Power
2	USBP0# (USBP1#)
3	USBP0 (USBP1)
4	Ground

Table 5-51: USB Connectors

SERIAL PORT CONNECTOR

Pin	*Signal Name*
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring indicator

Table 5-52: Serial Port Connector

PARALLEL PORT

Signal Name	*Pin*	*Pin*	*Signal Name*
STROBE-	1	14	AUTO FEED
Data Bit 0	2	15	ERROR*
Data Bit 1	3	16	INIT*
Data Bit 2	4	17	SELECT IN*
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACK*	10	23	Ground
BUSY	11	24	Ground
Error	12	25	Ground
SELECT	13		

Table 5-53: Parallel Port Connector

Peripherals

IDE CONNECTORS

Signal Name	*Pin*	*Pin*	*Signal Name*
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DDRQ0(DDRQ1)	21	22	Ground
I/O Write	23	24	Ground
I/O Read	25	26	Ground
IORDY	27	28	Vcc pull-up
DDACK0(DDACK1)	29	30	Ground
IRQ14(IRQ15)	31	32	Reserved
Addr 1	33	34	Reserved
Addr 0	35	32	Addr 2
Chip Select 1P(1S)	37	38	Chip Select 3P (3S)
Activity	39	40	Ground

Table 5-54: IDE Connectors

FLOPPY CONNECTOR

Signal Name	*Pin*	*Pin*	*Signal Name*
Ground	1	2	DENSEL
Ground	3	4	Reserved
Key	5	6	FDEDIN
Ground	7	8	Index
Ground	9	10	Motor Enable A
Ground	11	12	Drive Select B
Ground	13	14	Drive Select A
Ground	15	16	Motor Enable B
MSEN1	17	18	DIR
Ground	19	20	STEP
Ground	21	22	Write Data
Ground	23	24	Write Enable
Ground	25	26	Track 00
MSEN0	27	28	Write Protect
Ground	29	30	Read Data
Ground	31	32	Side 1 Select
Ground	33	34	Diskette Change

Table 5-55: Floppy Connector

Miscellaneous

IrDA MODULE CONNECTOR

This connector supports the optional wireless transmitting and receiving infrared module. This module mounts to a system case that supports this feature (not supported in HP Pavilion systems at this time).

Pin	*Signal Name*
1	+5 Volt
2	No connection
3	IRRX
4	Ground
5	IRTX

Table 5-56: Infrared Module Connector

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Part 1 - CD-ROMs for all HP Pavilion 4400 Series PCs

This part of Section 6 addresses all of the CD-ROM drives that are found in the HP Pavilion 4400 Series PCs.

About the High-Speed CD-ROM Drive

The CD-ROM drives are capable of reading compact discs meeting international standards, such as Photo CD, multi-session, ISO-9660, and XA (eXtended Architecture) discs.

The table below shows the specific CD-ROM drive that comes with each HP Pavilion system and its average data transfer rate, maximum data transfer rate, and average access speed. All drives support 2 channels of audio with a sampling frequency of 44.1 KHz.

System	CD-ROM Rating	Average Data Transfer Rate	Maximum Data Transfer Rate	Average Access Speed
4402 AP	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4404 AP	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4405 Europe	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4406AP	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4407 AP	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4408 AP	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4409 AP	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4410 Europe	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4431 Mexico	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4440 Europe	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4440 North America	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4443 Walmart	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4450 North America	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4451 Mexico	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
4456 North America	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms

Table 6-1: CD-ROM Drives

This internal CD-ROM drive connects to the system using the standard ATAPI/IDE (Advanced Technology Attachment Packet Interface/Integrated Drive Electronics).

The CD-ROM drive can be configured in one of two ways. From the manufacturer, the drive comes configured as a “slave” using the same cable as the hard disk drive (this method is known as “daisy chaining”). The other method is a Master, on its own cable to a second IDE controller port.

The CD-ROM, as used in the HP Pavilion, must be configured as a Master. This configuration change is done simply by moving the jumper on the Device Configuration Connectors on the rear of the drive to the far right position, labeled Master.

Removing and Replacing the CD-ROM Drive

1. Before removing the CD-ROM drive, you must first remove the system cover. To remove the cover, refer to Section 2, Part 1.
2. If you haven't already done so, remove all cables from the CD-ROM drive.
3. Remove the 4 screws that secure the Motherboard Access Panel to the chassis and then pivot the panel outward to about a 45 degree angle.
4. Remove the 4 screws that secure the CD-ROM drive to the 5¼" drive cage.
5. Push the CD-ROM forward out of the drive cage and through the front of the chassis.

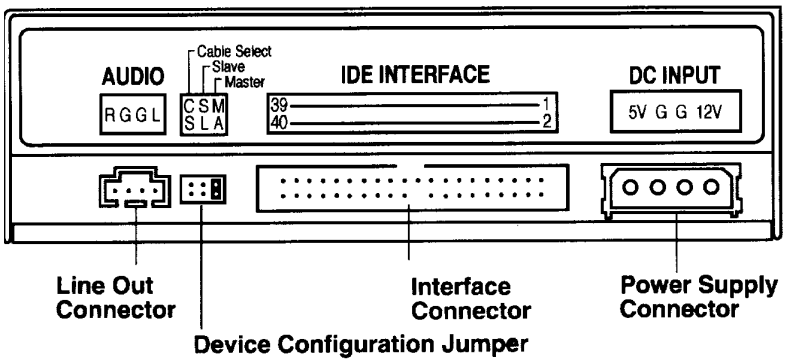

Figure 6-1: Rear view of CD-ROM drive

With the CD-ROM drive removed, make sure to set the Device Configuration Jumper to the Master position. This will allow the computer to boot up from the CD-ROM drive.

Follow the procedure below to replace the CD-ROM drive.

1. Slide the CD-ROM drive, back end first, through the front of the chassis and into the drive cage.
2. Attach the CD-ROM drive to the drive cage using 4 screws but do not tighten them.
3. Position the CD-ROM so that its bezel is properly aligned with the front panel. Then tighten the 4 screws.
4. Connect the Audio cable between the CD-ROM drive and the CD-ROM Audio connector on the motherboard or the modem/sound card.
5. Connect the Interface and Power Supply cables.

Part 2 - CD-ROM Drives for all HP Pavilion 6300 or 6400 Series PCs

This part of Section 6 addresses all of the CD-ROM drives that are found in the HP Pavilion 6300 or 6400 Series PCs.

About the High-Speed CD-ROM Drive

The CD-ROM drives are capable of reading compact discs meeting international standards, such as Photo CD, multi-session, ISO-9660, and XA (eXtended Architecture) discs.

The table below shows the specific CD-ROM drive that comes with each HP Pavilion system and its average data transfer rate, maximum data transfer rate, and average access speed. All drives support 2 channels of audio with a sampling frequency of 44.1 KHz.

System	CD-ROM Rating	Average Data Transfer Rate	Maximum Data Transfer Rate	Average Access Speed
6353 (Walmart)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6356 (North America)	24X Max	1200 Kbytes/sec	3600 Kbytes/sec	120 ms
6357 (North America)	24X Max	1200 Kbytes/sec	3600 Kbytes/sec	120 ms
6403 (AP)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6404 (AP)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6405 (AP)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6407 (AP)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6408 (AP)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6409 (AP)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6460 (North America)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6466 (North America)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms
6470Z (North America)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms

Table 6-2: CD-ROM Drives

This internal CD-ROM drive connects to the system using the standard ATAPI/IDE (Advanced Technology Attachment Packet Interface/Integrated Drive Electronics).

The CD-ROM drive can be configured in one of two ways. From the manufacturer, the drive comes configured as a “slave” using the same cable as the hard disk drive (this method is known as “daisy chaining”). The other method is a Master, on its own cable to a second IDE controller port.

The CD-ROM, as used in the HP Pavilion, must be configured as a Master. This configuration change is done simply by moving the jumper on the Device Configuration Connectors on the rear of the drive to the far right position, labeled Master.

Removing and Replacing the CD-ROM Drive

1. Before removing the CD-ROM drive, you must first remove the left side panel. To remove the side panel, refer to Section 2, Part 2.
2. If you haven't already done so, remove all cables from the CD-ROM drive.
3. Remove the 2 screws that secure the CD-ROM drive to the 5¼" drive cage.
4. Push the CD-ROM forward out of the drive cage and through the front of the chassis.

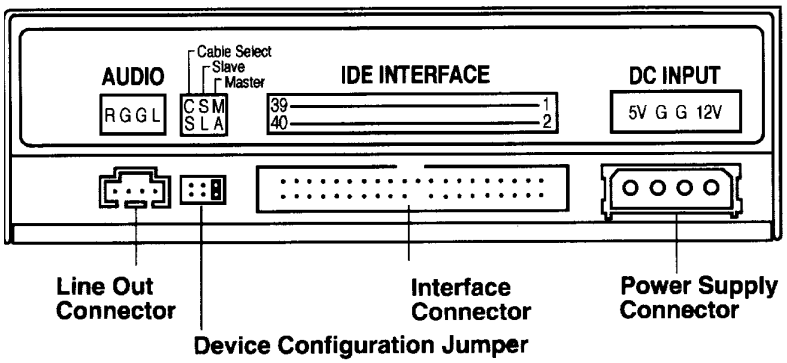

Figure 6-2: Rear view of CD-ROM drive

With the CD-ROM drive removed, make sure to set the Device Configuration Jumper to the Master position. This will allow the computer to boot up from the CD-ROM drive.

Follow the procedure below to replace the CD-ROM drive.

1. Slide the CD-ROM drive, back end first, through the front of the chassis and into the drive cage.
2. Attach the CD-ROM drive to the drive cage using 2 screws but do not tighten them.
3. Position the CD-ROM so that its bezel is properly aligned with the front panel. Then tighten the 2 screws.
4. Connect one end of the audio cable to the audio connector on the CD-ROM drive. Connect the other end of the audio cable to the CD-ROM connector on the motherboard.
5. Connect the Interface and Power Supply cables.

Part 3 - CD-ROM Drives for all HP Pavilion 8400 Series PCs

This part of Section 6 addresses all of the CD-ROM drives that are found in the HP Pavilion 8400 Series PCs.

About the High-Speed CD-ROM Drive

The CD-ROM drives are capable of reading compact discs meeting international standards, such as Photo CD, multi-session, ISO-9660, and XA (eXtended Architecture) discs.

The table below shows the specific CD-ROM drive that comes with each HP Pavilion system and its average data transfer rate, maximum data transfer rate, and average access speed. All drives support 2 channels of audio with a sampling frequency of 44.1 KHz.

System	CD-ROM Rating	Average Data Transfer Rate	Maximum Data Transfer Rate	Average Access Speed
8480Z (North America)	32X Max	1200 Kbytes/sec	4800 Kbytes/sec	120 ms

Table 6-2: CD-ROM Drives

This internal CD-ROM drive connects to the system using the standard ATAPI/IDE (Advanced Technology Attachment Packet Interface/Integrated Drive Electronics).

The CD-ROM drive can be configured in one of two ways. From the manufacturer, the drive comes configured as a "slave" using the same cable as the hard disk drive (this method is known as "daisy chaining"). The other method is a Master, on its own cable to a second IDE controller port.

The CD-ROM, as used in the HP Pavilion, must be configured as a Master. This configuration change is done simply by moving the jumper on the Device Configuration Connectors on the rear of the drive to the far right position, labeled Master.

Removing and Replacing the CD-ROM Drive

1. Before removing the CD-ROM drive, you must first remove the left and right side panels. To remove the panels, refer to Section 2, Part 3.
2. If you haven't already done so, remove all cables from the CD-ROM drive.
3. Remove the 4 screws that secure the CD-ROM drive to the 5¼" drive cage.
4. Push the CD-ROM forward out of the drive cage and through the front of the chassis.

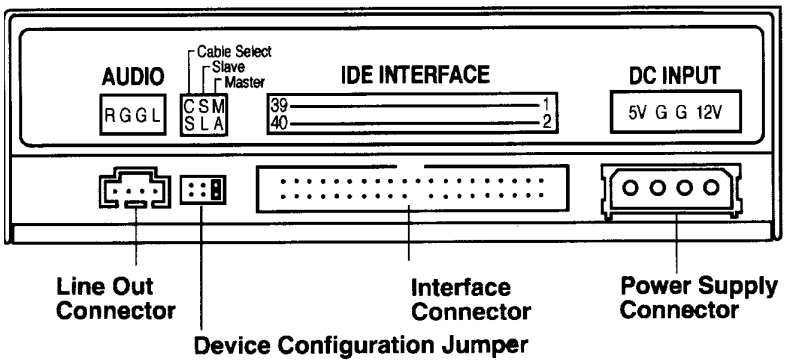

Figure 6-3: Rear view of CD-ROM drive

With the CD-ROM drive removed, make sure to set the Device Configuration Jumper to the Master position. This will allow the computer to boot up from the CD-ROM drive.

Follow the procedure below to replace the CD-ROM drive.

1. Slide the CD-ROM drive, back end first, through the front of the chassis and into the drive cage.
2. Attach the CD-ROM drive to the drive cage using 4 screws but do not tighten them.
3. Position the CD-ROM so that its bezel is properly aligned with the front panel. Then tighten the 4 screws.
4. Connect one end of the audio cable to the audio connector on the CD-ROM drive. Connect the other end of the audio cable to the "TO CD-ROM" connector on the sound adapter.
5. Connect the Interface and Power Supply cables.

Part 1 - DVD Drive for the HP Pavilion 6400 Series PCs

This section addresses the DVD drive that is found in the HP Pavilion 6405 (Europe) and 6418 PCs.

About the DVD Drive

The Hitachi DVD-ROM Drive is a 5¼" half-height drive that is capable of reading CD-ROM that meet international standards (i.e., Photo CD, multi-session, ISO-9660, and XA (eXtended Architecture) discs), CD-R, CD-Audio, and DVD-ROMs.

CD-ROMs have a storage capacity of 650 Mbytes (Mode-1) or 742 Mbytes (Mode-2) while a single layer DVD-ROM can store approximately 4.7 Gbytes per side and a dual layer DVD-ROM can store approximately 8.5 Gbytes per side.

The drive has a high data transfer rate, with a maximum rate of 16.6 Mbytes/sec, and uses a large buffer memory (512 Kbytes) for look ahead cache. For DVD-ROMs, the average access time is 210 ms and for CD-ROMs the average is 130 ms.

This internal DVD-ROM Drive connects to the system using the standard ATAPI/IDE (Advanced Technology Attachment Packet Interface/Integrated Drive Electronics). The drive has 3 ways in which to eject a disk: Software, OPEN/CLOSE button, Emergency eject.

The DVD-ROM drive can be configured in one of two ways. From the manufacturer, the drive comes configured as a "master" on its own cable to a second IDE controller port. The other method is a Slave, using the same cable as the hard disk drive (this method is known as "daisy chaining").

The DVD-ROM, as used in the HP Pavilion, must be configured as a Master. If a replacement drive is configured as Slave, it must be changed for Master operation. The configuration change is done simply by moving the jumper on the Device Configuration Jumper on the rear of the drive to the far right position, labeled Master.

Removing and Replacing the DVD drive

1. Before removing the DVD drive, you must first remove the left side panel. To remove the panel, refer to Section 2, Part 2.
2. If you haven't already done so, remove all cables from the DVD drive.
3. Remove the 2 screws that secure the DVD drive to the 5¼" drive cage.
4. Push the DVD drive forward out of the drive cage and through the front of the chassis.

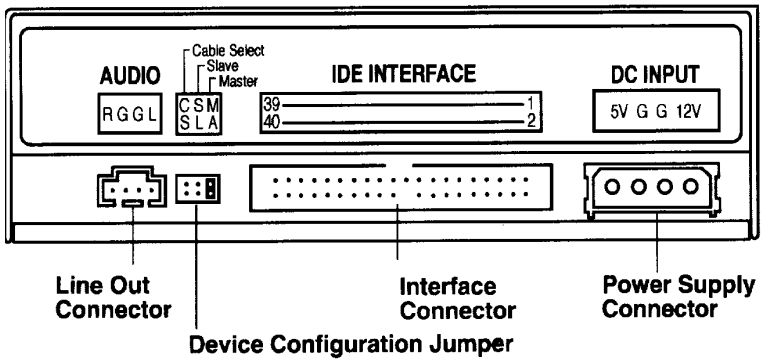

Figure 7-1: Rear view of DVD drive

With the DVD drive removed, make sure to set the Device Configuration Jumper to the Master position. This will allow the computer to boot up from the DVD drive.

Follow the procedure below to replace the DVD drive.

1. Slide the DVD drive, back end first, through the front of the chassis and into the drive cage.
2. Attach the DVD drive to the drive cage using 2 screws but do not tighten them.
3. Position the DVD drive so that its bezel is properly aligned with the front panel. Then tighten the 2 screws.
4. Connect the Audio cable between the DVD drive and DVD Audio connector on the sound adapter card.
5. Connect the Interface and Power Supply cables.

Part 2 - DVD Drive for the HP Pavilion 8400 Series PCs

This section addresses the DVD drive that is found in the HP Pavilion 8418 PC.

About the DVD Drive

The Hitachi DVD-ROM Drive is a 5¼" half-height drive that is capable of reading CD-ROM that meet international standards (i.e., Photo CD, multi-session, ISO-9660, and XA (eXtended Architecture) discs), CD-R, CD-Audio, and DVD-ROMs.

CD-ROMs have a storage capacity of 650 Mbytes (Mode-1) or 742 Mbytes (Mode-2) while a single layer DVD-ROM can store approximately 4.7 Gbytes per side and a dual layer DVD-ROM can store approximately 8.5 Gbytes per side.

The drive has a high data transfer rate, with a maximum rate of 16.6 Mbytes/sec, and uses a large buffer memory (512 Kbytes) for look ahead cache. For DVD-ROMs, the average access time is 210 ms and for CD-ROMs the average is 130 ms.

This internal DVD-ROM Drive connects to the system using the standard ATAPI/IDE (Advanced Technology Attachment Packet Interface/Integrated Drive Electronics). The drive has 3 ways in which to eject a disk: Software, OPEN/CLOSE button, Emergency eject.

The DVD-ROM drive can be configured in one of two ways. From the manufacturer, the drive comes configured as a "master" on its own cable to a second IDE controller port. The other method is a Slave, using the same cable as the hard disk drive (this method is known as "daisy chaining").

The DVD-ROM, as used in the HP Pavilion, must be configured as a Master. If a replacement drive is configured as Slave, it must be changed for Master operation. The configuration change is done simply by moving the jumper on the Device Configuration Jumper on the rear of the drive to the far right position, labeled Master.

Removing and Replacing the DVD drive

1. Before removing the DVD drive, you must first remove the left and right side panels. To remove the panels, refer to Section 2, Part 3.
2. If you haven't already done so, remove all cables from the DVD drive.
3. Remove the 4 screws that secure the DVD drive to the 5¼" drive cage.
4. Push the DVD drive forward out of the drive cage and through the front of the chassis.

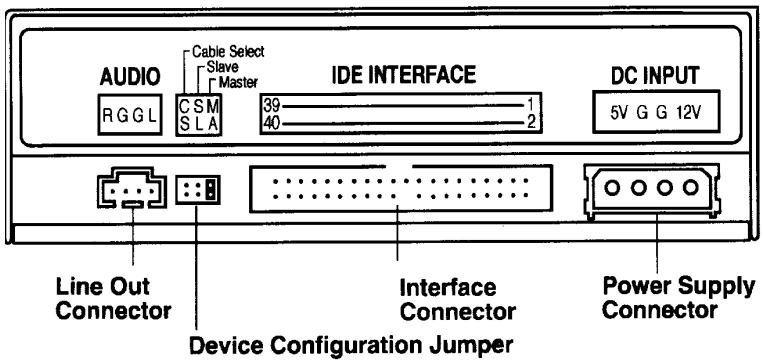

Figure 7-2: Rear view of DVD drive

With the DVD drive removed, make sure to set the Device Configuration Jumper to the Master position. This will allow the computer to boot up from the DVD drive.

