

COMPAQ

**Service Reference
Guide**

COMPAQ

Notice

© 2001 Compaq Computer Corporation.

Compaq, the Compaq logo, and Deskpro Registered in U. S. Patent and Trademark Office. iPAQ, ROMPaq, INSPECT, and Compaq Insight Manager are trademarks of Compaq Information Technologies Group, L.P. in the United States and/or other countries.

Microsoft, MS-DOS, Windows and Windows NT are trademarks of Microsoft Corporation in the United States and other countries.

Intel, Pentium, and Celeron are trademarks of Intel Corporation in the United States and other countries.

All other product names mentioned herein may be trademarks of their respective companies.

Compaq shall not be liable for technical or editorial errors or omissions contained herein. The information in this document is provided “as is” without warranty of any kind and is subject to change without notice. The warranties for Compaq products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty.

Compaq Service Reference Guide

First Edition (February 2001)
Part Number 225302-001
Spare Part Number 225698-001

Compaq Computer Corporation

CONTENTS

preface

About This Guide

Symbols and Conventions	vii
Technician Notes	viii
Additional Documentation	viii

chapter 1

Installing the Operating System

1.1 Microsoft Windows 98/Windows Me	1-1
1.1.1 Installing or Upgrading Device Drivers.....	1-1
1.2 Microsoft Windows NT Workstation 4.0 or Windows 2000 Professional.....	1-1
1.2.1 Installing or Upgrading Device Drivers.....	1-2
1.2.2 Creating an Emergency Repair Diskette.....	1-2
1.2.3 Using the Emergency Repair Diskette.....	1-3
1.3 Converting to NTFS	1-3
1.3.1 Windows NT Workstation 4.0.....	1-3
1.3.2 Windows 2000 Professional	1-3
1.3.3 Windows 98 and Windows Me.....	1-4
1.4 Registering the Computer	1-4
1.5 Compaq Software	1-4

chapter 2

Setup Utilities and Diagnostic Features

2.1 Computer Setup Utilities	2-1
2.1.1 Using Computer Setup Utilities	2-2
Power-On Self-Test (POST)	2-3
2.1.2 Computer Setup Menu	2-4
2.2 Computer Diagnostics	2-10
2.2.1 Create a Diagnostics Diskette	2-10
DOS-Based.....	2-10
Windows-Based	2-10
2.2.2 Computer Checkup (TEST).....	2-10
2.2.3 View System Information (INSPECT).....	2-11
2.2.4 Compaq Diagnostics for Windows	2-12
Using Compaq Diagnostics for Windows.....	2-13
Running Diagnostic Tests	2-13
2.3 Protecting Your Software	2-14
2.3.1 Ordering Backup Software	2-14
2.3.2 Compaq Restore CD	2-14
2.3.3 Compaq Restore CD for Windows NT.....	2-14

chapter 3

Desktop Management

3.1 Initial Configuration and Deployment.....	3-2
3.1.1 Remote System Installation	3-2
Altiris eXpress.....	3-2
PC Transplant Pro and PC Transplant for Compaq	3-3
3.2 Asset Tracking and Security.....	3-3
3.2.1 Password Security.....	3-5
Establishing a Setup Password Using Computer Setup	3-5
Establishing a Power-On Password Using Computer Setup.....	3-5
Entering a Power-On Password	3-6
Changing a Power-On or Setup Password	3-6
Deleting a Power-On or Setup Password	3-6
National Keyboard Delimiter Characters.....	3-7
Clearing Passwords	3-7
3.2.2 Smart Cover Sensor	3-7
Setting the Smart Cover Sensor Protection Level.....	3-7
3.2.3 Smart Cover Lock.....	3-8
Locking the Smart Cover Lock.....	3-8
Unlocking the Smart Cover Lock	3-8
Using the Smart Cover FailSafe Key	3-8
3.2.4 Master Boot Record Security.....	3-9
Before You Partition or Format the Current Bootable Disk	3-10
3.2.5 Kensington Cable Lock Provision	3-10
3.2.6 Fingerprint Identification Technology.....	3-10
3.3 Fault Notification and Recovery.....	3-11
3.3.1 Processor Fault Prediction and Prefailure Warranty.....	3-11
3.3.2 SMART Hard Drive Fault Prediction for IDE Drives	3-11
3.3.3 Drive Protection System for IDE Drives	3-11
3.3.4 Ultra ATA Integrity Monitoring	3-11
3.3.5 ECC Fault Prediction and Prefailure Warranty.....	3-12
3.3.6 Surge-Tolerant Power Supply.....	3-12
3.3.7 Thermal Sensor	3-12
3.4 Software Updating and Management	3-12
3.4.1 Local ROM Flash.....	3-13
3.4.2 Remote ROM Flash	3-13
Using Remote ROM Flash.....	3-13
3.4.3 FailSafe Boot Block ROM.....	3-14
3.4.4 Remote Security Management.....	3-16
3.4.5 Remote Wakeup and Remote Shutdown	3-16
3.4.6 NIC Alert	3-16
3.4.7 Replicating Original Setup.....	3-17
3.4.8 Dual-State Power Button	3-17
3.4.9 Power Management	3-18
3.4.10 World Wide Web Site.....	3-18
3.5 Building Blocks and Partners	3-19
3.5.1 Desktop Management Interface (DMI).....	3-19
3.5.2 Wired for Management.....	3-19