Follow the procedure below to replace the DVD drive.

1. Slide the DVD drive, back end first, through the front of the chassis and into the drive cage.
2. Attach the DVD drive to the drive cage using 4 screws but do not tighten them.
3. Position the DVD drive so that its bezel is properly aligned with the front panel. Then tighten the 4 screws.
4. Connect the Audio cable between the DVD drive and DVD Audio connector on the sound adapter card.
5. Connect the Interface and Power Supply cables.

Section 8 - 3½" Floppy Disk Drive

Part 1 - For all HP Pavilion 4400 Series PCs

Removing and Replacing the Floppy Disk Drive

The 3½" floppy drive resides in a bracket which connects tot he front of the chassis, below the 3½" expansion drive bay.

To remove the 3½" floppy drive, follow the procedure below:

1. Remove the system cover as described in Section 2, Part 1.
2. Remove the data and power connectors from the floppy drive.
3. Remove the one screw that secures the floppy drive bracket to the chassis.
4. Squeeze on the restraining clip located on the bracket to release the bracket from the chassis
5. While squeezing the clip, pull the bracket out the back of the unit.
6. To remove the floppy drive from the bracket, remove the 4 screws that secure the drive in place.
7. Slide the drive free of the bracket.

Follow the procedure below to replace the 3½" floppy drive.

1. Slide the floppy drive into the drive bracket and secure it in place with 4 screws.
2. The top of the bracket has four metal tongues which connect to slots on the bottom of the drive cage. Guide the metal tongues into the corresponding slots on the drive cage.
3. Slide the bracket into position, making sure that the eject button clears the hole in the front panel. Press the bracket firmly into place until you hear the restraining clip snap into place.
4. Secure the bracket to the chassis with 1 screws.
5. Connect the data and power cables to the floppy drive.

Part 2 - For all HP Pavilion 6300 and 6400 Series PCs

Removing and Replacing the Floppy Disk Drive

The 3½" floppy drive is mounting in the 3½" drive bay directly below the 5¼" drive bay.

To remove the 3½" floppy drive, follow the procedure below:

1. Before removing the floppy drive, you must first remove the rear and left side panels. Refer to Section 2, Part 2 for the procedure on removing these panels.
2. If you haven't already done so, remove all cables from the floppy drive.
3. Remove the 2 screws that secure the floppy drive to the 3½" drive bay.
4. From the front, push the floppy drive into the chassis and out of the drive bay.

Reverse the above procedure to replace the 3½" floppy drive.

Part 3 - For all HP Pavilion 8400 Series PCs

Removing and Replacing the Floppy Disk Drive

The 3½" floppy drive is mounting in the 3½" drive bay directly below the 5¼" drive bay.

To remove the 3½" floppy drive, follow the procedure below:

1. Before removing the floppy drive, you must first remove the rear and left side panels. Refer to Section 2, Part 3 for the procedure on removing these panels.
2. If you haven't already done so, remove all cables from the floppy drive.
3. Remove the 4 screws that secure the floppy drive to the 3½" drive bay.
4. From the front, push the floppy drive into the chassis and out of the drive bay.

Reverse the above procedure to replace the 3½" floppy drive.

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Part 1 - Hard Disk Drives in all HP Pavilion 4400 PCs

Drives Shipped with Systems

There are many different drives that are used throughout the HP Pavilion 4400 family PCs. Table 9-1 lists the system and standard disk drive that the system is shipped with.

System	Drive Storage Capacity
HP Pavilion 4402	2.1 Gbytes
HP Pavilion 4404	3.2 Gbytes
HP Pavilion 4405	3.2 Gbytes
HP Pavilion 4406	3.2 Gbytes
HP Pavilion 4407	3.2 Gbytes
HP Pavilion 4408	4.3 Gbytes
HP Pavilion 4409	4.3 Gbytes
HP Pavilion 4410	4.3 Gbytes
HP Pavilion 4431	3.2 Gbytes
HP Pavilion 4440 (Europe)	6.4 Gbytes
HP Pavilion 4440 (North America)	4.3 Gbytes
HP Pavilion 4443	3.2 Gbytes
HP Pavilion 4450	6.4 Gbytes
HP Pavilion 4451	6.4 Gbytes
HP Pavilion 4456	5.1 Gbytes

Table 9-1: Disk Drive Storage

Removing and Replacing the Hard Disk Drive

The drive is mounted on a bracket inside the chassis, near the front panel. To remove the drive, follow the procedure below:

1. Remove the power cable, tab and remove all other cables from the back of the system, and remove the system cover.
2. If you haven't already done so, remove all cables from the hard disk drive.
3. Remove the 2 screws that secure the disk drive bracket.
4. The bottom of the bracket has 4 metal tongues which fit into slots on the front of the chassis. Pull the bracket towards the open side of the chassis to free the tabs.
5. Lift the disk drive and the bracket up and out of the chassis.
6. The drive is mounted to the bracket with 4 screws. Remove the screws to remove the drive from the bracket.

To replace the hard disk drive, reverse the procedure above.

Part 2 - Hard Disk Drives in all HP Pavilion 6300 and 6400 Series PCs

Drives Shipped with Systems

There are many different drives that are used throughout the HP Pavilion 6300 and 6400 family PCs. Table 8-2 lists the system and standard disk drive that the system is shipped with.

System	Drive Storage Capacity
HP Pavilion 6353	6.4 Gbytes
HP Pavilion 6356	4.3 Gbytes
HP Pavilion 6357	6.4 Gbytes
HP Pavilion 6403	4.3 Gbytes
HP Pavilion 6404	6.4 Gbytes
HP Pavilion 6405 (AP)	6.4 Gbytes
HP Pavilion 6405 (Europe)	4.3 Gbytes
HP Pavilion 6407	4.3 Gbytes
HP Pavilion 6408	6.4 Gbytes
HP Pavilion 6409	6.4 Gbytes
HP Pavilion 6418	6.4 Gbytes
HP Pavilion 6460	9.6 Gbytes
HP Pavilion 6466	12.7 Gbytes
HP Pavilion 6470Z	12.7 Gbytes

Table 9-2: Disk Drive Storage

Removing and Replacing the Hard Disk Drive

The drive is a 5¼ inch drive which is mounted in the drive cage. Follow the procedures below to remove the drive:

1. Before the hard drive can be removed, remove the left side panel. See Section 2 Part 2 for removal information.
2. If you haven't already done so, remove all cables from the hard disk drive, CD-ROM or DVD Drive, and the floppy disk drive.
3. Remove the drive cage from the system chassis. See Section 2 Part 2 for removal information.
4. Remove the 4 screws that secure the disk drive to the drive cage.
5. Slide the disk drive out of the drive cage.

To replace the hard disk drive, reverse the procedure above.

Part 3 - Hard Disk Drives in all HP Pavilion 8400 Series PCs

Drives Shipped with Systems

There are many different drives that are used throughout the HP Pavilion 8400 family PCs. Table 8-3 lists the system and standard disk drive that the system is shipped with.

System	Drive Storage Capacity
HP Pavilion 8418	9.6 Gbytes
HP Pavilion 8480Z	12.7 Gbytes

Table 9-3: Disk Drive Storage

Removing and Replacing the Hard Disk Drive

The drive is a 5¼ inch drive which is mounted in the bottom of the 5¼ inch drive bay. Follow the procedures below to remove the drive:

1. Before the hard drive can be removed, the back panel, both side panels, and the front panel must be removed. See Section 2 Part 3 for removal information.
2. If you haven't already done so, remove all cables from the hard disk drive.
3. Remove the 4 screws (2 on each side) that secure the drive to the drive bay.
4. Slide the drive out the front of the chassis.

To replace the hard disk drive, reverse the procedure above.

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V.90 56 Kbps Audio/Fax/Modem

About the 56 Kbps Audio/Fax/Modem

All of the HP Pavilion Series PCs covered in this handbook come with a V.90 56 Kbps modem. There are 2 different modems used, however both are V.90 56Kbps modems.

For the HP Pavilion PCs, the Audio/Fax/Modem card and the Sound Amplification Card work together to provide a total communication solution. These cards support for 16-bit stereo sound, a telephone management device, and a high-speed modem to transform your computer into a complete desktop communications and multimedia center. This modem provides the following key functions:

- **Fax Communication:** Conveniently send and receive faxes right from the computer at speeds of up to 14,400 bps.
- **Data Communication:** Connect at high speeds of up to 56,000 bps to Internet, On-line services, BBSs, and other PCs or networks for telecomputing tasks.

The Audio/Fax/Modem card is fully Hayes compatible running at speeds up to 56 Kbps (maximum data rate for a fax is 14,400) for Class 1 fax and modem data transmission/reception. The Audio/Fax/Modem card is Plug and Play compatible. There are no jumpers or switches to set on the board. Under Windows '98, the card is configured for COM2, 3 or 4 using IRQ3.

Technical Specifications:

- V.90 (56,000 bps)
- V.32bis (14,400 bps)
- V23 (4,800 bps)
- V.22 (1,200 bps)
- Bell 103 (300 bps)
- V.29 (9,600 bps FAX)
- V.21 (300 bps FAX Channel-2)
- V.42 (error correction)
- MNP 2-4 (error correction)
- V.80 Video Ready Interface
- V.34 (28,800 bps and 33,600 bps)
- V.32 (9,600 bps)
- V.22bis (2,400 bps)
- Bell 212A (1,200 bps)
- V.17 (14,400 bps FAX)
- V.27ter (4,800 bps FAX)
- V.42bis (data compression)
- MNP 5 (data compression)
- Digital Simultaneous Voice and Data (DSVD) supporting ITU-T V.70 and Intel DSVD 1.2

Control and Operation

The modem supports the following control and operation functions:

- Auto-dial and Auto-answer operations
- Automatic Fall-forward/Fall-back
- Automatic feature negotiation
- Automatic speed buffering
- automatic speed negotiation
- Call progress monitoring
- Class 1 and Class 2 FAX command sets
- Digital and analog loopback tests
- Extended AT command set
- Hardware or software flow control
- Non-volatile memory (stores 2 modem configurations and 4 phone numbers)
- Software adjustable speaker volume
- 115,200 bps DTE speed support
- Plug and Play compatible

Remove and Replace the Audio/Fax/Modem card from HP Pavilion 4400 Series PCs

The Audio/Fax/Modem card is connected to the Audio riser card. Follow the procedure below to remove the Audio/Fax/Modem card.

1. Remove the system cover as described in Section 2, Part 1.
2. Remove the connectors to the CD-ROM audio connector and the Audio riser card.
3. Remove the screw that attaches the guide rail of the card to the chassis.
4. Gently rock the card back and forth to loosen it and pull on its edges to release it from the riser card.
5. Place the card in an anti-static bag or on an anti-static work pad.

To replace the Audio/Fax/Modem card, reverse the above procedure.

Remove and Replace the Audio/Fax/Modem card from HP Pavilion 6300 and 6400 Series PCs

The Audio/Fax/Modem card is connected ISA slot on the motherboard. Follow the procedure below to remove the Audio/Fax/Modem card.

1. Remove the left side panel from the system.
2. Remove the connectors to the CD-ROM audio connector and the Audio riser card.
3. Remove the screw that secures the modem card to the chassis.
4. Gently rock the card back and forth to loosen it and pull on its edges to release it from the riser card.
5. Place the card in an anti-static bag or on an anti-static work pad.

To replace the Audio/Fax/Modem card, reverse the above procedure.

Remove and Replace the Audio/Fax/Modem card from HP Pavilion 8400 Series PCs

The Audio/Fax/Modem card is connected ISA slot on the motherboard. Follow the procedure below to remove the Audio/Fax/Modem card.

NOTE
To remove any expansion card in an HP Pavilion 8400 Series system, you must first remove the expansion slot retainer plate from the system. This plate is secured to the system with 2 screws.

1. Remove the left side cover as described in Section 2, Part 3.
2. Remove the connectors to the CD-ROM audio connector and the Audio riser card.
3. If you haven't already done so, remove the expansion slot retainer plate.
4. Gently rock the card back and forth to loosen it and pull on its edges to release it from the riser card.
5. Place the card in an anti-static bag or on an anti-static work pad.

To replace the Audio/Fax/Modem Sound card, reverse the above procedure.

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Section 11 - Sound Amplification Adapters

Part 1 - Audio Riser Card with Audio/Fax/Modem card in the HP Pavilion PCs

About the Audio Riser Card in the HP Pavilion PCs

Almost all HP Pavilion PCs covered in this book use an Audio riser card that is connected to the Riptide Audio/Fax/Modem card. Audio signals from the CD-ROM and other sources are routed through the modem card to the Audio riser card which has jacks for a microphone and audio line in and line out.

Removing and Replacing the Audio Riser Card in an HP Pavilion 4400 Series PC

The Audio riser card is mounted in a cut-out on the back of the chassis above the power supply. To remove the Audio riser card, follow the procedure below.

1. Remove the system cover as described in Section 2, Part 1.
2. Remove the cable connector to the audio/fax/modem card.
3. Remove the 2 screws that secure the Audio riser card to the chassis.
4. Pull the card out of the cut-out and place the card in an anti-static bag or on an anti-static work pad.

To replace the card, reverse the above procedure.

Removing and Replacing the Audio Riser Card in an HP Pavilion 6400 Series PCs

The Audio riser card is mounted in a cut-out on the back of the chassis. To remove the Audio riser card, follow the procedure below.

1. Remove the left side cover as described in Section 2, Part 2.
2. Remove the cable connector to the audio/fax/modem card.
3. Remove the 2 screws that secure the Audio riser card to the chassis.
4. Pull the card out of the cut-out and place the card in an anti-static bag or on an anti-static work pad.

To replace the card, reverse the above procedure.

Removing and Replacing the Audio Riser Card in an HP Pavilion 8400 series PCs

The Audio riser card is mounted in a cut-out on the back of the chassis. To remove the Audio riser card, follow the procedure below.

1. Remove the left side cover as described in Section 2, Part 3.
2. Remove the cable connector to the audio/fax/modem card.
3. Remove the 2 screws that secure the Audio riser card to the chassis.
4. Pull the card out of the cut-out and place the card in an anti-static bag or on an anti-static work pad.

To replace the card, reverse the above procedure.

Part 2 – Ensoniq PCI Sound Card

About the Ensoniq PCI Sound Card in the HP Pavilion PCs

Some HP Pavilion PCs may feature an Ensoniq PCI sound card and a Fax/Modem card. The Ensoniq PCI sound card contains jacks for joystick, headphones, speaker, and the audio feature connector. The audio feature connector contains additional jacks for microphone and audio line in and audio line out.

Removing and Replacing the Ensoniq PCI Sound Card in HP Pavilion 4400 series PCs

The Ensoniq PCI sound card is mounted in an expansion slot on the motherboard. To remove the sound card, follow the procedure below.

1. Remove the system cover as described in Section 2, Part 1.
2. Remove the connectors to the power supply, CD-ROM audio and the Fax/Modem card.
3. Remove the screw that secures the card to the chassis.
4. Pull on the edges of the card to release it from the expansion slot and then pull the card out of the chassis. Place the card in an anti-static bag or on an anti-static work pad.

To replace the card, reverse the above procedure.

Removing and Replacing the Ensoniq PCI Sound Card in HP Pavilion 6300 or 6400 series PCs

The Ensoniq PCI sound card is mounted in an expansion slot on the motherboard. To remove the sound card, follow the procedure below.

1. Remove the left side cover as described in Section 2, Part 2.
2. Remove the connectors to the power supply, CD-ROM audio and the Fax/Modem card.
3. Remove the screw that secures the card to the chassis.
4. Pull on the edges of the card to release it from the expansion slot and then pull the card out of the chassis. Place the card in an anti-static bag or on an anti-static work pad.

To replace the card, reverse the above procedure.

Removing and Replacing the Ensoniq PCI Sound Card in the HP Pavilion 8400 Series PCs

The Ensoniq PCI sound card is mounted in an expansion slot on the motherboard. To remove the sound card, follow the procedure below.

NOTE
To remove any expansion card in an HP Pavilion 8400 Series system, you must first remove the expansion slot retainer plate from the system. This plate is secured to the system with 2 screws.

1. Remove the left side panel as described in Section 2, Part 3.
2. Remove the connectors to the power supply, CD-ROM audio and the Fax/Modem card.
3. Remove the screw that secures the card to the chassis.
4. Pull on the edges of the card to release it from the expansion slot and then pull the card out of the chassis. Place the card in an anti-static bag or on an anti-static work pad.

To replace the Audio Adapter, reverse the above procedure.

Section 12 - Special Feature Assemblies

Part 1- Multimedia Keyboards

Introduction

The HP Pavilion systems covered in this handbook come with either a 3-button multimedia keyboard or a one-touch enhanced multimedia keyboard.

The One-Touch Multimedia Keyboard

The one-touch multimedia keyboard has several special keys to give the user quick access to some of the most common PC tasks. By pressing a single key, the user can check for telephone messages or retrieve faxes that have been received, connect to the Internet, or launch a favorite application.

The following list describes each of the special keys:

Application Keys

INTERNET accesses your Internet service provider or on-line service.

SHORTCUT 1, 2 and 3 launch specific application, specified by the user.

The INTERNET and SHORTCUT keys are user-configurable. To configure these keys, see the Configure Buttons section below.

SUSPEND is the equivalent of the Suspend option in the Windows '98 Start Menu.

INFORMATION launches the HP Pavilion Support Center where you can view on-line documentation, get answers to common questions, and more.

CD Player Keys

The CD Player keys perform the standard functions of a normal CD player, but control the CD Player software in the HP Pavilion while playing a music CD in the CD-ROM drive. The buttons perform, Previous Track, Play/Pause, Stop, and Next Track.

Sound Controls

MUTE turns off all the sound by muting the Master Volume Control from the Windows '98 Sound System Mixer.

VOLUME knob will turn the volume up and down. More precisely, these keys increase or decrease the volume in the Windows '98 Sound System Mixer.

If you decide for any reason to replace the Multimedia Keyboard with a standard keyboard, you may do so without having to reconfigure the system.

Configuring the Buttons

The SHORTCUT and INTERNET buttons can be configured to launch an application of your choice. Note: The first time one of these buttons is pressed, you are automatically given the opportunity to configure the key. Thereafter, you can reconfigure the button

by clicking on the Keyboard Manager icon on the task bar, and then selecting the button you want to configure.

To configure buttons

1. In the Button Label box, type the name of the application that the button will launch. This label will appear onscreen each time the button is pressed.
2. From the list of pre-installed applications, select the application to be associated with the button.

   Or

   If the desired application is not on the list, select Attach Other Application to Button and then click the Browse button to select any .EXE file on the computer
3. Click on OK.
4. If necessary, close the keyboard picture window.

NOTE
The new button assignment takes effect immediately, but is not permanently saved until you issue the Shut Down command and answer Yes to the prompt “Save Keymaps?”

NOTE
The Disable Button option disables the button so that nothing happens when you press the key on the keyboard.

Part 2 – Digital Camera Port

Introduction

The HP Pavilion 6470Z and HP Pavilion 8480Z PCs come with a Digital Camera Port on the front panel. This port is nothing more than a standard serial connector configured as COM2 with a cable connected to the COM2 connector on the motherboard.

Removing and Replacing the Digital Camera Port from the HP Pavilion 6470Z

To remove the Digital Camera Port from the HP Pavilion 6470Z, follow the procedure below:

1. Remove the left and right side panels as described in Section 2, Part 2.
2. Remove the Digital Camera Port cable from the motherboard.
3. Remove the 4 screws that secure the Digital Camera Port to the chassis.
4. Pull the Digital Camera Port out the front of the system, making sure the cable does not catch on anything.

To replace the Digital Camera Port, reverse the above procedure.