chapter 4

Ultra ATA Drive Guidelines & Features

4.1 Ultra ATA Devices	4-1
4.2 Drive Installation Guidelines	4-1
4.2.1 General Application Rules	4-1
4.2.2 Special Situations	4-2
4.3 Device 0/Device 1 Relationship	4-2
4.4 SMART	4-3
4.5 Drive Capacities	4-3

chapter 5

SCSI Devices

5.1 SCSI Guidelines	5-1
5.2 Using the Multi-Mode SCSI Cable	5-2
5.3 Using SCSISelect with SCSI Devices	5-3
5.4 SMART	5-3
5.5 Jumpers	5-4
5.5.1 Ultra3 SCSI Hard Drive	5-4
5.5.2 CD-ROM or DVD-ROM Drive	5-5
5.5.3 Zip Drive	5-5

chapter 6

Routine Maintenance and Disassembly Preparation

6.1 Electrostatic Discharge Information	6-1
6.1.1 Generating Static	6-1
6.1.2 Preventing Electrostatic Damage to Equipment	6-2
6.1.3 Personal Grounding Methods and Equipment	6-2
6.1.4 Grounding Workstations	6-2
6.1.5 Recommended Materials and Equipment	6-3
6.2 Routine Care	6-3
6.2.1 General Cleaning Safety Precautions	6-3
6.2.2 Cleaning the Computer Case	6-4
6.2.3 Cleaning the Keyboard	6-4
6.2.4 Cleaning the Monitor	6-4
6.2.5 Cleaning the Mouse	6-5
6.3 Service Considerations	6-5
6.3.1 Power Supply Fan	6-5
6.3.2 Tools and Software Requirements	6-5
6.3.3 Screws	6-5
6.3.4 Cables and Connectors	6-6
6.3.5 Hard Drives	6-6
6.3.6 Lithium Coin Cell Battery	6-6

chapter 7

Removal & Replacement Procedures - Security and External Components

7.1 Preparation for Disassembly	7-1
7.2 Unlocking the Cover	7-2
7.2.1 Smart Cover Lock	7-2

7.3 Security Devices	7-3
7.3.1 iPAQ Security Bar	7-3
7.3.2 Compaq Type 1 Bracket	7-4
7.3.3 Compaq Type 2 Bracket	7-5
7.3.3 Kensington Cable Lock	7-7
7.4 Hood Sensor	7-9
7.5 iPAQ Desk Attachment	7-10
7.6 Feet Installation	7-11
7.7 Access Panel/Computer Cover	7-12
7.7.1 Access Panel Models	7-12
7.7.2 Computer Cover Models.....	7-13
7.7.3 iPAQ Access Panels.....	7-14
Outer Access Panels.....	7-14
Inner Access Panel.....	7-15
7.8 Front Bezel	7-16
7.8.1 Secured with Tabs.....	7-16
7.8.2 Secured with Screws.....	7-17
7.8.3 iPAQ Front and Top Bezels.....	7-18
Front Bezel.....	7-18
Top Bezel.....	7-19
Speaker Grill	7-20
7.8.4 Subpanel and Bezel Blanks – Convertible Minitower.....	7-21
7.8.5 Power Button – Convertible Minitower.....	7-22
7.9 Front Trim	7-23
7.9.1 Secured with Tabs.....	7-23
7.9.2 Secured with Screws.....	7-24

chapter 8

Removal & Replacement Procedures - Expansion Components

8.1 Drives	8-1
8.1.1 Convertible Minitower.....	8-2
Removing a Drive	8-2
Installing a New Drive	8-3
Removing a 3.5-Inch Drive from a 5.25-Inch Drive Adapter.....	8-4
8.1.2 Slim Desktop/Small Form Factor	8-5
Drives Secured with J-slots	8-5
Diskette Drive – Slim Desktop	8-6
Hard Drive – Slim Desktop.....	8-7
8.1.3 Standard Desktop.....	8-8
Removing the Internal, Side-Mounted, 3.5-Inch Hard Drive	8-8
Removing an External 5.25-Inch Drive from the Drive Bay	8-9
Removing the Diskette Drive.....	8-10
8.1.4 iPAQ Hard Drive	8-11
8.2 Memory Expansion	8-12
8.2.1 440BX.....	8-12
8.2.2 Intel 810/810e.....	8-12
8.2.3 Intel 815e	8-13
8.2.4 Intel 820.....	8-14
8.2.5 Intel 850.....	8-15
8.2.6 DIMM Installation	8-16

8.2.7 RIMM Installation	8-17
Single Memory Channel System.....	8-17
Dual Memory Channel System	8-17
Installation Procedures	8-18
8.3 Expansion Card Cage	8-19
8.3.1 Removing an Expansion Card Cage	8-19
8.3.2 Riser Board	8-20
8.4 Expansion Cards – Standard Sockets	8-21
8.5 Graphics Sockets with Retention Mechanisms.....	8-22
8.5.1 Graphics Performance Accelerator (GPA)/AGP Inline Memory Module (AIMM) Card with a Type 1 Retention Mechanism	8-22
Removing a GPA/AIMM Card	8-22
Installing a GPA/AIMM Card.....	8-23
8.5.2 AGP Card with a Type 1 Retention Mechanism	8-24
Removing an AGP Card	8-24
8.5.3 GPA/AIMM Card with a Type 2 Retention Mechanism	8-25
Removing a GPA/AIMM Card	8-25
8.5.4 AGP Card with a Type 2 Retention Mechanism	8-26
Removing an AGP Card	8-26
8.5.5 Removing an AGP Card	8-27
8.6 iPAQ Graphics Memory Cache.....	8-28
8.7 iPAQ Legacy Module.....	8-29
8.8 iPAQ MultiBay Board.....	8-30

chapter 9

Removal and Replacement Procedures - Small Components

9.1 Battery	9-1
9.1.1 Standard Battery Holder	9-1
9.1.2 iPAQ Battery.....	9-3
9.2 Speaker	9-4
9.2.1 Standard Speaker	9-4
9.2.2 iPAQ Speaker	9-5
9.3 Chassis Fan.....	9-6
9.3.1 Standard Fan	9-6
9.3.2 Chassis Fan with Cover	9-7
9.4 Air Baffles	9-8
9.4.1 Component Access Without Baffle Removal	9-8
9.4.2 Air Baffle Removal.....	9-9
9.5 Power Switches and Switch Cables.....	9-10
9.5.1 Switch Secured with Screws	9-10
9.5.2 Switch Secured with Tabs – Type 1	9-11
9.5.3 Switch Secured with Tabs – Type 2	9-12
9.6 Board Guide.....	9-13

chapter 10

Removal & Replacement Procedures - Base Components

10.1 System Board.....	10-1
10.1.1 System Board Secured with Screws	10-1
10.1.2 System Board Removal – Small Form Factor	10-3
10.1.3 iPAQ System Board Removal	10-5
10.2 Power Supply.....	10-7
10.3 Processor and Heatsink.....	10-8