Removing and Replacing the Digital Camera Port from the HP Pavilion 8480Z

To remove the Digital Camera Port from the HP Pavilion 8480Z, follow the procedure below:

1. Remove the left and right side panels as described in Section 2, Part 3.
2. Remove the auxillary fan scoop, so you can gain access to the motherboard.
3. Remove the Digital Camera Port cable from the motherboard.
4. Remove the 4 screws that secure the Digital Camera Port to the chassis.
5. Pull the Digital Camera Port out the front of the system, making sure the cable does not catch on anything.

To replace the Digital Camera Port, reverse the above procedure.

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Section 13 - Internal Iomega Zip Drive

About the Internal Iomega Zip Drive

The Iomega Zip 100 -ATA drive is a 3.5 inch form factor, high capacity, high performance, direct access storage device. The drive uses Iomega Zip Cartridges which are removable and have a capacity of 100 Mbytes.

Removing and Replacing the Zip Drive

Removing and Replacing the Zip Drive from an HP Pavilion 6400 Series PC.

Follow the procedure below to remove the Zip Drive from the HP Pavilion 6400 Series PC.

1. Remove the left side panel of the system as described in Section 2, Part 2.
2. Remove the data cable that runs to the motherboard. Note that this cable is part of a daisy chain cable that also attaches to the CD-ROM. Then remove the power cable.
3. Partially remove the Drive Cage as described in Section 2, Part 2.
4. Remove the 2 screws that secure the Zip Drive to the drive cage.
5. Slide the Zip Drive out the front of the drive cage.

To replace the Zip Drive, reverse the procedure above.

Removing and Replacing the Zip Drive from an HP Pavilion 8400 Series PC.

Follow the procedure below to remove the Zip Drive from the HP Pavilion 8400 Series PC.

1. Remove the left and right side panels of the system as described in Section 2, Part 3.
2. Remove the data cable that runs to the motherboard. Note that this cable is part of a daisy chain cable that also attaches to the CD-ROM. Then remove the power cable.
3. Remove the 4 screws that secure the Zip Drive the chassis.
4. Slide the Zip Drive out the front of the system.

To replace the Zip Drive, reverse the procedure above.

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Part 1 - BIOS Setup Settings for the HP Pavilion 4402, 4404, 4405, 4408, 4410, 4431, 4440, 4443, 6353, 6356, and 6357 PCs

Introduction

This section tells how to use the Setup program that is built into the system BIOS. The Setup program makes it possible to change and store system configuration information such as the types of peripherals that are installed, the boot-up sequence for the system, and enabling or disabling the power management support. The Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery when power to the system is off.

If you want to go into the Setup program, press the F1 key after the Hewlett-Packard logo screen appears but before the system begins to start Windows '98. Once the power button has been pressed, you have about five seconds to press F1 to enter Setup before the boot process continues.

NOTE
The information stored by the Setup program is essential. It should not be changed arbitrarily.

NOTE
If you repeatedly receive Run Setup error messages, check the computer's internal battery. If the battery is dead or not properly connected, the system cannot retain configuration values in CMOS RAM.

Entering Setup

Press the F1 key just after you have turned on power to the PC to enter Setup. You do not need to insert a diskette or load an operating system.

Basic System Configuration

Select Basic System Configuration to input configuration values such as date, time and disk type. The settings displayed here are those of the HP Pavilion 4440 (North America version). The other system's setting categories are identical except for some system specific items that are detected and set by the system (e.g., Primary IDE Master, Extended Memory, etc.)

The screen below shows the Basic System Configuration Setup menu.

Main	Advanced	Power	Boot	Exit
System Time		10:40:30		
System Date		12/11/1998		
Language		English (US)		
Legacy Diskette A		1.44 Mb 3½"		
Legacy Diskette B		Disabled		
Primary Master		ST34323A-(PM) †		
Primary Slave		None †		
Secondary Master		CD-532E-B-(SM) †		
Secondary Slave		None †		
System Memory		640 KB †		
Installed Memory		64 MB †		
Memory Bank 0		32 MB SDRAM †		
Memory Bank 1		32 MB SDRAM †		
Core Version		4.06 †		
BIOS Version 4.06		1.02 12/06/98 †		

Figure 14-1: Setup Main Menu Screen
(† = system auto detects this field, not changeable)

About the Setup Menu Screen

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Select a menu screen by pressing the left or right arrow keys. Use the up or down arrow keys to select items on the screen. Use the Enter key to select an item for modification. For certain items, pressing Enter will bring up a submenu. After you have selected a menu item, use the arrow keys to modify the settings. Press the Esc key to move back a screen.

Setup Menus	Description
Main	Use this menu for basic system configuration
Advanced	Use this menu to set the Advanced Features available on the system's chipset.
Power	Use this menu to configure Power Management features.
Boot	Use this menu to determine the system's startup sequence.
Exit	Use this menu to save or discard changes made in the current session, or to load the system defaults

Table 14-1: Understanding the BIOS Setup Menu Screens for the HP Pavilion

Main Menu Settings

The following tables show the default values for the Main screen menu and its submenus.

Main Menu	Settings (* denotes default)
System Time	HH:MM:SS
System Date	MM/DD/YYYY
Legacy Diskette A	Disabled 360 Kb 5¼" 1.2 Mb 5¼" 720 Kb 3½" 1.44 Mb 3½" (default) 2.88 Mb 3½"
Legacy Diskette B	Disabled (default) 360 Kb 5¼" 1.2 Mb 5¼" 720 Kb 3½" 1.44 Mb 3½" 2.88 Mb 3½"
Primary Master	ST34323A-(PM) (this is a submenu)
Primary Slave	None (this is a submenu)
Secondary Master	CD-532E-B-(SM) (this is a submenu)
Secondary Slave	None (this is a submenu)
Installed Memory	64 MB (set by the computer) †
Memory Bank 0	32 MB SDRAM (set by the computer) †
Memory Bank 1	32 MB SDRAM (set by the computer) †
Core Version	4.06 (set by the computer) †
BIOS Version	1.03 12/06/98 (set by the computer) †

Table 14-2: Understanding the BIOS Setup Menu

Hard Disk Configuration

The submenu below is for the Primary Master device. The menu is the same for the other three devices.

Primary Master Submenu	Settings (* denotes default)	
Type	Auto *	IDE Removable
	None	ATAPI Removable
	CD-ROM	User
Cylinders	8912 (determined by auto configure)	
Heads	15 (determined by auto configure)	
Sectors	63 (determined by auto configure)	

Table 14-3: Primary Master Submenu Settings (continued on next page)

Primary Master Submenu	Settings (* denotes default)
Maximum Capacity	4312 MB (determined by auto configure)
Multi-Sector Transfers	16 Sectors (determined by auto configure)
LBA Mode Control	Enabled (determined by auto configure)
32 Bit I/O	Disabled Enabled *
Transfer Mode	Fast PIO 4 (determined by auto configure)
Ultra DMA Mode	Mode 2 (determined by auto configure)

Table 14-3: Primary Master Submenu Settings (continued)

Advanced Menu Settings

This section describes the Setup options found on the Advanced menu screen. If you select certain options from the Advanced screen, the Setup program will switch to a subscreen for the selected option.

Advanced Menu	Default Setting		
CPU Type	AMD-K6-2 (set by the computer)		
CPU Speed	333 MHz (set by the computer)		
Cache RAM	512 KB (set by the computer)		
Installed O/S	Win98/WinNT5.0		
Reset Configuration Data	No *	Yes	
PCI Configuration	Press Enter		
PS/2 Mouse	Disabled	Enabled	Auto Detect *
I/O Device Configuration	Press Enter		
Large Disk Access Mode	Other	DOS *	
Local Bus IDE Adapter	Disabled Secondary	Primary Both *	
VGA Ram Size	2.0M	4.0M *	

Table 14-4: Advanced Menu Default Settings

PCI Configuration Submenu

PCI Configuration Submenu	Settings (* denote default)
PCI Device, Slot #1	Press Enter
PCI Device, Slot #2	Press Enter

Table 14-5: PCI Configuration Submenu Settings

PCI Device, Slot #1 or Slot #2

PCI Device Slot #1 Submenu	Settings (* denote default)	
Option Rom Scan	Enabled	Disabled *
Enable Master	Disabled *	Enabled
Latency Timer	Default 0020h 0040h * 0060h	0080h 00A0h 00C0h 00E0h

Table 14-6: PCI Device Slot Submenu Settings (Note: All 3 Slots show the same settings)

I/O Device Configuration Submenu

Peripheral Configuration Submenu	Settings (* denote default)	
Serial port A	Disabled Enabled *	Auto OS Controlled
Base I/O Address	3F8 * 2F8	3E8 2E8
Interrupt	IRQ3	IRQ4 *
Parallel port	Disabled Enabled *	Auto OS Controlled
Mode	Output only Bi-directional *	EPP ECP
Base I/O Address	378 * 3BC	278
Interrupt	IRQ5	IRQ7 *
Floppy disk controller	Disabled	Enabled *
Base I/O address	Primary *	Secondary
Floppy Drive Swap	Disabled *	Enabled

Table 14-7: Peripheral Configuration Submenu Settings

Power Configuration Menu

Power Configuration Submenu	Settings (* denote default)	
Power Savings	Disabled Customized *	Maximum Power Savings Maximum Performance
Auto Suspend Timeout	Off * 5 minutes 10 minutes 15 minutes	20 minutes 30 minutes 40 minutes 60 minutes

Table 14-8: Power Configuration Menu Settings (continued on the next page)

Power Configuration Submenu	Settings (* denote default)	
Hard Disk Timeout	Disabled *	2 minutes
	10 seconds	4 minutes
	15 seconds	6 minutes
	30 seconds	8 minutes
	45 seconds	10 minutes
	1 minute	15 minutes
Resume On Time	Off *	On
Resume Time	[00:00:00]	

Table 14-8: Power Configuration Menu Settings (continued)

Boot Configuration Menu

Boot Configuration Submenu	Settings (* denote default)	
Removable Devices	To change the start up order, highlight a device and use the + or - key on the numeric keypad to move it to the desired location.	
ATAPI CD-ROM Drive		
Hard Drive		
Network Boot		
Hard Drive	Press Enter to view, but not changeable	
Removable Devices	Press Enter to view, but not changeable	
Boot-time Diagnostic Screen	Disabled *	Enabled
QuickBoot Mode	Disabled	Enabled *

Table 14-9: Boot Configuration Menu Settings

Exit Menu

Exit Menu	Selections
Exit Saving Changes	Press Enter
Exit Discarding Changes	Press Enter
Load Setup Defaults	Press Enter
Discard Changes	Press Enter
Save Changes	Press Enter

Table 14-10: Exit Menu

Part 2 - BIOS Setup Settings for HP Pavilion 6403, 6404, 6405, 6407, 6408, 6409, 6418, 6460, 6466, 6470Z, 8418, and the 8480Z PCs

Introduction

This section tells how to use the Setup program that is built into the system BIOS. The Setup program makes it possible to change and store system configuration information such as the types of peripherals that are installed, the boot-up sequence for the system, and enabling or disabling the power management support. The Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery when power to the system is off.

If you want to go into the Setup program, press the F1 key after the Hewlett-Packard logo screen appears but before the system begins to start Windows '98. Once the power button has been pressed, you have about five seconds to press F1 to enter Setup before the boot process continues.

NOTE
The information stored by the Setup program is essential. It should not be changed arbitrarily.

NOTE
If you repeatedly receive Run Setup error messages, check the computer's internal battery. If the battery is dead or not properly connected, the system cannot retain configuration values in CMOS RAM.

Entering Setup

CAUTION
Close all open files and leave your application program before entering Setup. You cannot exit back into an application. The system automatically reboots when you leave Setup.

Press the F1 key just after you have turned on power to your PC to enter Setup. You do not need to insert a diskette or load an operating system.

Basic System Configuration

Select Basic System Configuration to input configuration values such as date, time and disk type.

The screen below, of the HP Pavilion 6470Z PC, shows the Basic System Configuration Setup menu.

Main	Advanced	Power	Boot	Exit	
System Time		[10:40:30			]
System Date		[12/11/1998			]
Language		[English (US)			]
Legacy Diskette A:		[1.44 Mb 3½"			]
Primary Master		[QUANTUM BIGFOOT TS12.7AT – (PM)			]
Primary Slave		[None			]
Secondary Master		[CD-532E – B – (SM)			]
Secondary Slave		[IOMEGA ZIP 100 – (SS)			]
Installed Memory		96 MB †			
Memory Bank 0		64 MB SDRAM †			
Memory Bank 1		32 MB SDRAM †			
Core Version		4.06 †			
BIOS Revision		1.00 11/13/98 †			

Figure 14-2: Setup Main Menu Screen
(† = system auto detects this field, not changeable)

About the Setup Menu Screen

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Select a menu screen by pressing the left or right arrow keys. Use the up or down arrow keys to select items on the screen. Use the Enter key to select an item for modification. For certain items, pressing Enter will bring up a submenu. After you have selected a menu item, use the arrow keys to modify the settings. Press the Esc key to move back a screen.

Setup Menus	Description
Main	Use this menu for basic system configuration
Advanced	Use this menu to set the Advanced Features available on the system's chipset.
Power	Use this menu to configure Power Management features.
Boot	Use this menu to determine the system's startup sequence.
Exit	Use this menu to save or discard changes made in the current session, or to load the system defaults.

Table 14-11: Understanding the BIOS Setup Menu Screens for the HP Pavilion

Main Menu Settings

The following tables show the default values for the Main screen menu and its submenus.

Main Menu	Settings (* denotes default)
System Time	HH:MM:SS
System Date	MM/DD/YYYY
Legacy Diskette A	Disabled 720 Kb 3½" 360 Kb 5¼" 1.44 Mb 3½" (default) 1.2 Mb 5¼" 2.88 Mb 3½"
Legacy Diskette B (doesn't show on screen when set to Disabled)	Disabled (default) 720 Kb 3½" 360 Kb 5¼" 1.44 Mb 3½" 1.2 Mb 5¼" 2.88 Mb 3½"
Primary Master	QUANTUM Bigfoot TX4.0AT (this is a submenu)
Primary Slave	None (this is a submenu)
Secondary Master	CD-5240EA (this is a submenu)
Secondary Slave	None (this is a submenu)
Installed Memory	32 MB (set by the computer) †
Memory Bank 0	32 MB SDRAM (set by the computer) †
Memory Bank 1	Not Installed (set by the computer) †
Core Version	4.06
BIOS Revision	1.03 06/29/98 (set by the computer) †

Table 14-12: Understanding the BIOS Setup Main Menu
(† = system auto detects this field, not changeable)

Hard Drive Configuration

The submenu below is for the Primary Master device. The menu is the same for the other three devices.

Primary Master Submenu	Settings (* denotes default)
Type	Auto * IDE Removable None ATAPI Removable CD-ROM User
CHS Format	
Cylinders	17475 (determined by auto configure)
Heads	15 (determined by auto configure)
Sectors	63 (determined by auto configure)
Maximum Capacity	8455 MB (determined by auto configure)
LBA Format	
Total Sectors	25075008 (determined by auto configure)
Maximum Capacity	12838 MB (determined by auto configure)
Multi-Sector Transfers	16 Sectors (determined by auto configure)
LBA Mode Control	Enabled (determined by auto configure)
32 Bit I/O	Disabled Enabled *
Transfer Mode	Fast PIO 4 (determined by auto configure)
Ultra DMA Mode	Mode 2 (determined by auto configure)

Table 14-13: Primary Master Submenu Settings

Advanced Menu Settings

This section describes the Setup options found on the Advanced menu screen. If you select certain options from the Advanced screen, the Setup program will switch to a subscreen for the selected option.

Advanced Menu	Default Setting
CPU Type	Pentium II (set by the computer)
CPU Speed	400 MHz (set by the computer)
Cache RAM	512 KB (set by the computer)
Installed O/S	Win98/WinNT5.0
Reset Configuration Data	No * Yes
Default Primary Video Adapter	PCI * AGP
PS/2 Mouse	Disabled Enabled Auto Detect *
Large Disk Access Mode	Other DOS *
Local Bus IDE Adapter	Disabled Primary Secondary Both *
PCI Configuration	Press Enter
I/O Device Configuration	Press Enter

Table 14-14: Advanced Menu Default Settings

PCI Configuration Submenu

PCI Configuration Submenu	Settings (* denote default)
TV Output Format	NTSC * PAL PAL-M PAL-60 NTSC-J PAL-CN SCART-PAL
ISA graphics device installed	No * Yes
PCI/PNP ISA UMB Region Exclusion	Press Enter for submenu
PCI/PNP ISA IRQ Resource Exclusion	Press Enter for submenu

Table 14-15: PCI Configuration Submenu Settings

PCI/PNP ISA UMB Region Exclusion Submenu

PCI/PNP ISA UMB Region Exclusion Submenu	Settings (* denote default)
C800 - CBFF	Available * Reserved
CC00 - CFFF	Available * Reserved
D000 - D3FF	Available * Reserved
D400 - D7FF	Available * Reserved
D800 - DBFF	Available * Reserved
DCFF - DFFF	Available * Reserved

Table 14-16: PCI/PNP ISA UMB Region Exclusion Submenu Settings

PCI/PNP ISA IRQ Region Exclusion Submenu

PCI/PNP ISA IRQ Region Exclusion Submenu	Settings (* denote default)	
IRQ 3	Available *	Reserved
IRQ 4	Available *	Reserved
IRQ 5	Available *	Reserved
IRQ 7	Available *	Reserved
IRQ 9	Available *	Reserved
IRQ 10	Available *	Reserved
IRQ 11	Available *	Reserved

Table 14-17: PCI/PNP ISA IRQ Region Exclusion Submenu Settings

I/O Device Configuration Submenu

Peripheral Configuration Submenu	Settings (* denote default)	
Serial port A	Disabled Enabled *	Auto
Base I/O Address	3F8 * 2F8	3E8 2E8
Interrupt	IRQ3	IRQ4 *
Serial port B	Disabled Enabled * (enabled when system has Digital Camera Port)	Auto
Mode	Normal * ASK-IR	IrDA
Base I/O Address	2F8 * 2E8	3E8 3F8
Interrupt	IRQ 3 *	IRQ 4
Parallel port	Disabled Enabled *	Auto
Mode	Output only Bi-directional *	EPP ECP
Base I/O Address	378 * 3BC	278
Interrupt	IRQ5	IRQ7 *
Floppy disk controller	Disabled	Enabled *
Base I/O address	Primary *	Secondary

Table 14-18: Peripheral Configuration Submenu Settings

Power Configuration Menu

Power Configuration Submenu	Settings (* denote default)	
Power Savings	Disabled Customized *	Maximum Power Savings Maximum Performance
Auto Suspend Timeout	Off * 5 minutes 10 minutes 15 minutes	20 minutes 30 minutes 40 minutes 60 minutes
Hard Disk Timeout	Disabled * 10 seconds 15 seconds 30 seconds 45 seconds 1 minute	2 minutes 4 minutes 6 minutes 8 minutes 10 minutes 15 minutes
IDE Primary Master Monitoring	Disabled	Enabled *
IDE Primary Slave Monitoring	Disabled *	Enabled
IDE Secondary Master Monitoring	Disabled *	Enabled
IDE Secondary Slave Monitoring	Disabled *	Enabled
Power Button Behavior	Sleep/Wake	On/Off *
Restore On AC/Power Loss	Stay Off *	Power On
Resume On Time	Off *	On
Resume Time	00:00:00	

Table 14-19: Power Configuration Menu Settings

Boot Configuration Menu

Boot Configuration Submenu	Settings (* denote default)
Removable Devices ATAPI CD-ROM Drive Hard Drive Network Boot	To change the start up order, highlight a device and use the + or - key on the numeric keypad to move it to the desired location.
Hard Drive	Press Enter to view, but not changeable
Removable Devices	Press Enter to view, but not changeable
Removable Format (present when system has an internal ZIP drive)	Press Enter to view, but not changeable
Boot-time Diagnostic Screen	Disabled * Enabled

Table 14-20: Boot Configuration Menu Settings

Exit Menu

Exit Menu	Selections
Exit Saving Changes	Press Enter
Exit Discarding Changes	Press Enter
Load Setup Defaults	Press Enter
Discard Changes	Press Enter
Save Changes	Press Enter

Table 14-21: Exit Menu

Part 3 - BIOS Setup Settings for HP Pavilion 4406, 4407, 4409, 4450, 4451, and the 4456 PCs

Introduction

This section tells how to use the Setup program that is built into the system BIOS. The Setup program makes it possible to change and store system configuration information such as the types of peripherals that are installed, the boot-up sequence for the system, and enabling or disabling the power management support. The Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery when power to the system is off.