10.3.1 Processor Installation	10-8
Hardware Application Layer.....	10-8
10.3.2 Heatsink Installation	10-9
10.3.3 Heatsink Removal Methods.....	10-9
Single Clip Heatsink	10-9
Dual Clip Heatsink.....	10-10
Round Heatsink.....	10-11
10.4 Removing Drivelocks - Convertible Minitower	10-12
10.5 Converting a Desktop to a Minitower	10-15

appendix A

Connector Pin Assignments

appendix B

Power Cord Set Requirements

General Requirements	B-1
Country-Specific Requirements	B-2

appendix C

POST Error Messages

appendix D

Diagnostic Indicator Lights

Keyboard Lights	D-1
System Board Lights - Desktop Computers and Workstations	D-1

appendix E

Diagnostic Error Codes

Summary of Test Error Codes	E-1
Microprocessor	E-2
Memory.....	E-3
Keyboard.....	E-3
Parallel Port.....	E-4
Diskette Drive	E-4
Serial Port	E-4
Modem Communications.....	E-5
Hard Drive	E-5
Tape Drive	E-6
Video.....	E-6
Audio	E-8
Network Interface	E-8
CD-ROM and DVD-ROM.....	E-8
Pointing Device.....	E-8
Special Error Codes	E-9
Device Names	E-9
Test Names	E-9
Test Error Codes	E-10

appendix F

Troubleshooting Without Diagnostics

Preliminary Checklist	F-1
Solving Minor Problems.....	F-2
Diskette Drive	F-3
Display	F-4
SCSI.....	F-5
Printer	F-6
Hard Drive	F-7
Audio	F-8
Hardware Installation.....	F-9
DVD- and CD-ROM.....	F-10
Processor.....	F-11
Memory.....	F-11
Network	F-12
Resolving Audio Hardware Conflicts.....	F-14
Troubleshooting Using Compaq Intelligent Manageability Features.....	F-14

appendix G

System Board and Riser Board Reference Designators

appendix H

Model Number Naming for Compaq Products

Compaq Deskpro Series of Personal Computers.....	H-1
Compaq iPAQ Desktop Personal Computers	H-2
Compaq Deskpro and Professional Workstations	H-3
Processors 1.0 GHz and Greater	H-3
<i>Index</i>	I-1

preface

ABOUT THIS GUIDE

This *Compaq Service Reference Guide* is a troubleshooting and repair guide that can be used for reference when servicing Compaq Deskpro Personal Computers, Compaq Deskpro Workstations, some Compaq Professional Workstations, and the Compaq iPAQ Desktop Personal Computer. Only authorized technicians trained by Compaq should attempt to repair this equipment.

Compaq Computer Corporation reserves the right to make changes to all Compaq products without notice.

All features identified in this document may not be available on all Compaq Products.

Symbols and Conventions

The following text and symbols mark special messages throughout this guide:



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of data.



Text set off in this manner presents commentary, sidelights, or clarifying information.

The following warning symbols are located on applicable components of some products and should be observed to avoid personal injury or component damage:



WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is touched, the potential for injury exists. To reduce risk of injury from a hot component, allow the surface to cool before touching.



WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. The enclosed area contains no operator-serviceable parts. To reduce risk of personal injury from electrical shock hazards, do not open this enclosure.



WARNING: Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection. To reduce risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Technician Notes



WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void any warranty.



WARNING: To reduce the risk of personal injury from electrical shock and hazardous energy levels, only authorized service technicians should attempt to make repairs to this equipment. Do not exceed the level of repair specified in these procedures.

Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs could create conditions that are hazardous.



CAUTION: To properly ventilate your system, you must provide at least 3 inches (7.6 cm) of clearance at the front and back of the computer.



CAUTION: The computer is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.



The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Additional Documentation

The following documentation is available to support these products:

- User Documentation
- Technical Training Guides
- Compaq Service Advisories and Bulletins
- *Compaq QuickFind*
- *Compaq Technical Reference Guide*
- *Compaq Service Quick Reference Guide*
- *Compaq Quick Troubleshooting Guide*

chapter 1

INSTALLING THE OPERATING SYSTEM

Depending on the model, Microsoft Windows 98, Microsoft Windows 2000 Professional, Microsoft Windows Me, or Microsoft Windows NT is preinstalled on the computer and will be configured automatically the first time the computer is turned on.



CAUTION: Do not add optional hardware devices to your computer until the operating system is successfully installed. Doing so may cause errors and may prevent the operating system from installing properly.