If you want to go into the Setup program, press the F1 key after the Hewlett-Packard logo screen appears but before the system begins to start Windows '98. Once the power button has been pressed, you have about five seconds to press F1 to enter Setup before the boot process continues.

NOTE
The information stored by the Setup program is essential. It should not be changed arbitrarily.

NOTE
If you repeatedly receive Run Setup error messages, check the computer's internal battery. If the battery is dead or not properly connected, the system cannot retain configuration values in CMOS RAM.

Entering Setup

CAUTION
Close all open files and leave your application program before entering Setup. You cannot exit back into an application. The system automatically reboots when you leave Setup.

Press the F1 key just after you have turned on power to your PC to enter Setup. You do not need to insert a diskette or load an operating system.

Basic System Configuration

Select Basic System Configuration to input configuration values such as date, time and disk type.

The screen below shows the Basic System Configuration Setup menu.

Main	Advanced	Power	Boot	Exit	
System Time		[10:40:30			]
System Date		[12/116/1998			]
Language		[English (US)			]
Legacy Diskette A:		[1.44 Mb 3½"			]
Primary Master		[WDC AC26400B-(PM)			]
Primary Slave		[None			]
Secondary Master		[CD 8322B-(SM)			]
Secondary Slave		[None			]
Installed Memory		32 MB †			
Memory Bank 0		32 MB SDRAM †			
Memory Bank 1		None †			
Core Version		4.06 †			
BIOS Revision		1.00 11/17/98 †			

Figure 14-3: Setup Main Menu Screen
(† = system auto detects this field, not changeable)

About the Setup Menu Screen

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Select a menu screen by pressing the left or right arrow keys. Use the up or down arrow keys to select items on the screen. Use the Enter key to select an item for modification. For certain items, pressing Enter will bring up a submenu. After you have selected a menu item, use the arrow keys to modify the settings. Press the Esc key to move back a screen.

Setup Menus	Description
Main	Use this menu for basic system configuration
Advanced	Use this menu to set the Advanced Features available on the system's chipset.
Power	Use this menu to configure Power Management features.
Boot	Use this menu to determine the system's startup sequence.
Exit	Use this menu to save or discard changes made in the current session, or to load the system defaults.

Table 14-22: Understanding the BIOS Setup Menu Screens for the HP Pavilion

Main Menu Settings

The following tables show the default values for the Main screen menu and its submenus.

Main Menu	Settings (* denotes default)
System Time	HH:MM:SS
System Date	MM/DD/YYYY
Legacy Diskette A	Disabled 720 Kb 3½" 360 Kb 5¼" 1.44 Mb 3½" (default) 1.2 Mb 5¼" 2.88 Mb 3½"
Legacy Diskette B (doesn't show on screen when set to Disabled)	Disabled (default) 720 Kb 3½" 360 Kb 5¼" 1.44 Mb 3½" 1.2 Mb 5¼" 2.88 Mb 3½"
Primary Master	WDC AC 26400B-(PM) (this is a submenu)
Primary Slave	None (this is a submenu)
Secondary Master	8322B-(SM) (this is a submenu)
Secondary Slave	None (this is a submenu)
Installed Memory	32 MB (set by the computer) †
Memory Bank 0	32 MB SDRAM (set by the computer) †
Memory Bank 1	None (set by the computer) †
Core Version	4.06
BIOS Revision	1.00 11/17/98 (set by the computer) †

Table 14-23: Understanding the BIOS Setup Main Menu
(† = system auto detects this field, not changeable)

Hard Drive Configuration

The submenu below is for the Primary Master device. The menu is the same for the other three devices.

Primary Master Submenu	Settings (* denotes default)
Type	Auto * IDE Removable None ATAPI Removable CD-ROM User
CHS Format	
Cylinders	13328 (determined by auto configure)
Heads	15 (determined by auto configure)
Sectors	63 (determined by auto configure)
Maximum Capacity	6449 MB (determined by auto configure)
LBA Format	
Total Sectors	12594960 (determined by auto configure)
Maximum Capacity	6449 MB (determined by auto configure)
Multi-Sector Transfers	16 Sectors (determined by auto configure)

Table 14-24: Primary Master Submenu Settings (continued on next page)

Primary Master Submenu	Settings (* denotes default)
LBA Mode Control	Enabled (determined by auto configure)
32 Bit I/O	Disabled Enabled *
Transfer Mode	Fast PIO 4 (determined by auto configure)
Ultra DMA Mode	Mode 2 (determined by auto configure)

Table 14-24: Primary Master Submenu Settings (continued)

Advanced Menu Settings

This section describes the Setup options found on the Advanced menu screen. If you select certain options from the Advanced screen, the Setup program will switch to a subscreen for the selected option.

Advanced Menu	Default Setting		
CPU Type	Celeron (set by the computer)		
CPU Speed	366 MHz (set by the computer)		
Cache RAM	128 KB (set by the computer)		
Installed O/S	Win98/WinNT 5.0		
Reset Configuration Data	No *	Yes	
Default Primary Video Adapter	PCI *	ACP	
PS/2 Mouse	Disabled	Enabled	Auto Detect *
Large Disk Access Mode	Other	DOS *	
Local Bus IDE Adapter	Disabled Secondary	Primary Both *	
PCI Configuration	Press Enter		
I/O Device Configuration	Press Enter		

Table 14-25: Advanced Menu Default Settings

PCI Configuration Submenu

PCI Configuration Submenu	Settings (* denote default)
ISA graphics device installed	No * Yes
PCI/PNP ISA UMB Region Exclusion	Press Enter for submenu
PCI/PNP ISA IRQ Resource Exclusion	Press Enter for submenu

Table 14-26: PCI Configuration Submenu Settings

PCI/PNP ISA UMB Region Exclusion Submenu

PCI/PNP ISA UMB Region Exclusion Submenu	Settings (* denote default)	
C800 - CBFF	Available *	Reserved
CC00 - CFFF	Available *	Reserved
D000 - D3FF	Available *	Reserved
D400 - D7FF	Available *	Reserved
D800 - DBFF	Available *	Reserved
DCFF - DFFF	Available *	Reserved

Table 14-27: PCI/PNP ISA UMB Region Exclusion Submenu Settings

PCI/PNP ISA IRQ Region Exclusion Submenu

PCI/PNP ISA IRQ Region Exclusion Submenu	Settings (* denote default)	
IRQ 3	Available *	Reserved
IRQ 4	Available *	Reserved
IRQ 5	Available *	Reserved
IRQ 7	Available *	Reserved
IRQ 9	Available *	Reserved
IRQ 10	Available *	Reserved
IRQ 11	Available *	Reserved

Table 14-28: PCI/PNP ISA IRQ Region Exclusion Submenu Settings

I/O Device Configuration Submenu

Peripheral Configuration Submenu	Settings (* denote default)	
Serial port A	Disabled Enabled *	Auto
Base I/O Address	3F8 * 2F8	3E8 2E8
Interrupt	IRQ3	IRQ4 *
Serial port B	Disabled * Enabled	Auto
Parallel port	Disabled Enabled *	Auto
Mode	Output only Bi-directional *	EPP ECP

Table 14-29: Peripheral Configuration Submenu Settings (continued on next page)

Peripheral Configuration Submenu	Settings (* denote default)	
Base I/O Address	378 *	278
	228	
Interrupt	IRQ5	IRQ7 *
Floppy disk controller	Disabled	Enabled *
	Auto	
Base I/O address	Primary *	Secondary

Table 14-29: Peripheral Configuration Submenu Settings (continued)

Power Configuration Menu

Power Configuration Submenu	Settings (* denote default)	
Power Savings	Disabled	Maximum Power Savings
	Customized *	Maximum Performance
Auto Suspend Timeout	Off	20 minutes
	5 minutes	30 minutes *
	10 minutes	40 minutes
	15 minutes	60 minutes
Hard Disk Timeout	Disabled *	2 minutes
	10 seconds	4 minutes
	15 seconds	6 minutes
	30 seconds	8 minutes
	45 seconds	10 minutes
	1 minute	15 minutes
IDE Primary Master Monitoring	Disabled	Enabled *
IDE Primary Slave Monitoring	Disabled *	Enabled
IDE Secondary Master Monitoring	Disabled *	Enabled
IDE Secondary Slave Monitoring	Disabled *	Enabled
Power Button Behavior	Sleep/Wake	On/Off *
Restore On AC/Power Loss	Stay Off *	Power On
Resume On Time	Off *	On
Resume Time	00:00:00	

Table 14-30: Power Configuration Menu Settings

Boot Configuration Menu

Boot Configuration Submenu	Settings (* denote default)
Removable Devices	To change the start up order, highlight a device and use the + or - key on the numeric keypad to move it to the desired location.
ATAPI CD-ROM Drive	
Hard Drive	
Network Boot	
Hard Drive	Press Enter to view, but not changeable
Removable Devices	Press Enter to view, but not changeable
Boot-time Diagnostic Screen	Disabled * Enabled

Table 14-31: Boot Configuration Menu Settings

Exit Menu

Exit Menu	Selections
Exit Saving Changes	Press Enter
Exit Discarding Changes	Press Enter
Load Setup Defaults	Press Enter
Discard Changes	Press Enter
Save Changes	Press Enter

Table 14-32: Exit Menu

Introduction

This section provides you with a step-by-step troubleshooting procedure to help identify a problem and locate its source in the HP Pavilion 4400, 6300, 6400 and 8400 Series PCs.

This section is divided into 5 parts:

- Problems at startup
- Problems after system is up and running
- Problems running new application software
- Problems operating add-in cards
- Suggested resolutions to some common problems

Problems at Start-Up

The Power On Self-Test (POST) is the prime troubleshooting tool used to diagnose and isolate system problems in the HP Pavilion 4400, 6300, 6400 and 8400 Series PCs. To enter the POST, turn on the system. Each time the computer is turned on, the POST checks the following:

- System motherboard
- Memory
- Keyboard
- Certain peripheral devices

The POST is operating while the HP Logo is being displayed. There will be 3 potential results of POST:

1. POST does not detect any errors, the system beeps once and boots up Windows '98.
2. Errors that do not prevent the boot process (non-fatal errors) display a message that looks similar to the following:

   Error message Line 1
   Error message Line 2
   Press <F1> for Setup, <Esc> to Boot

   At this time you can note the error and press Esc to resume the boot-up process, or F1 to enter the Setup program.
3. Errors that prevent the boot process from continuing (fatal errors), are communicated by a series of audible beeps. If this type of error occurs, refer to the Beep Codes and Error Messages that follow.

BIOS Beep Codes and Error Messages

Errors can occur during POST (Power On Self Test) which is performed every time the system is powered on. Fatal errors, which prevent the system to continue the boot process, are communicated through a series of audible beeps. Other errors are displayed in the following format:

ERROR *Message Line 1*
ERROR *Message Line 2*

For most displayed error messages, there is only one message. If a second message appears, it is "RUN SETUP". If this message occurs, press F1 to run BIOS Setup.

Beep Codes

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	Parity is not supported on this product, will not occur.
3	Base 64 KB Memory Failure	Memory failure in the first 64 KB, or Monitor not plugged in.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the motherboard is not functioning.
5	Processor Error	The CPU on the motherboard generated an error.
6	8042 - Gate A20 Failure	The keyboard controller (8042) may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	ROM checksum value does not match the value encoded in BIOS.
10	CMOS Shutdown Register Rd/Wrt Error	The shutdown register for CMOS RAM failed.
11	Cache Error / External Cache Bad	The external cache is faulty.

Table 15-1: Beep Codes

BIOS Error Messages

Error Message	Explanation
8042 Gate - A20 Error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry on the motherboard.
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective. Replace it.
CH-2 Timer Error	Most AT systems include two timers. There is an error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run BIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run BIOS Setup.
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount in CMOS RAM. Run BIOS Setup.
CMOS Time and Date Not Set	Run Standard CMOS Setup to set the date and time in CMOS RAM.
Diskette Boot Failure	The boot disk in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
Display Switch Not Proper	Some systems require a video switch on the motherboard be set to either color or monochrome. Turn the system off, set the switch, then power on.
DMA Error	Error in the DMA controller.
DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.
FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.

Table 15-2: Error Messages (continued on next page)

Error Message	Explanation
Invalid Boot Diskette	The BIOS can read the disk in floppy drive A:, but cannot boot the system. Use another boot disk.
Keyboard Is Locked...Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue.
Keyboard Error	There is a timing problem with the keyboard. Set the *Keyboard* option in Standard CMOS Setup to *Not Installed* to skip the keyboard POST routines.
KB/Interface Error	There is an error in the keyboard connector.
Off Board Parity Error	Parity error in memory installed in an expansion slot. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) *XXXX* is the hex address where the error occurred.
On Board Parity Error	Parity is not supported on this product, this error will not occur.
Parity Error ????	Parity error in system memory at an unknown address.

Table 15-2: Error Messages (continued)

Plug and Play (PCI Configuration) Error Messages

Plug and Play Error Message	Explanation
Bad PnP Serial ID Checksum	The serial ID checksum of a Plug and Play card was invalid.
Floppy Disk Controller Resource Conflict	The floppy disk controller has requested a resource that is already in use.
NVRAM Checksum Error, NVRAM Cleared	The ESCD data was reinitialized because of an NVRAM checksum error. Try rerunning the ICU.
NVRAM Cleared by Jumper	The "Clear CMOS" switch has been moved to the ON position and CMOS RAM has been cleared.
NVRAM Data Invalid, NVRAM Cleared	Invalid entry in the ESCD area.
Parallel Port Resource Conflict	The parallel port has requested a resource that is already in use.
PCI Error Log is Full	This message is displayed when more than 15 PCI conflict errors are detected. No additional PCI errors can be logged.
PCI I/O Port Conflict	Two devices requested the same resource, resulting in a conflict.
PCI IRQ Conflict	Two devices requested the same resource, resulting in a conflict.

Table 15-3: Plug and Play Error Messages (continued on next page)

Plug and Play Error Message	Explanation
PCI Memory Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Boot Device Not Found	The designated primary boot device (hard disk drive, diskette drive, or CD-ROM drive) could not be found.
Primary IDE Controller Resource Conflict	The primary IDE controller has requested a resource that is already in use.
Primary Input Device not Found	The designated primary input device (keyboard, mouse, or other, if input is redirected) could not be found.
Secondary IDE Controller Resource Conflict	The secondary IDE controller has requested a resource that is already in use.
Serial Port 1 Resource Conflict	Serial port 1 has requested a resource that is already in use.
Serial Port 2 Resource Conflict	Serial port 2 has requested a resource that is already in use.
Static Device Resource Conflict	A non-Plug and Play ISA card has requested a resource that is already in use.
System Board Device Resource Conflict	A non Plug and Play system resource has requested a resource that is already in use.

Table 15-3: Plug and Play Error Messages (continued)

ISA NMI Messages

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

Table 15-4: ISA NMI Messages

Problems at Start-up

Problems that occur at initial start-up are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause. When you experience a problem at start-up, check the following items:

___ Are all cables correctly connected and secured?

___ Are the configuration settings correct in Setup?

___ Are all software drivers properly installed?

___ Are all the jumpers and switch settings on add-in boards and peripheral devices set correctly? For the valid settings, see the documentation shipped with these devices. Ensure that there are no conflicts, for example, two add-in boards sharing the same IRQ.

___ Are all jumpers and DIP switch settings on the motherboard correct if changed from the settings shipped form the factory?

___ Is the power supply set to the correct input voltage?

___ Are add-in boards and disk drives installed correctly?

___ Is there a keyboard attached to the computer?

___ Is the bootable diskette installed in drive A?

___ Is the system hard disk properly formatted or defined?

___ Are all the SIMMs installed correctly? Try reseating the SIMMs.

___ Is the operating system properly loaded?

Problems After the System Has Been Running Correctly

After the system hardware and software have been running correctly, problems often indicate equipment failure. Go through the checklist below to see if the situation is one that can be easily corrected.

___ If running the software from a diskette, try using a new copy.

___ If running the software from the hard disk drive, try running it from a diskette. If it runs correctly from a diskette, there may be a problem with the software on the hard disk drive. Reinstall the software on the hard disk drive and try again. If it still fails, you many have a bad sector on the hard disk drive.

___ If you suspect the CMOS RAM has been corrupted, try clearing CMOS RAM and run Setup.

___ If the problems are intermittent:

a. Possible loose cable
b. Dirt in the keyboard (if keyboard input is incorrect)
c. Marginal power supply

___ A transient voltage spike, power outage, or brownout may have occurred. Symptoms may include:

a. Flickering video display
b. Unexpected system reboots
c. System not responding to user commands

Try rebooting first, then if the problem persists, reload the software.

___ Try reseating the SIMMs.

___ The **LAST RESORT**. You may need to reformat the hard disk. Before reformatting BACKUP THE DATA. If the problem persists after reformatting the disk, the I/O controller on the motherboard may be defective.

Problems Operating Add-in Boards

Problems related to add-in boards are usually related to improper board installation or interrupt and address conflicts. Go through the checklist below to see if the problem can be corrected.

___ Check the manufacturer's instructions for installation and switch/jumper settings.

___ Check cable installation

Problems Running New Application Software

Problems that occur when running new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. If the problem persists after going through this checklist, contact the software vendor's customer service representative.

___ Does the system meet the minimum hardware requirements for the software?

___ Is the software an authorized copy?

___ Check with software vendor to see if the software is supported in Windows '98.

___ If running the software from a diskette, is it a good copy?

___ If running the software from the hard disk drive - check for proper installation.

___ Are the correct device drivers installed?

___ Are the correct video drivers installed?

___ Is the software correctly configured for the system?

Problems and Suggestions

What Happens	What to do
Application Software Problems	Make sure all cables are installed correctly. Verify that the system board jumpers are set properly. Verify that the system hardware configuration is set correctly. Try running the software in a different speed mode. Try clearing CMOS RAM and reconfigure the system. Make sure the list of system settings is available to re-enter. Clearing CMOS RAM sets the options to default values
Characters on-screen are distorted or incorrect	Insure that the video signal and power cables are properly installed. Insure that the monitor is compatible with the selected video mode.
Characters do not appear on the screen	Insure the video signal cable is installed. Insure the monitor is plugged in and turned on.
CMOS RAM settings are wrong.	If system settings stored in CMOS RAM change for no apparent reason, (for example, the time of day develops an error), the backup battery may no longer have enough power to maintain the settings. Replace the battery.
Diskette drive light does not go on when drive is in use or is tested by POST.	Make sure the power and signal cables for the drive are properly installed. Check that the drive is properly configured and enabled in Setup.
Hard drive light does not go on when drive is in use or is tested by POST.	Insure the power and signal cables for the drive are properly installed. Insure the drive is properly configured and enabled in Setup.
Power-on light does not go on.	If the system is operating properly, check the connector between the motherboard and the LED in the front panel.
System HALTS before completing POST	This indicates a **fatal** system error. Note the screen display and note any beep code emitted.

Table 15-5: Problems and Suggestions

Problems with the Multimedia Keyboard

Problem	Solution
The multimedia keyboard is not working properly	Try one, or both, of the following: Check that the applications associated with the INTERNET and SHORTCUT buttons are the ones desired (see Configuring the Buttons in Section 13, Part 2). Try closing and relaunching the Keyboard Manager: 1. Right-click the Keyboard Manager icon on the task bar. 2. Select Multimedia Keyboard, and then Close. 3. Right-click on the Keyboard Manager icon again. 4. Select Multimedia Keyboard, and then Launch.
The onscreen messages are not displayed when a special multimedia key is pressed	Try one, or both, of the following: Make sure Onscreen Display has not been disabled. 1. Right-click the Keyboard Manager icon on the task bar 2. From the shortcut menu, choose Onscreen Display 3. If the Enable option is displayed, select it to enable onscreen display of messages. Otherwise, press Esc to cancel. Launch the OSD.EXE application 1. Open My Computer or Windows Explorer. 2. Navigate tot he C:\Program Files\Mediascape\Onscreen Display folder. 3. Double-click on OSD.EXE
Nothing happens when special multimedia keys are pressed	Try one of the following: If you see the Keyboard Manager icon in the task bar: 1. Right-click on the Keyboard Manager icon 2. Select Multimedia Keyboard, and then launch If you don't see the Keyboard Manager icon in the task bar 1. Click on the Start button 2. Select Shut Down 3. Select Restart the computer 4. Click on Yes.

Table 15-6: Problems with the Multimedia Keyboard

Problems with the Fax/Modem card and/or the HP Fax/Phone software

This section provides solutions to problems that might be experienced when using the Intel Connect or similar software with the Fax/Modem card.

Problem	Solution
Cannot dial out	Check that there is a line from the PC to the wall jack. Replace the modem with a working phone to ensure that the phone line is working. Make sure the phone line is connected to the jack marked **LINE**. Incorrect connection prevents the modem from operating properly.
Modem dials but does not connect	Make sure the IRQ setting is identical on both the modem AND the software. Modem and software must be configured identically. Make sure the phone line is working properly. Replace the modem with a regular phone and dial the number. If the line sounds noisy, you may have difficulty connecting to a remote device.
When connecting with a remote computer or on-line service, the modem makes a connection but no data appears on the screen.	The remote system may be waiting to receive your data before it begins. Try pressing the ENTER key a few times. Make sure the correct data format (data bits, stop bits, and parity bits) and flow control (RTS/CTS) method are being used. Make sure the correct terminal emulation mode is being used.
Volume on speakers too loud or too soft	Make the following adjustments: • On the Windows '98 task bar, click on the **speaker symbol** in the lower right corner of the screen. Drag the **Volume** button up to increase the volume, down to decrease the volume. • If Mute is checked, click on the box to delete the check.
Can't receive faxes	Make the following adjustments: • At the Intel Connect Main Screen click on Options. • Adjust the following values: number of rings 3 messages per mailbox 50 message duration 5 minutes

Table 15-7: Problems and Suggestions

Radio Frequency Interference Notice (USA)

The HP Pavilion 4400, 6300, 6400, 8300 and 8400 Series PCs have been tested and found to comply within 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, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

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

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

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class B limits may be attached to this computer product. Operation with non-compliant peripherals is likely to result in interference to radio and/or TV reception. All cables used to connect to peripherals must be shielded and grounded. Operation with cables connected to peripherals, that are not shielded and grounded may result in interference to radio and/or TV reception.

NOTE
If a Class A device is installed within this system, then the system is to be considered a Class A system. In this configuration operation of this equipment in a residential area is likely to cause harmful interference.

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Section 16 - HP Pavilion Displays

Introduction

Although many monitors can be used with the HP Pavilion Multimedia PCs, there are five official HP Pavilion displays. They are the:

- HP Pavilion M40 Multimedia 14" Display
- HP Pavilion M50 Multimedia 15" Display
- HP Pavilion M70 Multimedia 17" Display
- HP Pavilion M90 Multimedia 19" Display
- HP Pavilion S40 Multimedia 14" Display

Part 1 - HP Pavilion M40, M50, and M70 Multimedia Displays

The HP Pavilion M40, M50 and M70 Multimedia Displays (Model D5269A, D5258A, and D5259A) are high-resolution, multi-scan color monitors designed for use with HP Pavilion and other computers. Each display includes a built-in microphone and mounts for the speakers supplied with HP Pavilion computers. The displays comply with EPA ENERGY STAR standards and include automatic power-management features.

Other features include:

- Non-glare picture tube to reduce the reflection of ambient light (except U.S. M40 models)
- On-screen adjustment of display settings
- Compliance with Swedish MPR II guidelines for reduced electromagnetic emissions (except U.S. M40 models)
- Support for high refresh rates to reduce screen flicker and eyestrain
- Built-in tilt and swivel base

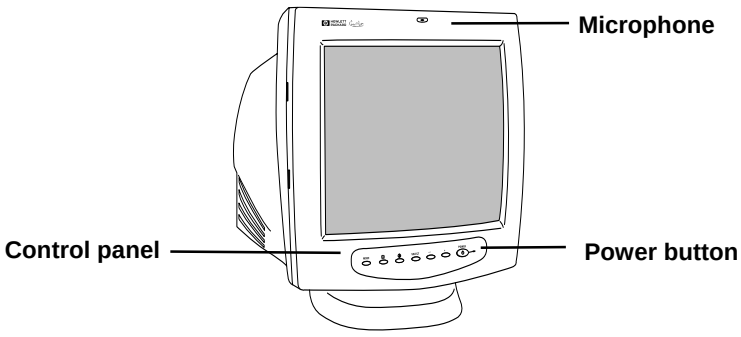


Figure 16-1: Controls

For Your Safety

For your safety and the protection of your display, follow these precautions:

- Always connect the display to a grounded, three-prong power outlet. Use only the factory-supplied power cord.

WARNING
To completely disconnect power from the display, you must remove the power cable from the power socket.

- To prevent electrical shock, do not remove the back cover of the display. The cover should be removed only by qualified service personnel.
- Position the display so the power cord is accessible.
- Do not place objects on top of the display that could fall into the vents or block airflow.
- To avoid the risk of damage to the display and electrical shock to yourself, do not expose the display to rain or moisture.
- Adjust only those controls whose operations are covered in this manual. Improperly adjusting other controls may result in damage and could require repair by a service technician.

If any of the following conditions occur, unplug the display and contact a qualified service technician:

- The power cord or plug is frayed or damaged.
- You have spilled liquid into the display.
- The display has been exposed to rain or water.
- The display does not operate correctly when the operating instructions are followed.
- The display has been dropped or the cabinet has been damaged.
- The performance of the display changes abruptly.

Installation

Follow the instructions in this section to install the HP Pavilion M Series Multimedia Display.

NOTE
Before installing the display, refer to your computer and video adapter documentation. You may need to make changes to accommodate the display.

Unpacking the Display

When you unpack the display, make sure that you have the following items:

- The display with its attached video cable and pedestal mount
- A power cord

Where to Place the Display

Place the display on a flat, sturdy surface. If you plan to use the display with a desktop PC, you can place it on top of the computer. (If you're not using an HP Pavilion computer, check the documentation for the maximum weight the computer's case can hold.)

Choose an area that is free from excessive heat, moisture, and sunlight. Avoid possible sources of electromagnetic interference, such as transformers, motors, fluorescent lighting, and other computer displays.

Connecting the Power and Video Cables

Before connecting any cables, make sure to read the safety instructions at the beginning of the manual. The computer and display must be turned off.

To connect the power and video cables

1. Connect the power cord to the back of the display.

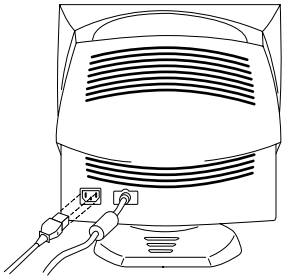


Figure 16-2: Connect the power cord

2. Plug the power cord into a power outlet.
3. Connect the orange plug on the video cable to the video port of your computer. If you have an HP Pavilion computer, this port is marked in orange. (The illustration below is for reference only. Check your computer manual for the video port location.)

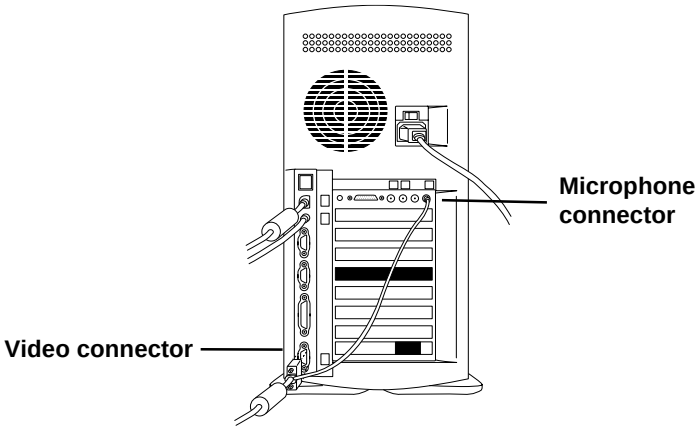


Figure 16-3: Microphone and Video Connectors

4. Plug the yellow microphone connector into the sound input port of your computer. On HP Pavilion computers, the port is marked in yellow.

Connecting the Speakers

The display is designed for use with the HP/Polk Audio speakers supplied with HP Pavilion computers.

To connect the speakers:

1. Extend the cables attached to the two speakers.
2. Identify the left and right speakers. You can tell which side a speaker fits onto by observing its curvature and mounting pegs. The side of the speaker with mounting pegs fits flush against the side of the display.
3. Fit the pegs of the right speaker into the corresponding holes on the right side of the display, then push down until the speaker is secure.

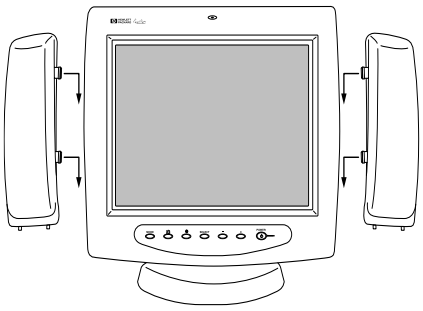


Figure 16-4: Mounting the Speakers

4. Clip the speaker wires to the underside of the monitor as shown in the illustration.

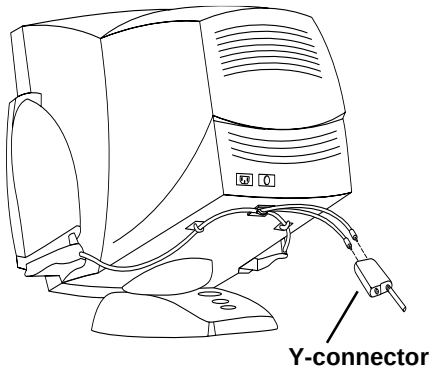


Figure 16-5: Y-Connector

5. Plug the two speaker wire connectors into the Y-connector.
6. Plug the single connector on the end of the Y-connector's cable to the sound-out port on your computer. (Check in the computer's documentation for the location of the port.)

Using the Display

This chapter contains information about using your HP Pavilion M40, M50, or M70 Multimedia Display.

Turning the Display On and Off

You use the power button on the front panel to turn the display on and off. When the display is on, the light near the power button is illuminated. The light is green when the display and computer are active and amber when the display is in one of its reduced power modes.

The display's power management features reduce power consumption to low levels when your computer has been inactive for a specified period of time. See "Minimizing Energy Use" later in this chapter for more information.

Because of the display's power management features, you don't normally need to turn off the display when it's not in use. When turned off, the display uses the same amount of power that it uses in sleep mode (less than eight watts).

If your computer doesn't support DPMS power management, you can reduce power consumption by turning off the monitor when it won't be used for an extended period. You can turn the display off even if you leave the computer running.

WARNING
To completely disconnect power from the display, you must remove the power cable from the power socket.

To turn the display on or off

- Press the power button on the front of the display.

Degaussing the Display

Each time you turn on the display, it is automatically *degaussed*. Degaussing removes magnetism that causes unwanted color variations. Degauss the display any time you notice unusual color variations. If you leave the display continuously turned on or frequently change its position, you should degauss about once a week.

To degauss the M40 or M50 display, turn it off for about 30 minutes. When you turn the display on again, there will be a short humming sound and a momentary instability in the image.

There are two degaussing options for the M70 display. You can either turn off the display as described for the M40 and M50, or use the degauss option in the OSD main window.

Setting the Screen Resolution

The screen resolution determines the amount of information shown in the display. Screen resolution refers to the number of the dots or pixels used to make up an image. A low screen resolution means that the display uses a relatively small number of relatively large dots. A higher resolution means that more dots of a smaller size make up the image. With higher screen resolutions, icons, windows, and text are smaller on the screen, but more information can be displayed.

The screen resolution is set on the computer. The display supports many common screen resolutions, as shown in "M40 Video Modes," "M50 Video Modes," and "M70 Video Modes" later in this section. Check the documentation supplied with your computer and video adapter to find out which resolutions they support.

Minimizing Eyestrain

To minimize eyestrain and avoid screen flicker, use the highest possible image refresh rate or vertical frequency supported by your computer at the current screen resolution. (The image refresh rate is the number of times per second that the image is refreshed.) The tables in "M40 Video Modes," "M50 Video Modes," and "M70 Video Modes" later in this section show the image refresh rates supported by the displays at different screen resolutions.

Minimizing Energy Use

All HP Pavilion computers and many other computers support VESA display power management. Power-management features reduce the display's power consumption after a period of keyboard inactivity.

The display supports three different power-saving modes—standby, suspend, and sleep—which reduce consumption to less than eight watts. See "DPMS Power-Management Features" later in this section for a description of the characteristics of each mode.

When the display is in one of its power saving modes, the screen is blanked out and the front panel power indicator is amber. Pressing a key on the keyboard or moving the mouse restores the image. Consult your computer's documentation for information about setting the power-saving mode.

Care and Cleaning

To maximize screen life and prevent damage to the picture tube, HP recommends that you

- Use the display power-management system (if available on your computer) or a screen saver program.
- Turn off the display or reduce its brightness and contrast to minimum levels when you won't be using the display for an extended period. This is particularly important if you don't use a power-management system or screen saver.
- Avoid setting contrast and brightness to maximum levels or using the Games preset mode for prolonged periods.

Cleaning the Screen

The screen of the display has a high-quality optical coating that reduces glare and static buildup. To prevent damage to this coating, use only regular household glass cleaner to clean the screen.

CAUTION
Don't use cleaning solutions containing fluoride, acids, or alkalis. Never use hard or abrasive cleaning products to clean the screen.

To clean the screen

1. Turn off and unplug the display.
2. Spray a soft cotton cloth with glass cleaner and gently wipe the screen.
3. Dry the screen with a soft cotton cloth.
4. Plug the display and turn it on.

Adjusting the Viewing Angle

The display's pedestal mounting enables you to adjust the viewing angle. You can tilt and turn the display to find the most comfortable viewing position.

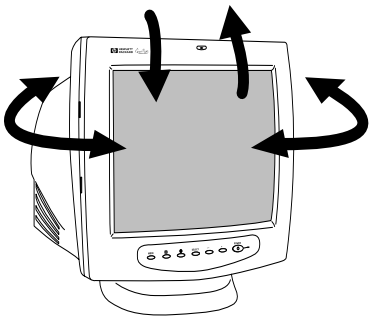


Figure 16-6: Adjusting the Viewing Angle

Changing Display Settings

You use the OSD (On-Screen Display) features of the Pavilion displays to change their settings. The buttons on the front panel control on-screen icons and windows.

Using the Front Panel

You use the six buttons on the front of the display to control OSD functions.

MODE	The Mode button allows you to choose from the display's custom preset modes. See the next section, "Setting the Custom Preset Mode," for instructions.
☼	The brightness button opens and closes the brightness adjustment window.
◑	The contrast button opens and closes the contrast adjustment window.
SELECT	The Select button opens the OSD main window if no other OSD windows are displayed. In the OSD main window, the Select button opens the adjustment window for the selected icon.
-	The minus button decreases a setting if an adjustment window is open. In the OSD main window, the button moves backward through the icons.
+	The plus button increases a setting if an adjustment window is open. In the OSD main window, the button moves forward through the icons.

Setting the Custom Preset Modes

Your display is configured for excellent performance right out of the box. If you want to optimize the display's settings for a particular activity, however, you can use custom preset modes.

Custom preset modes enable you to quickly change contrast and color settings to match those commonly used for various activities and viewing conditions. The three preset modes are Productivity, Picture, and Games.

The display also includes a Personal Setup mode, whose contrast, brightness, and color settings you can define. (See "Changing Mode Settings," for information about defining the Personal Setup mode and temporarily changing settings for the other modes.)

You choose the mode in the Mode window, which displays the following icons:

Productivity mode is designed for best results in office environments and with applications like word processors and spreadsheets.

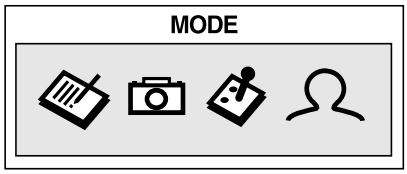
Picture mode has the same settings used by graphics professionals in photographic and pre-press applications and environments.

Games mode offers higher contrast and the same color settings found in TV and arcade games. It is also appropriate for viewing full-motion video. HP recommends that Games mode not be used for productivity applications.

Personal Setup mode enables you to define and save colors and settings for your own purposes.

To set the display mode

1. Press the Mode button to display the Mode window.



2. To immediately change to the next mode, press the Mode button again. (Alternatively, press the + or – button to move through the icons.)
3. When the display mode you want is highlighted, press the Select button to close the Mode window. (Alternatively, wait five seconds for the window to close automatically.)

Changing Mode Settings

The custom preset modes were designed for quick access to common settings. You can't permanently change these settings, but you can make *temporary* adjustments to the contrast, brightness, and color to meet a particular need. These changes are lost if you change to another mode or turn off the display.

For example, if you change the brightness level while working in Games mode, switch to Productivity mode, then return to Games mode, the original factory default brightness level will be in effect.

If you turn off the display, it will be in Personal Setup mode when you turn it back on. Any changes previously made to Productivity, Picture, or Games modes are lost.

The display's power-saving features don't affect temporary changes to custom preset modes. If you leave the computer inactive long enough to trigger its power-management system, or if you turn off the computer, the temporary changes will still be in effect when the display returns from its power-saving state.

If you want to define and save settings, use Personal Setup mode. Personal Setup initially has the same settings as Productivity mode. When you're working in Personal Setup mode, however, adjustments to brightness, contrast, and color are automatically saved and remain in effect until you change them.

In addition, Personal Setup enables you to individually control the red, green, and blue video content in the image. See "Setting Red, Green, and Blue Values," later in this section, for instructions.

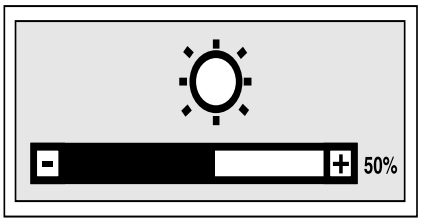
Adjusting the Brightness and Contrast

You can change the display's brightness or contrast quickly by pressing the brightness or contrast button on the front panel. (You can also adjust the brightness and contrast through the OSD main window as described in the next section, "Using the OSD Main Window.") Brightness adjusts the black level, while contrast adjusts the difference between the dark and light parts of the image.

Adjust the brightness level so that black items on the screen appear black. Then adjust the contrast for the most comfortable viewing. Keep in mind that these changes are permanent only in Personal Setup mode.

To adjust the brightness or contrast

1. Press the brightness or contrast button on the front panel to open the brightness or contrast adjustment window.



2. Press the + or – button to increase or decrease the setting from its current position.
3. When the brightness or contrast is at the desired level, press the brightness or contrast button again to close the adjustment window. (Alternatively, wait five seconds for the window to close automatically.)

Using the OSD Main Window

The OSD main window enables you to make changes to a variety of display settings. You open the window by pressing the Select button when no other OSD windows are displayed on the screen.