CAUTION: Once the automatic installation has begun, DO NOT TURN OFF THE COMPUTER UNTIL THE PROCESS IS COMPLETE. Turning off the computer during the installation process might damage the software that runs the computer.

1.1 Microsoft Windows 98/Windows Me

The first time the computer is turned on, Microsoft Windows is automatically installed. This takes approximately 10 minutes, depending on the system hardware configuration. At the beginning of the installation process, the user is prompted to select the appropriate language for the operating system. Read and follow the instructions that appear on the screen to complete the installation. During this process, do not turn off your computer unless you are directed to do so.

1.1.1 Installing or Upgrading Device Drivers

To install hardware devices such as a printer, a display adapter, or network adapter after the operating system installation is completed, the operating system needs access to the appropriate software drivers for the devices.

The Windows Cab files directory and its subdirectories provide the Compaq-specific integration of the operating system and include supported device drivers. The Cab files directory path is `c:\Windows\Options\Cabs`.

1.2 Microsoft Windows NT Workstation 4.0 or Windows 2000 Professional

The first time you turn on your computer, the operating system is automatically installed for you. This takes approximately 10 minutes, depending on the system hardware configuration. At the beginning of the installation process, the user is prompted to select the appropriate language for the operating system. Read and follow the instructions that appear on the screen to complete the installation. During this process, do not turn off your computer unless you are directed to do so.

If you are installing a SCSI controller you must install the SCSI device drivers before you load Windows NT onto the workstation. If you do not have the drivers on a diskette, they may be downloaded from www.compaq.com.

To load the SCSI device drivers and Windows NT:

1. Insert the Windows NT CD into the drive and start the computer.
2. When the words “Setup is inspecting your computer’s hardware configuration...” display on the monitor, press F6. This will prompt Setup to ask for the drivers.
3. Follow the online instructions for installing the drivers.
4. When prompted, choose “S” to specify an additional device.
5. Choose “Other.”
6. Select the device controller from the list presented.
7. Press Enter to continue the installation.
8. Continue with the normal Windows NT installation process.


The first time you turn on your workstation, you will be prompted to select a language for your operating system and then you will be offered a choice of installing either Microsoft Windows NT 4.0 or Windows 2000 Professional. Read and follow the instructions on the screen to complete the installation of your operating system. During this process, do not turn off your workstation unless you are directed to do so.

1.2.1 Installing or Upgrading Device Drivers

To install hardware devices such as a printer, a display adapter, or network adapter after the operating system installation is completed, the operating system needs access to the appropriate software drivers for the devices.

The I386 directory and its subdirectories provide the Compaq-specific integration of the operating system for the computer model and include device drivers supported by Windows NT or Windows 2000.

When prompted for the I386 directory on the operating system CD, replace the path specification with C:\I386 or use the browse button of the dialog box to browse the computer for the I386 folder. For Windows NT 4.0, reapply Service Pack 6A by clicking its icon located on the computer desktop. For Windows 2000, no further steps are required.

-  When reapplying the service pack for Windows NT 4.0, and you are prompted to replace a file with a newer version, always choose Yes.

The service pack for Windows 2000 Professional has been integrated into the program.

1.2.2 Creating an Emergency Repair Diskette

-  Not all Compaq computers equipped with Windows NT support this feature.

This section applies only to computers equipped with a diskette drive.

After installing Microsoft Windows NT, Compaq recommends that you create an Emergency Repair Diskette. Using one blank, formatted diskette, complete the following steps:

1. Click Start → Run.
2. In the dialog box, enter:
C:\RDISK.EXE
3. Follow the instructions that appear on the screen.

1.2.3 Using the Emergency Repair Diskette

 Not all Compaq computers equipped with Windows NT support this feature.

This section applies only to computers equipped with a diskette drive. The Emergency Repair Diskette cannot be used on an LS-120 drive.

To use the Emergency Repair Diskette, insert the diskette in the diskette drive and restart the computer. Follow the instructions displayed on the screen.