In the OSD main window, you select icons for the settings you want to change:


Select the brightness icon to adjust the black level in the image.


Select the contrast icon to adjust the level of difference between light and dark areas of the image.


Select the horizontal size icon to adjust the horizontal size of the image.


Select the horizontal position icon to adjust the horizontal position of the image.


Select the vertical size icon to adjust the vertical size of the image.


Select the vertical position icon to adjust the vertical position of the image.


Select the pincushion icon to adjust any tapering or bowing of the sides of the image.


Select the trapezoid icon to adjust distortion that causes the image to take on a trapezoidal shape.


Select the color temperature icon to adjust the color temperature or white balance of the image. See the next section, “Choosing the Color Temperature,” for instructions.

(M70 display only) Select the degauss icon to degauss the display and restore image quality.

(M70 display only) Select the rotation icon to adjust the angle of the image.

Select the factory reset icon to return size and position settings to their original factory values. (If you're using a nonstandard screen resolution, this feature returns the display to the geometric settings in effect when the resolution was first applied..)

Select the exit icon to close the OSD main window and save any changes you have made.

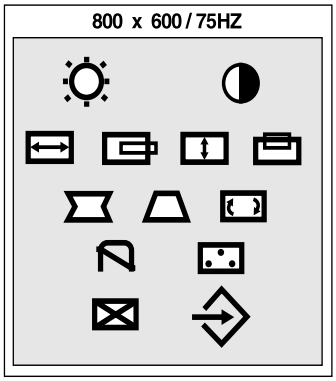
In most cases, when you select an icon, an adjustment window appears below the OSD main window. The adjustment window contains a control bar that you shorten or lengthen with the + or – key. A number next to the control bar shows the percentage of the current setting relative to its maximum value.

There are some exceptions to this pattern, however:

- Selecting the color temperature icon opens a window where you can make additional choices. See "Choosing the Color Temperature," for instructions.
- The degauss, factory reset, and exit options don't have adjustment windows. They take effect immediately after you select them.

To use the OSD main window:

1. When no other OSD windows are displayed on the screen, press the Select button on the front of the display to open the OSD main window.

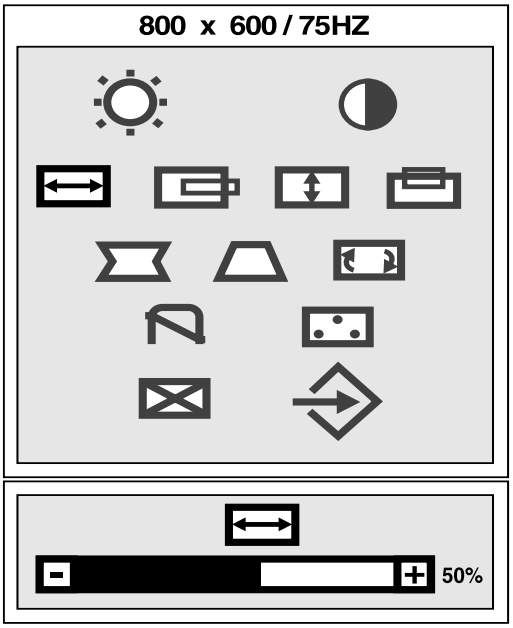


2. Press the + or – button to move among the icons in the window.

3. When the icon for the function you want is highlighted, press the Select button.

If you selected the degauss, factory reset, or exit option, it takes effect immediately.

If you selected another option, an adjustment window appears for the option you selected.



4. Press the + or – button to change the current setting.
5. Press the Select button to save your changes and close the adjustment window.
6. To close the OSD main window, select the Exit icon (⊠) or wait five seconds for the window to close automatically.

Choosing the Color Temperature

The default color settings in Productivity, Picture, and Games modes are optimized for best results in those environments, but you can change the color temperature temporarily when necessary. (If you need to save color settings for a particular application, use Personal Setup mode.)

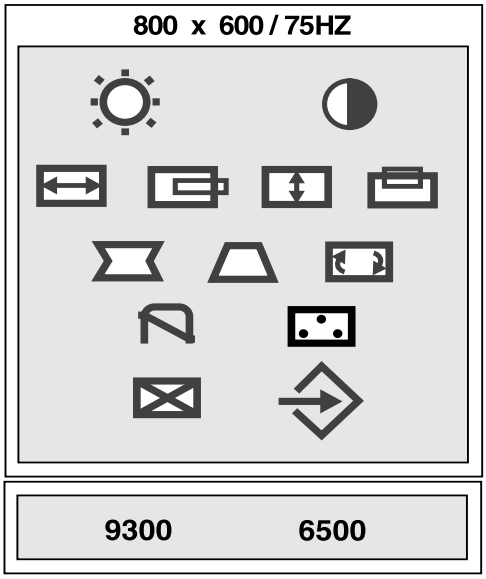
In Productivity and Games Modes, you can choose between two settings: 9300K and 6500K. In Picture mode, you can also choose a third setting—5000K. This setting is represented by the camera icon (📷).

In Personal Setup mode, you can choose colors to suit the color of the ambient lighting in your environment. 9300K is often used for office environments or fluorescent lighting. 6500K is often used for incandescent lighting.

You can also choose to individually adjust the red, green, and blue (RGB) values that make up the screen image. See "Setting Red, Green, and Blue Values," below for instructions.

To choose the color temperature

1. In the OSD main window, press the + or – button to move to the color temperature icon ( ).
2. Press the Select button to open the color adjustment window.



3. Press the + or – button to move to the color temperature option you want.
4. Press the Select button to select the color temperature and close the adjustment window.

Setting Red, Green, and Blue Values

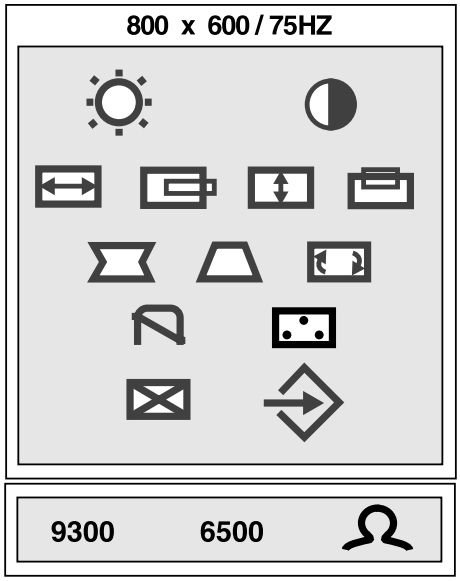
You may need to make very precise adjustments to the screen color. For example, under unique ambient lighting conditions, you may need to adjust the screen color so that it more closely matches the output of your printer. You can make these adjustments in Personal Setup mode by individually setting red, green, and blue (RGB) values.

Make sure to let the display warm up fully before trying to match colors precisely. It takes the display about 30 minutes to warm up completely after being turned on or recovering from a power-saving state.

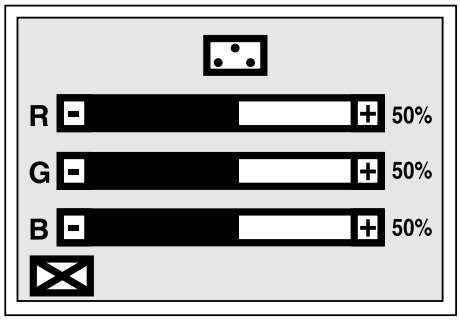
If you have difficulty getting an exact color match, reset each color (RGB) to the same level (e.g. 60%), then readjust to find the color setting you want.

To set RGB values

1. In the OSD main window, press the + or – button to move to the color temperature icon ( ).
2. Press the Select button to open the color adjustment window.



3. In the color adjustment window, use the + button to move to the Personal Setup icon ( ).
4. Press the Select button to open the RGB adjustment window. The Exit icon is highlighted by default.



5. If you want to accept the current RGB values, press the + or - button to close the window.

6. To make changes to color values, press the Select button to move to the red adjustment bar, then press the + or - button to adjust the value.
7. Press the Select button to move to the green adjustment bar, then press the + or – button to adjust it.
8. Press the Select button to move to the blue adjustment bar, then press the + or – button to adjust it.

Press the Select button to move to the exit icon (⌧), then press the + or – button to close the adjustment window. (Alternatively, wait five seconds for the window to close automatically.)

Technical Information

The displays are compatible with IBM PC, PC/XT, PC/AT, PS/2, and other PC-compatible computers. They are also compatible with VESA power-management standards. (See "DPMS Power-Management Features" at the end of this chapter.)

M40 Display Information

Item	Specification
Picture tube	14 in (35.6 cm), 90° deflection, non-glare, black matrix, light transmission 57% phosphor P22 medium short, 0.28 mm dot pitch
Maximum viewable area	270 mm (H) x 200 mm (V) 10.6 in (H) x 7.8 in (V)
Line (horizontal) frequency	30–49 KHz
Raster (vertical) frequency	50–100 Hz
Power source	100–240 VAC, 50/60 Hz
Maximum power consumption	74 W
Dot rate	65 MHz
Pedestal	Tilt: -5° forward, 12° backward Swivel: 90° left or right
Dimensions (W x H x D)	372 x 401 x 395 mm 14.9 x 16.0 x 15.8 in
Net weight	11 kg (24.3 lb.)
Operating Conditions Temperature Humidity	 5° to 35°C (41° to 95°F) 20% to 80%
Storage Conditions Temperature Humidity	 -25° to 55°C (-13° to 131°F) 20% to 80%, non-condensing

Table 16-1: M40 General Specifications

M40 Video Modes

The display supports the following industry-standard combinations of screen resolution and refresh rates. Other combinations are possible, but may require adjustments to the image size and position. The M40 display will store up to 12 user defined settings.(See "Using the OSD Main Window" above for information about making these adjustments.)

Resolution (dots x lines)	Vertical Frequency
640 x 480	60 Hz
640 x 480	75 Hz
640 x 480	85 Hz
720 x 400	70 Hz
800 x 600	60 Hz
800 x 600	75 Hz
1024 x 768	60 Hz

Table 16-2: Video Modes

CAUTION
Setting the screen resolution/refresh rate combination higher than 1024 x 768 at 60 Hz can damage the display.

M40 Pin Assignments

The following figure illustrates the 15-pin D-sub male video connector used by the M40 monitor. The table shows the pin assignments.

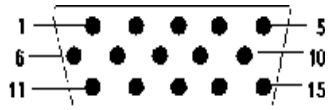


Figure 16-7: VGA Cable Connector

Pin Number	Assignment
1	Red video input
2	Green video input
3	Blue video input
4	Ground
5	DDC return
6	Red video return

Table 16-3: VGA Connector Pin Assignment (continued on next page)

Pin Number	Assignment
7	Green video return
8	Blue video return
9	No connect
10	Sync return
11	Ground
12	DDC data (SDA)
13	Horizontal sync
14	Vertical sync
15	DDC data clock (SCL)

Table 16-3: VGA Connector Pin Assignment (continued)

NOTE
Because of a policy of continuous product improvement, pin assignments are subject to change without notice.

M50 Display Information

Item	Specification
Picture tube	15 in (38.1 cm), 90° deflection, non-glare, black matrix, light transmission 57% phosphor P22 medium short, 0.28 mm dot pitch
Maximum viewable area	280 mm (H) x 210 mm (V) 11 in (H) x 8.25 in (V)
Line (horizontal) frequency	30–54 KHz
Raster (vertical) frequency	50–100 Hz
Power source	100–240 VAC, 50/60 Hz
Maximum power consumption	90 W
Dot rate	65 MHz
Pedestal	Tilt: -5° forward, 12° backward Swivel: 90° left or right
Dimensions (W x H x D)	372 x 401 x 395 mm 14.9 x 16.0 x 15.8 in
Net weight	13 kg (28.6 lb.)
Operating Conditions Temperature Humidity	 5° to 35°C (41° to 95°F) 20% to 80%
Storage Conditions Temperature Humidity	 -25° to 55°C (-13° to 131°F) 20% to 80%, non-condensing

Table 16-4: M50 General Specifications

M50 Video Modes

The display supports the following industry-standard combinations of screen resolution and refresh rates. Other combinations are possible, but may require adjustments to the image size and position. The M50 display will store up to 12 user defined settings.(See “Using the OSD Main Window” above for information about making these adjustments.)

Resolution (dots x lines)	Vertical Frequency
640 x 480	60 Hz
640 x 480	75 Hz
640 x 480	85 Hz
720 x 400	70 Hz
800 x 600	60 Hz
800 x 600	75 Hz
800 x 600	85 Hz
1024 x 768	60 Hz

Table 16-5: Video Modes

CAUTION
Setting the screen resolution/refresh rate combination higher than 1024 x 768 at 60 Hz can damage the display.

M50 Pin Assignments

The following figure illustrates the 15-pin D-sub male video connector used by the M50 monitor. The table shows the pin assignments.

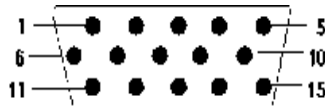


Figure 16-8: VGA Cable Connector

Pin Number	Assignment
1	Red video input
2	Green video input
3	Blue video input
4	Ground
5	DDC return
6	Red video return
7	Green video return
8	Blue video return
9	No connect
10	Sync return
11	Ground

Table 16-6: VGA Connector Pin Assignment (continued on next page)

Pin Number	Assignment
12	DDC data (SDA)
13	Horizontal sync
14	Vertical sync
15	DDC data clock (SCL)

Table 16-6: VGA Connector Pin Assignment (continued)

NOTE
Because of a policy of continuous product improvement, pin assignments are subject to change without notice.

M70 Display Information

Item	Specification
Picture tube	17 in (43.1 cm), 90° deflection, non-glare, light transmission 52% phosphor P22 medium short, 0.28 mm dot pitch
Maximum viewable area	320 mm (H) x 240 mm (V) 12.8 in (H) x 9.6 in (V)
Line (horizontal) frequency	30–70 KHz
Raster (vertical) frequency	50–120 Hz
Power source	100–240 VAC, 50–60 Hz
Maximum power consumption	130 W (maximum)
Dot rate	110 MHz
Pedestal	Tilt: -5° forward, 17° backward Swivel: -45° left or right
Dimensions (W x H x D)	408 x 416 x 450 mm 16.3 x 16.6 x 18.0 in
Net weight	19 kg (41.9 lb.)
Operating Conditions Temperature Humidity	 5° to 35°C (41° to 95°F) 20% to 80%, non-condensing
Storage Conditions Temperature Humidity	 -25° to 60°C (-13° to 140°F) 20% to 80%, non-condensing

Table 16-7: M70 General Specifications

M70 Video Modes

The M70 display supports the following industry-standard combinations of screen resolution and refresh rates. Other combinations are possible, but may require adjustments to the image size and position. The M70 display will store up to 9 user defined settings. (See “Using the OSD Main Window” above for information about making these adjustments.)

Resolution (dots x lines)	Vertical Frequency
640 x 480	60 Hz
720 x 400	70 Hz
800 x 600	75 Hz
800 x 600	85 Hz
1024 x 768	60 Hz
1024 x 768	75 Hz
1024 x 768	85 Hz
1280 x 1024	60 Hz

Table 16-8: Video Modes

CAUTION
Setting the screen resolution/refresh rate combination higher than 1280 x 1024 at 60 Hz can damage the display.

M70 Pin Assignments

The following figure illustrates the 15-pin D-sub male video connector used by the M70 monitor. The table shows the pin assignments.

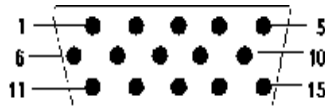


Figure 16-9: VGA Cable Connector

Pin Number	Assignment
1	Red video input
2	Green video input
3	Blue video input
4	Ground
5	DDC return
6	Red video return
7	Green video return
8	Blue video return
9	No connect
10	Sync return
11	Ground

Table 16-9: VGA Connector Pin Assignment (continued on next page)

Pin Number	Assignment
12	DDC data (SDA)
13	Horizontal sync
14	Vertical sync
15	DDC data clock (SCL)

Table 16-9: VGA Connector Pin Assignment (continued)

NOTE
Because of a policy of continuous product improvement, pin assignments are subject to change without notice.

DPMS Power-Management Features

The HP Pavilion M40, M50, and M70 displays can recognize power-management signals from VESA DPMS video adapters, such as those in HP Pavilion and many other computers. When the display receives an appropriate signal, it reduces its power but remains ready for quick use. The power light on the front panel turns amber when the display is in a power-saving mode.

VESA DPMS video adapters reduce display power consumption by setting the horizontal and/or vertical synchronization signals to inactive. The display will recover quickly when the synchronization signals are reapplied.

Standby and Suspend modes offer low power consumption with rapid recovery, while Sleep mode offers the lowest power consumption and a somewhat slower recovery.

The following table shows the characteristics of the normal operating mode and the three power-saving modes.

VESA DPMS Power Management						
				Power Used		
Mode	Video	H-Sync	V-Sync	M40	M50	M70
On	Active	Yes	Yes	74W	90W	130W
Standby	Blank	No	Yes	<15W	<15W	<30W
Suspend	Blank	Yes	No	<15W	<15W	<30W
Sleep	Blank	No	No	<8W	<8W	<8W

Table 16-10: Power Management States

Part 2 - HP Pavilion S40 Multimedia Display

The HP Pavilion S40 Multimedia Display (Model D5298) is high-resolution, multi-scan color monitor designed for use with HP Pavilion computers. Each display includes mounts for the speakers supplied with HP Pavilion computers. The display complies with EPA ENERGY STAR standards and includes automatic power-management features.

Other features include:

- Support for VGA, SVGA, VESA VGA, UVGA and a maximum non-interlaced resolution of 1024 x 768
- Front panel controls
- Non-glare picture tube to reduce the reflection of ambient light (European models)
- Plug and Play compatibility
- Compliance with Swedish MPR II guidelines for reduced electromagnetic emissions (European models)
- Support for high refresh rates to reduce screen flicker and eyestrain
- Tilt and swivel base

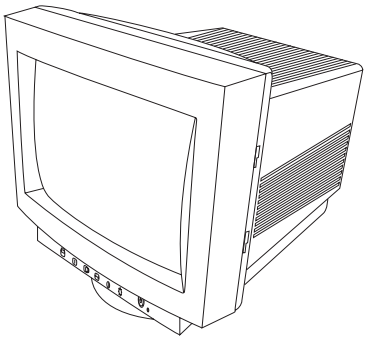


Figure 16-10: S40 Multimedia Display

For Your Safety

For your safety and the protection of your display, follow these precautions:

- Always connect the display to a grounded, three-prong power outlet. Use only the factory-supplied power cord.

WARNING
To completely disconnect power from the display, you must remove the power cable from the power socket.

- To prevent electrical shock, do not remove the back cover of the display. The cover should be removed only by qualified service personnel.
- Position the display so the power cord is accessible.
- Do not place objects on top of the display that could fall into the vents or block airflow.
- To avoid the risk of damage to the display and electrical shock to yourself, do not expose the display to rain or moisture.
- Adjust only those controls whose operations are covered in this manual. Improperly adjusting other controls may result in damage and could require repair by a service technician.

If any of the following conditions occur, unplug the display and contact a qualified service technician:

- The power cord or plug is frayed or damaged.
- You have spilled liquid into the display.
- The display has been exposed to rain or water.
- The display does not operate correctly when the operating instructions are followed.
- The display has been dropped or the cabinet has been damaged.
- The performance of the display changes abruptly.

Installation

Follow the instructions in this section to install the HP Pavilion S40 Multimedia Display.

NOTE
Before installing the display, refer to your computer and video adapter documentation. You may need to make changes to accommodate the display.

Unpacking the Display

When you unpack the display, make sure that you have the following items:

- The display with its attached video cable
- Tilt and swivel base
- A power cord

Installing the Base Pedestal

1. Turn the monitor upside down on a sturdy surface. (Don't place it screen-side down; the glass can be scratched.)

2. Position the base pedestal with the latch facing the back of the monitor.

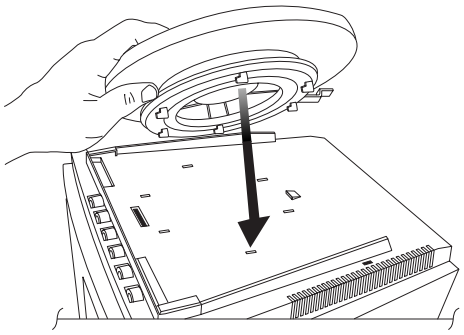


Figure 16-11: Installing the Base Pedestal

3. Insert the six tabs on the base pedestal into the six slots found on the bottom of the monitor.
4. Push the base pedestal toward the front of the monitor until it snaps into position.

Where to Place the Display

Place the display on a flat, sturdy surface. If you plan to use the display with a desktop PC, you can place it on top of the computer. (If you're not using an HP Pavilion computer, check the documentation for the maximum weight the computer's case can hold.)

Choose an area that is free from excessive heat, moisture, and sunlight. Avoid possible sources of electromagnetic interference, such as transformers, motors, fluorescent lighting, and other computer displays.

Connecting the Monitor to the Computer

Before connecting any cables, make sure to read the safety instructions at the beginning of the manual. The computer and display must be turned off.

To connect the power and video cables:

1. Make sure the monitor and computer are turned off.
2. Connect the power cord to the back of the display.

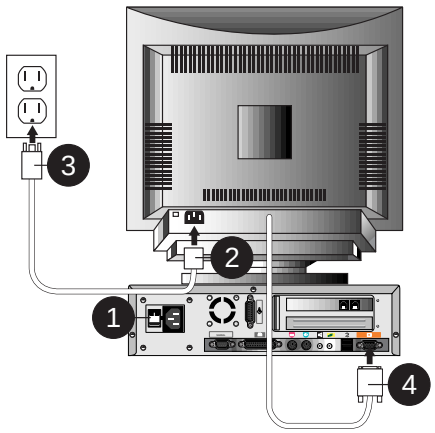


Figure 16-12: Connect the Cables

3. Plug the other end of the power cord into a grounded power outlet.
4. Connect the video cable on the monitor to the 15-pin video graphics connector on the rear panel of the computer and tighten the fastening screws. (If you have an HP Pavilion computer, this port is marked in orange. For other computers, check your computer manual for the video port location.)

Connecting the Speakers

The display is designed for use with the HP/Polk Audio speakers supplied with HP Pavilion computers.

To connect the speakers:

1. Identify the left and right speakers. You can tell which side a speaker fits onto by its mounting pegs. The side of the speaker with mounting pegs fits against the side of the display.
2. Fit the pegs of the right speaker into the corresponding holes on the right side of the display, then push down until the speaker is secure.

   To make mounting easier, angle the speaker slightly toward the center of the display, then insert the pegs.

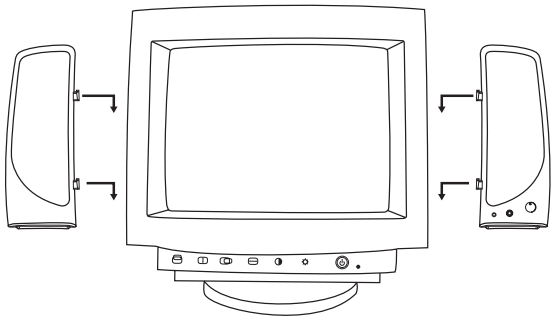


Figure 16-13: Mounting the Speakers

If the computer comes with "A" or "B" speakers, it also comes with a Y-connector. Follow steps 3 and 4 below for connecting "A" or "B" speakers. If, however, the computer comes with "D" speakers, which include an AC Power Adapter, follow steps 5 through 7 for the connecting procedures.

3. Plug the two speaker wire connectors into the Y-connector.
4. Plug the single connector on the end of the Y-connector's cable to the sound-out port on your computer. (Check in the computer's documentation for the location of the port.) The "A" or "B" speakers are now ready for operation.
5. Plug the left speaker cable in to the connector marked "SPEAKER" on the right speaker.
6. Plug one end of the audio cable in to the "INPUT" connector on the right speaker and the other of the cable to the speaker connector on the back of the computer system.
7. Connector the AC Power Adapter cable to the 9Volt connector on the right speaker and then plug in the adapter. The "D" speakers are now ready for operation.

Changing Display Settings

Your Pavilion S40 Multimedia Display is capable of displaying several different resolution settings and may be adjusted for different ambient lighting conditions (compatible resolutions are shown in the Technical Specifications section of this manual). Depending on the mode you choose in the Display Settings window on your PC, you may need to make minor adjustments for the image size and center. To make these adjustments, refer to the following table.

Adjust the brightness control so that black areas of the image appear black, then adjust the contrast control until you are satisfied.

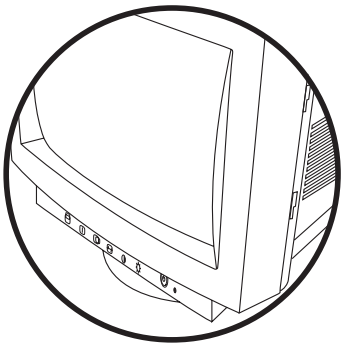


Figure 16-14: Display Controls

Icon	Control	Function
	Vertical Position	Centers image vertically
	Vertical Height	Sizes image vertically
	Horizontal Position	Centers image horizontally
	Horizontal Width	Sizes image horizontally
	Contrast	Adjusts screen contrast
	Brightness	Adjusts screen brightness
	Power Switch	Turns monitor on and off

Table 16-11: HP Pavilion S40 Front Panel Controls

Technical Information

This display is compatible with IBM PC, PC/XT, PC/AT, PS/2, and other PC-compatible computers.

S40 Display Information

Item	Specification
Picture tube	90° deflection, black matrix, light transmission, 57% phosphor, P22 medium short, 0.28 mm dot pitch (European only: non-glare/anti-static, MPR compliant)
CRT size	14 in (35.6 cm)
Maximum viewable area	270 mm (H) x 200 mm (V) 10.6 in (H) x 7.8 in (V)
Maximum diagonal visible image area	13.2 in or 33.5 cm
Weight unpacked	24.3 lb. or 11 kg
Dimensions (W x H x L)	370 x 355 x 394 mm 14.6 x 14.0 x 15.5 in
Power source	100–240 VAC, 50/60 Hz
Power consumption	less than 80 watts maximum
Operating Conditions Temperature Humidity	 5° to 35°C (41° to 95°F) 15% to 80%

Table 16-12: S40 General Specifications

S40 Video Modes

The display supports the following industry-standard combinations of screen resolution and refresh rates.

Resolution (dots x lines)	Vertical Frequency
640 x 350	70 Hz
640 x 480	60 Hz
640 x 480	75 Hz
720 x 400	70 Hz
800 x 600	60 Hz
800 x 600	75 Hz
1024 x 768	60 Hz

Table 16-13: Video Modes

CAUTION
Setting the screen resolution/refresh rate combination higher than 1024 x 768 at 60 Hz can damage the display.

S40 Pin Assignments

The following figure illustrates the 15-pin D-sub male video connector used by the S40 monitor. The table shows the pin assignments.

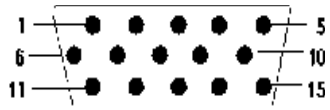


Figure 16-15: VGA Cable Connector

Pin Number	Assignment
1	Red video input
2	Green video input
3	Blue video input
4	Ground
5	DDC return
6	Red video return
7	Green video return
8	Blue video return
9	No connect
10	Sync return
11	Ground
12	DDC data (SDA)
13	Horizontal sync
14	Vertical sync
15	DDC data clock (SCL)

Table 16-14: VGA Connector Pin Assignment

NOTE
Because of a policy of continuous product improvement, pin assignments are subject to change without notice.

Part 3 - HP Pavilion M90 Multimedia Display

The HP Pavilion M90 Multimedia Display (model D6433A) is a high-resolution, multi-scan color monitor designed for use with HP Pavilion and other computers. Each display includes a built-in microphone and mounts for the speakers supplied with HP Pavilion computers. The display complies with EPA Energy Star® standards and includes automatic power management features.

Other features include:

- Support for VGA, SVGA, VESA VGA, UVGA and a maximum non-interlaced resolution of 1024 x 768
- Front panel controls
- Non-glare picture tube to reduce the reflection of ambient light (European models)
- Plug and Play compatibility
- Compliance with Swedish MPR II guidelines for reduced electromagnetic emissions (European models)
- Support for high refresh rates to reduce screen flicker and eyestrain
- Built-in tilt and swivel base

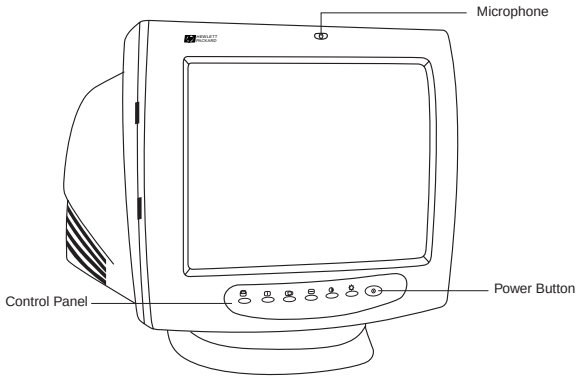


Figure 16-16: M90 Multimedia Display

For Your Safety

For your safety and the protection of your display, follow these precautions:

- Always connect the display to a grounded, three-prong power outlet. Use only the factory-supplied power cord.

WARNING
To completely disconnect power from the display, you must remove the power cable from the power socket.

- To prevent electrical shock, do not remove the back cover of the display. The cover should be removed only by qualified service personnel.
- Position the display so the power cord is accessible.
- Do not place objects on top of the display that could fall into the vents or block airflow.
- To avoid the risk of damage to the display and electrical shock to yourself, do not expose the display to rain or moisture.
- Adjust only those controls whose operations are covered in this manual. Improperly adjusting other controls may result in damage and could require repair by a service technician.

If any of the following conditions occur, unplug the display and contact a qualified service technician:

- The power cord or plug is frayed or damaged.
- You have spilled liquid into the display.
- The display has been exposed to rain or water.
- The display does not operate correctly when the operating instructions are followed.
- The display has been dropped or the cabinet has been damaged.
- The performance of the display changes abruptly.

Installation

Follow the instructions in this section to install the HP Pavilion M90 Multimedia Display.

NOTE
Before installing the display, refer to your computer and video adapter documentation. You may need to make changes to accommodate the display.

Unpacking the Display

When you unpack the display, make sure that you have the following items:

- The display with its attached video cable
- A power cord

Where to Place the Display

Place the display on a flat, sturdy surface. Choose an area that is free from excessive heat, moisture, and sunlight. Avoid possible sources of electromagnetic interference, such as transformers, motors, fluorescent lighting, and other computer displays.

Connecting the Monitor to the Computer

Before connecting any cables, make sure to read the safety instructions at the beginning of the manual. The computer and display must be turned off.

To connect the power and video cables:

1. Make sure the monitor and computer are turned off.
2. Connect the power cord to the back of the display.

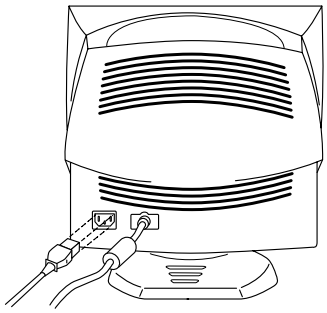


Figure 16-17: Connect the Power Cord

3. Plug the other end of the power cord into a grounded power outlet.
4. Connect the video cable on the monitor to the 15-pin video graphics connector on the rear panel of the computer and tighten the fastening screws. (If you have an HP Pavilion computer, this port is marked in orange. For other computers, check your computer manual for the video port location.)

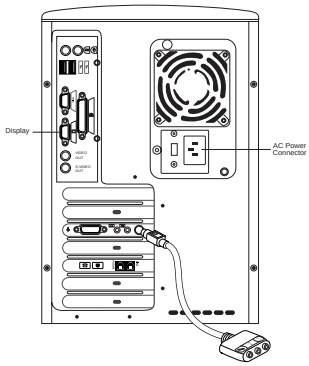


Figure 16-18: Connectors on the HP Pavilion

5. Insert the yellow microphone cable plug into the sound input connector on the back of your computer. On HP Pavilion computers, the connector is marked in yellow.

Connecting the Speakers

The display is designed for use with the HP/Polk Audio speakers supplied with HP Pavilion computers.

To connect the speakers:

1. Identify the left and right speakers. You can tell which side a speaker fits onto by its mounting pegs. The side of the speaker with mounting pegs fits against the side of the display.
2. Fit the pegs of the right speaker into the corresponding holes on the right side of the display, then push down until the speaker is secure.

   To make mounting easier, angle the speaker slightly toward the center of the display, then insert the pegs.

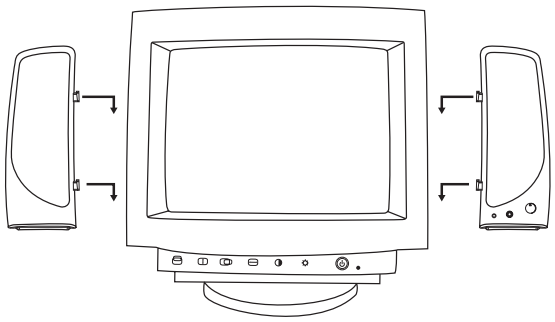


Figure 16-19: Mounting the Speakers

If the computer comes with "A" or "B" speakers, it also comes with a Y-connector. Follow steps 3 and 4 below for connecting "A" or "B" speakers. If, however, the computer comes with "D" speakers, which include an AC Power Adapter, follow steps 5 through 7 for the connecting procedures.

3. Plug the two speaker wire connectors into the Y-connector.
4. Plug the single connector on the end of the Y-connector's cable to the sound-out port on your computer. (Check in the computer's documentation for the location of the port.) The "A" or "B" speakers are now ready for operation.
5. Plug the left speaker cable in to the connector marked "SPEAKER" on the right speaker.
6. Plug one end of the audio cable in to the "INPUT" connector on the right speaker and the other of the cable to the speaker connector on the back of the computer system.

7. Connector the AC Power Adapter cable to the 9Volt connector on the right speaker and then plug in the adapter. The "D" speakers are now ready for operation.

Using the Display

Turning the Display On and Off

Use the Power button on the front panel to turn the display on and off. When the display is on, the light near the Power button is illuminated. The light is green when the display and computer are active and amber when the display is in one of its reduced power modes.

The display's power management features reduce power consumption to low levels when your computer has been inactive for a specified period of time.

Because of the display's power management features, you don't normally need to turn off the display when it's not in use. When turned off, the display uses the same amount of power that it uses in sleep mode (less than eight watts).

If your computer doesn't support DPMS power management, you can reduce power consumption by turning off the monitor when it won't be used for an extended period. You can turn the display off even if you leave the computer running.

Degaussing the Display

Degaussing removes magnetism that causes unwanted color variations. Degauss the display any time you notice unusual color variations. If you leave the display continuously turned on or frequently change its position, then degauss the display about once a week.

NOTE
Do not degauss more frequently than once every 30 minutes, or the degauss will be incomplete.

There are two degaussing options for the M90 display. Each time you turn on the display, it is automatically degaussed. You can also use the Degauss option in the OSD main window to degauss the display.

Setting the Screen Resolution

The screen resolution determines the amount of information shown in the display. Screen resolution refers to the number of dots or pixels used to make up an image. A low screen resolution means that the display uses a relatively small number of relatively large dots. A higher resolution means that more dots of a smaller size make up the image. With higher screen resolutions, icons, windows, and text are smaller on the screen; but more information can be displayed.

The screen resolution is set by using the Control Panel menu item, in the Settings group on the Start menu on the Windows desktop. The M90 display supports many common screen resolutions. Check the documentation supplied with your computer or video adapter to find out which resolutions they support.

Selecting Refresh Rate

To minimize eyestrain and maximize the performance of your display, use the highest possible image refresh rate or vertical frequency for which you don't perceive flicker (generally at or above 75 Hz for most users). (The image refresh rate is the number of times per second that the image is refreshed.)

Minimizing Energy Use

HP Pavilion computers support VESA Display Power Management Signaling (DPMS). Power Management features reduce the display's power consumption after a period of keyboard inactivity.

The display supports three different power-saving modes–Standby, Suspend, and Sleep.

When the display is in one of its power-saving modes, the screen is blanked out and the front panel power indicator is amber. Consult your computer's user's guide for information about setting the power-saving modes

Cleaning the Screen

The screen of the display has a high-quality optical coating that reduces glare and static buildup. To prevent damage to this coating, use only regular household glass cleaner to clean it.

WARNING
Don't use cleaning solutions containing fluoride, acids, or alkalis. Never use hard or abrasive cleaning products to clean the screen.

To clean the screen:

1. Turn off and unplug the display.
2. Spray a soft cotton cloth with glass cleaner and gently wipe the screen.
3. Dry the screen with a soft cotton cloth.
4. Plug in the display and turn it on.

Adjusting the Viewing Angle

The display's pedestal mounting enables you to adjust the viewing angle. You can tilt and swivel the display to find the most comfortable viewing position.

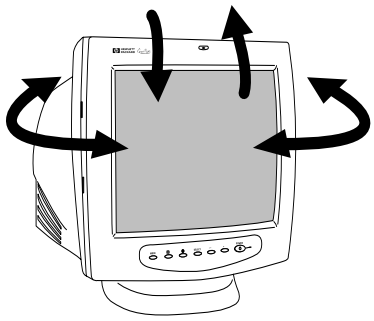


Figure 16-20: Adjusting the Viewing Angle

Changing Display Settings

You use the OSD (On-Screen Display) features of the Pavilion displays to change their settings. The buttons on the front panel control on-screen icons and windows.

Using the Front Panel

You use the six buttons on the front of the display to control OSD functions.

MODE	The Mode button allows you to choose from the display's custom preset modes. See the next section, "Setting the Custom Preset Mode," for instructions.
☼	The brightness button opens and closes the brightness adjustment window.
◑	The contrast button opens and closes the contrast adjustment window.
SELECT	The Select button opens the OSD main window if no other OSD windows are displayed. In the OSD main window, the Select button opens the adjustment window for the selected icon.
-	The minus button decreases a setting if an adjustment window is open. In the OSD main window, the button moves backward through the icons.
+	The plus button increases a setting if an adjustment window is open. In the OSD main window, the button moves forward through the icons.

Setting the Custom Preset Modes

Your display is configured for excellent performance right out of the box. If you want to optimize the display's settings for a particular activity, however, you can use custom preset modes.

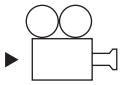
Pre-Set Contrast Modes

Pre-set contrast modes enable you to quickly change contrast settings to match those commonly used for various activities and viewing conditions. The two pre-set contrast modes are Text and Video/Games.

Two pre-set contrast modes are provided:

Text mode is designed for best results in lower ambient lighting environments and with applications like word processors and spreadsheets. This is a lower contrast setting.

Benefit: Eye comfort, less fatigue, and improved focus.

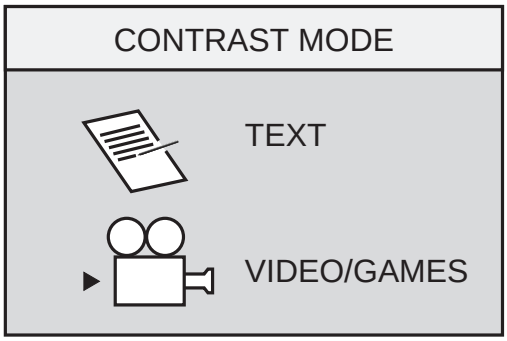


Video/Games mode offers higher contrast appropriate for viewing full-motion video, and for photographic and pre-press applications.

Benefit: Higher contrast for vibrant, vivid images, and maximum visual impact with games and video.

To set a pre-set contrast mode:

1. Press the Mode button on the front of the display. The Mode window opens.



2. To select a mode, press the Mode button again. (Or, press the Plus (+) or Minus (–) button to change which mode icon is selected.)

3. When the icon for the display mode you want is highlighted, press the Select button. The Mode window closes. (Or, wait five seconds for the window to close automatically.)

Changing Mode Settings

The pre-set contrast modes are the overall, master settings for brightness, contrast, and other image settings. You may make further adjustments to the image settings by using the OSD, also called slave adjustment.

If you turn off the display, the last used mode is active when you turn it back on.

Changes to color temperature are independent of the contrast mode setting—the two modes will function the same way with any color setting.

Adjusting the Brightness and Contrast

You can change the display's brightness or contrast quickly by pressing the Brightnessor Contrast button on the front panel. Brightness adjusts the black level, while contrast adjusts the difference between the dark and light parts of the image.

Adjust the brightness level so that black items on the screen appear black. Then adjust the contrast for the most comfortable viewing.

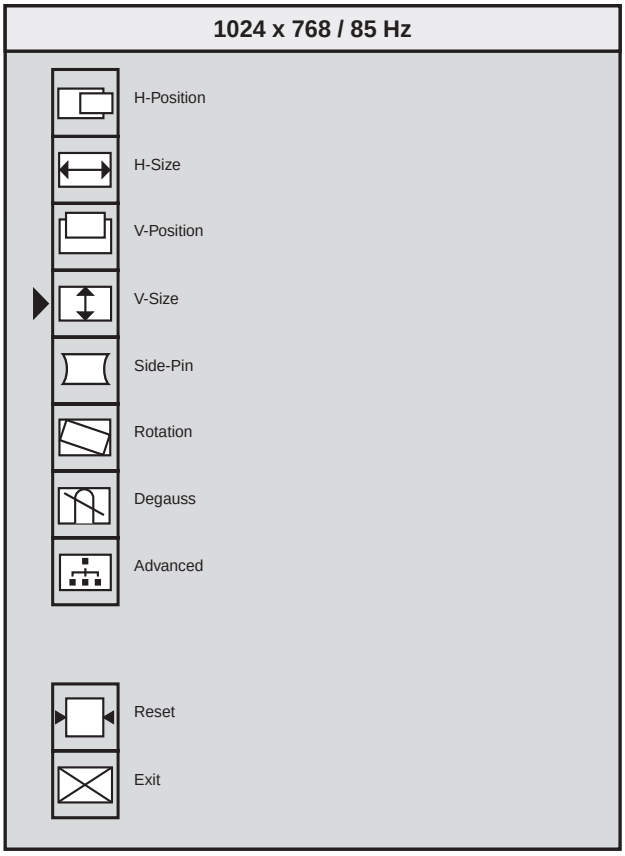
To adjust the brightness or contrast:

1. Press the Brightness or Contrast button on the front panel to open the Brightness Adjustment window, or the Contrast Adjustment window.

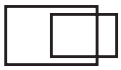
2. Press the Plus (+) or Minus (–) button to increase or decrease the setting from its current position.
3. When the brightness or contrast is at the desired level, press the Brightness or Contrast button again to close the adjustment window. (Or, wait five seconds for the window to close automatically

Using the OSD Main Window

The OSD Main window enables you to make changes to a variety of display settings. You open the window by pressing the Select button when no other OSD windows are displayed on the screen.

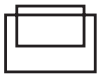


In the OSD Main window, you select icons for the settings you want to change:



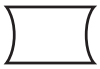
H-Position Select the Horizontal Position icon to adjust the horizontal position of the image.

H-Size Select the Horizontal Size icon to adjust the horizontal size of the image.



V-Position Select the Vertical Position icon to adjust the vertical position of the image.

V-Size Select the Vertical Size icon to adjust the vertical size of the image.



Side-Pin Select the Side-Pin icon to adjust any tapering or bowing of both sides of the image.

Rotation Select the Rotation icon to adjust the angle of the image.

Degauss Select the Degauss icon to degauss the display and restore image quality.

Advanced Select the Advanced icon to open the Advanced OSD window.

Reset Select the Reset icon to return size and position settings to their original factory values. (If you're using a nonstandard screen resolution, this feature returns the display to the geometric settings in effect when the resolution was first applied.)

Exit Select the Exit icon to close the OSD Main window and save any changes you have made.

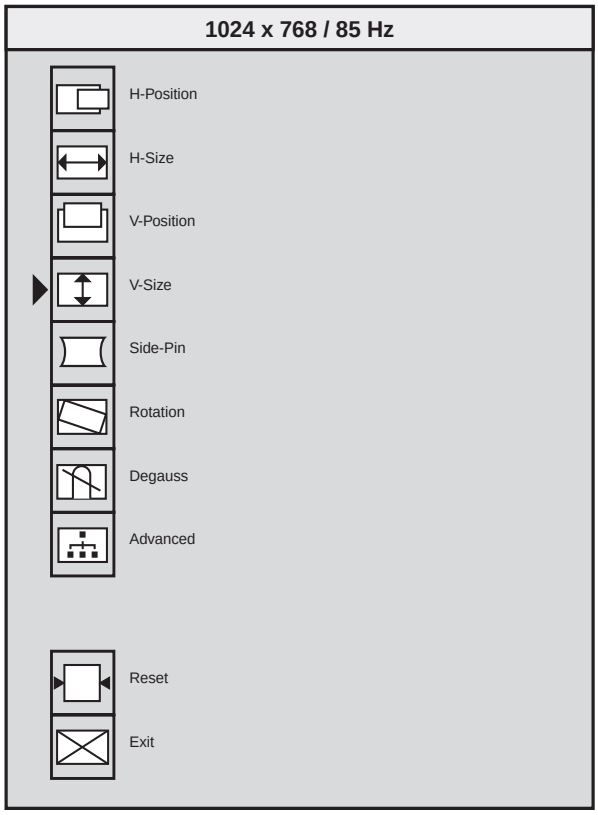
In most cases, when you select an icon, an adjustment window appears below the OSD window. The adjustment window contains a control bar that you shorten or lengthen with the Plus (+) or Minus (–) button. A number next to the control bar shows the percentage of the current setting relative to its maximum value.

There are some exceptions to this pattern, however:

- Selecting the Color icon opens a window where you can make additional choices.
- The Degauss, Reset, and Exit options don't have adjustment windows. They take effect immediately after you select them.
- Selecting the Moire Control icon in the OSD Advanced window opens the Moire window for both horizontal and vertical moire adjustments.
- Selecting the OSD Position icon in the OSD Advanced window opens the Position Adjustment window for both horizontal and vertical position adjustments.

To use the OSD Main window:

1. When no other OSD windows are displayed on the screen, press the Select button on the front of the display to open the OSD Main window.

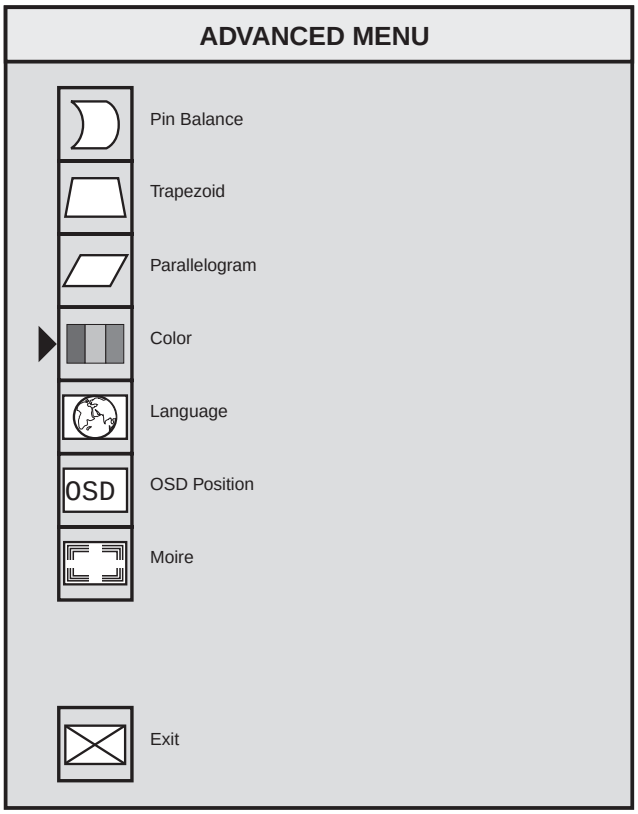


2. Press the Plus (+) or Minus (–) button to move among the icons in the window.
3. When the icon for the function you want is highlighted, press the Select button.
   If you selected the Degauss, Reset, or Exit option, the option takes effect immediately.
   If you selected another option, an adjustment window appears for the option you selected.

4. Press the Plus (+) or Minus (–) button to change the current setting.
5. Press the Select button to save your changes and close the adjustment window.
6. To close the OSD Main window, select the Exit icon or wait five seconds for the window to close automatically.

Using the OSD Advanced Window

The OSD Advanced window enables you to make changes to a variety of advanced display settings. Except in special circumstances, you will not need to adjust these settings; but they are available to you as added options. To open the Advanced window, select the Advanced icon in the OSD Main window when no other OSD windows are displayed on the screen.



In the OSD Advanced window, you select icons for the advanced settings you want to change:

Pin Balance Select the Pin Balance icon to straighten the left or right side of the image when only one side of the image is bowed.

Trapezoid Select the Trapezoid icon to make the vertical sides parallel to each other.

Parallelogram Select the Parallelogram icon to square the image.

Color Select the Color icon to adjust the color temperature or white balance of the image.

Language Select the Language icon to set the language of the OSD window (English, German, Spanish, Italian, or French).

OSD Position Select the OSD Position icon to adjust the position of the OSD window (up, down, left, or right) and all adjustment windows.

Moire Control Select the Moire Control icon to reduce wavy colored lines or patterns in the background of your image. Horizontal and vertical controls are available.

Exit Select the Exit icon to close the OSD Advanced window and save any changes you have made.

In most cases, when you select an icon, an adjustment window appears below the OSD Advanced window. The adjustment window contains a control bar that you shorten or lengthen with the Plus (+) or Minus (–) button. A number next to the control bar shows the percentage of the current setting relative to its maximum value.

Choosing the Color Temperature

The default color settings in the Text and Video/Games modes are optimized for best results in those environments, but you can change the color temperature temporarily when necessary.

In either Text or Video/Games mode, you can choose between three settings: COLOR1: 9300K, COLOR2: 6500K, or COLOR3: 5500K.

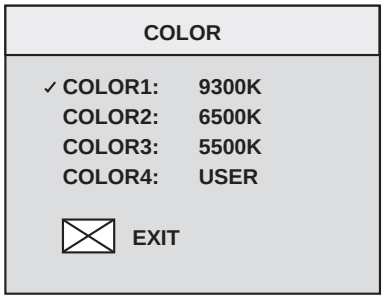
In either mode, you can choose colors to suit the color of the ambient lighting in your environment. 9300K is often used for office environments or fluorescent lighting. 5500K is often used for incandescent lighting.

You can also choose to individually adjust the red, green, and blue (RGB) values that make up the screen image.

To choose the color temperature:

1. On the OSD Advanced window, press the Plus (+) or Minus (–) button to move to the Color icon.

2. Press the Select button to open the Color Adjustment window.



Press the Plus (+) or Minus (–) button to move to the color temperature option you want.

3. Press the Select button to select the color temperature
4. Select the **Exit** icon to close the window.

Setting Red, Green, and Blue Values

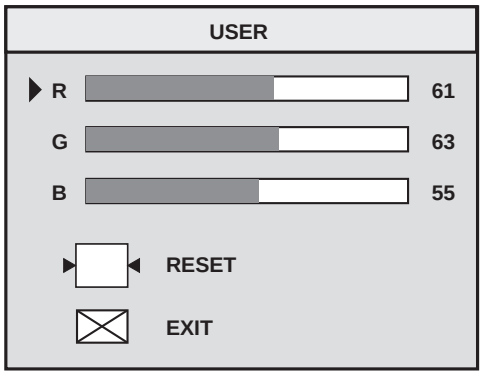
You may want to make very precise adjustments to the screen color. For example, under unique ambient lighting conditions, you may need to adjust the screen color so that it more closely matches the output of your printer. You can make these adjustments in either the Text or Video/Games mode by individually setting red, green, and blue (RGB) values.

Make sure to let the display warm up fully before trying to match colors precisely. It takes the display about 30 minutes to warm up completely after being turned on or recovering from a power-saving state.

If you have difficulty getting an exact color match, reset each color to its middle value (50%), then readjust to find the color setting you want.

To set RGB values:

1. In the OSD Advanced window, press the Plus (+) or Minus (–) button to move to the Color icon. 
2. Press the Select button to open the Color Adjustment window.
3. In the Color Adjustment window, press the Plus (+)or Minus (–) button to move to the COLOR4: USER setting.
4. Press the Select button to open the RGB Adjustment window.
5. Press the Plus (+) or Minus (–) button to move among the options, press Select to choose an option.



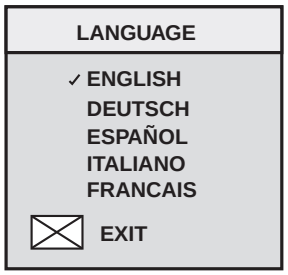
6. When a color is selected, press the Plus (+) or Minus (–) button to increase or decrease the video gain for that color, then press Select to save the change.
7. With the **Reset** icon selected, press Select to reset the colors to the original factory adjustments and close the window

Choosing a Language

To choose a language for the text in the OSD window:

1. In the OSD Advanced window, press the Plus (+)or Minus (–) button to move to the Language icon.

2. Press the Select button to open the Language Selection window.



3. Press the Plus (+) or Minus (-) button to move to the language you want.
4. Press the Select button to select the language and exit.

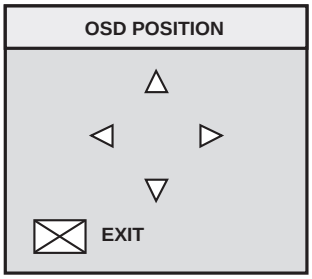
Choosing the OSD Position

The default OSD window position for the Main, Advanced, and Adjustment windows is the center of the screen, but you can change the window position.

To adjust the OSD window position:

1. In the OSD Advanced window, press the Plus (+) or Minus (–) button to move to the OSD Position icon.

2. Press the Select button to open the OSD Position Adjustment window.



3. Press the Select button to move between options.
4. With the vertical pointers selected, press the Plus (+) or Minus (–) button to move the OSD window up or down.
5. With the horizontal pointers selected, press the Plus (+) or Minus (–) button to move the OSD window right or left.
6. With the Exit icon selected, press the Plus (+) or Minus (–) button to close the window.

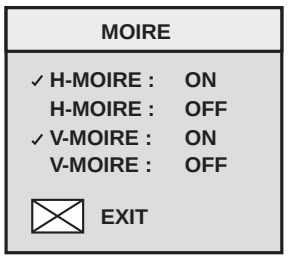
Adjusting the Moire Filters

Select the Moire Control icon to make a filter adjustment and reduce wavy colored lines or patterns in the background of your image. Separate adjustment of horizontal and vertical moire is available.

To adjust the moire filter:

1. In the OSD Advanced window, press the Plus (+) or Minus (–) button to move to the Moire Control icon.

2. Press the Select button to open the Moire Adjustment window.
3. Press the Plus (+) or Minus (–) button to move among the options.



4. Press the Select button to select an option. An adjustment bar will appear underneath the Moire window if "H-Moire : On" or "V-Moire : On" is selected.
5. Press the Plus (+) or Minus (–) button to change the current settings, while viewing the change on the monitor.
6. Press the Select button to save your changes and close the adjustment bar.
7. To close the Moire window, press the Plus (+) or Minus (–) button to select the Exit icon, and then press Select.

Restoring Factory Adjustments

To restore all parameters to the original factory values:

1. Turn the power off.
2. While pressing the Plus (+) button, turn the power back on.

Technical Information

The display is compatible with IBM PC, PC - compatible, and PS/2 computers. It is also compatible with VESA power management standards.

Display Information

Picture tube	19 in (482 mm), 90° deflection, 46% light transmission, phosphor P22 medium short, 0.26mm dot pitch, semi-tint, anti-reflective/ anti-static coating (Ar-asc)
Maximum viewable area	365 mm (H) x 274 mm (V) 14.4 in (H) x 10.8 in (V) 18 in (457mm) diagonal
Line (horizontal) frequency	30–95 kHz
Raster (vertical) frequency	50–160 Hz
Power source	100–240 VAC, 50–60 Hz (auto switching)
Power consumption	150 W (maximum)
Dot rate	210 MHz

Figure 16-14: Display Information (continued on next page)

Pedestal	Tilt: 5° forward, 17° backward Swivel: -45° left or right
Dimensions (W x H x D)	456 mm x 471 mm x 467 mm
Net weight	25.0 kg
Operating Conditions **Temperature** **Humidity** **Altitude**	0° to 40°C (32° to 104°F) 20% to 80%, non-condensing 0 to 10,000 feet
Storage Conditions **Temperature** Humidity	-25° to 60°C (-13° to 140°F) 20% to 80%, non-condensing

Figure 16-14: Display Information (continued)

Video Modes

The M90 display supports the following industry-standard combinations of screen resolution and refresh rates, indicated with a ✓. Other combinations are possible, but may require adjustments to the image size and position.

Resolution (dots x lines)	60Hz	70Hz	75Hz	85Hz
640 x 480	✓*	N/A	✓	✓
720 x 400	✓	✓*	N/A	N/A
800 x 600	✓	N/A	✓	✓*
1024 x 768	✓	✓	✓	✓*
1152 x 864	N/A	N/A	✓*	N/A
1280 x 960	✓	N/A	N/A	✓*
1280 x 1024	✓	N/A	✓*	✓*
1600 x 1200	✓	✓	✓*	N/A

Figure 16-15: Video Modes (* Factory preset mode)

WARNING
Setting the screen resolution/refresh rate combination higher than

1600 x 1200 at 75 Hz/93.75 kHz may damage the display.

Pin Assignments

The following figure illustrates the 15-pin D-sub male video connector used by the M90 display. The table shows the pin assignments.

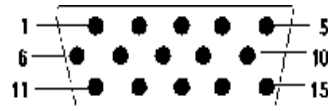


Figure 16-21: VGA Cable Connector

Pin Number	Assignment
1	Red video input
2	Green video input
3	Blue video input
4	Ground
5	DDC return
6	Red video return
7	Green video return
8	Blue video return
9	No connect
10	Sync return
11	Ground
12	DDC data (SDA)
13	Horizontal sync
14	Vertical sync
15	DDC data clock (SCL)

Table 16-16: VGA Connector Pin Assignment

NOTE
Because of a policy of continuous product improvement, pin assignments are subject to change without notice.

DPMS Power Management Features

To maximize screen life:

- Take advantage of your computer's power management system to control your display.

- The HP Pavilion M90 Multimedia Display can recognize power management signals from VESA Display Power Management Signaling (DPMS video adapters, such as those in HP Pavilion and many other computers. When the display receives an appropriate signal, it reduces its power but remains ready for quick use. The power light on the front panel turns amber when the display is in a power-saving mode.
- VESA DPMS video adapters reduce display power consumption by setting the horizontal and/or vertical synchronization signals to inactive. The display will recover quickly when the synchronization signals are reapplied.
- Standby and Suspend modes offer low power consumption with rapid recovery, while Sleep mode offers the lowest power consumption and a somewhat slower recovery.

The following table shows the characteristics of the normal operating mode and the three power-saving modes.

VESA Display Power Management Signaling (DPMS)				
Mode	Video	Hor. Sync.	Vert. Sync.	Power Used
On	Active	Yes	Yes	130 W
Standby	Blank	No	Yes	<15 W
Suspend	Blank	Yes	No	<15 W
Sleep	Blank	No	No	<8 W

Table 16-17: VESA Display Modes