1.3 Converting to NTFS

1.3.1 Windows NT Workstation 4.0

While most hard drives included with a Windows NT Workstation 4.0 model are preformatted with NTFS, some models contain a primary FAT 16 partition on which the operating system and Compaq software are installed. The rest of the hard drive is divided into one or more additional partitions. Because FAT 16 only supports partitions up to 2 GB, converting to NTFS will allow hard drives larger than 2 GB to be partitioned into larger segments. To convert an existing partition from a 2 GB FAT 16 partition to a 2 GB NTFS partition:

1. Click Start →Run.
2. Type `CONVERT.EXE X: /FS:NTFS` where X is the drive letter designating the partition you wish to convert.

Alternatively, the *Compaq Restore CD* can be utilized to repartition the hard drive. The largest NTFS partition possible is 7.5 to 8.0 GB, depending on the hard drive, with a second NTFS partition created from the remaining space on the drive.



CAUTION: The following procedures will remove all of the software applications and data files from your hard drive. Be sure to back up any data files you have created prior to converting from FAT16 to NTFS, or you will not be able to restore them.

You will be able to restore the operating system and drivers required to access the Internet from the *Compaq Restore CD*. The operating system (without Compaq software or optimized drivers) may be restored from the operating system installation CD or diskettes.

If the computer does not have a CD-ROM drive, other means of installation, such as a network share, will be needed for this procedure.

Insert the *Compaq Restore CD*, version 2.0 or higher, into the CD-ROM drive and turn on or restart the computer. Read and follow the instructions that appear on the screen to change the drive partitioning.

1.3.2 Windows 2000 Professional

To convert an existing partition from a FAT 32 partition to an NTFS partition, double-click the NTFS Convert icon on the desktop. Carefully read and follow the directions that appear on the screen.

1.3.3 Windows 98 and Windows Me

Windows 98 and Windows Me are not able to access a NTFS partition on the hard drive. Both Operating Systems will read both FAT and FAT 32 partitioning but only FAT 32 is supported.

As you can not upgrade from Windows NT 4.0 to Windows 98 or Windows Me, the only time this should be an issue is when the user formatted the drive with Windows NT 4.0 and then did a clean installation of the new operating system.

1.4 Registering the Computer

The computer should be registered with Compaq. Registration establishes a record of ownership and gives the user an opportunity to receive product announcements, updates, and other communications periodically. To register the machine, either telephone in the information or mail in the product registration card that comes with the computer.

1.5 Compaq Software

The Microsoft Windows 98, Me, Windows NT Workstation 4.0, or Windows 2000 Professional operating system is preinstalled on the computer and will be configured automatically the first time the computer is turned on. The following Compaq software will also be installed at that time on selected models:

- Computer Setup Utilities and diagnostic features
- Compaq Support Software including device drivers
- Compaq Configuration Record
- Online *Compaq Safety & Comfort Guide*
- Intelligent Manageability
- Enhanced Compaq Insight Personal Edition (Diagnostics for Windows)
- DMI Support
- Power Management with energy saver features
- Security Management tools
- Software Support Management tools

Certain drivers and utilities are available only in selected languages. You can obtain the latest version of these files, in English and selected other languages, in one of three ways:

- *Compaq Support Software CD for Compaq Desktop, Portable, and Workstation Products* (refer to Section 3.4.7, “Enhanced Support Software CD and World Wide Web Site,” for ordering information)
- Compaq Web site at www.compaq.com
- *Compaq Deskpro Supplement CD*, which is supplied with many models

chapter 2

SETUP UTILITIES AND DIAGNOSTIC FEATURES

Compaq Computer Setup Utilities and diagnostic features provide information needed about the computer system when contacting Compaq Customer Support. These tools can also be used to:

- Change factory default settings and to set or change the system configuration, which may be necessary when you add or remove hardware.
- Determine if all of the devices installed on the computer are recognized by the system and functioning properly.
- Determine information about the operating environment of the computer.
- Solve system configuration errors detected but not automatically fixed during the Power-On Self-Test (POST).
- Establish and manage passwords and other security features.
- Establish and manage energy-saving timeouts.



All features identified in this chapter may not be available on all Compaq products.

2.1 Computer Setup Utilities

Use Computer Setup Utilities to:

- Modify or restore factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Modify the boot order of bootable devices such as hard drives, diskette drives, CD-ROM drives, DVD-ROM drives, or PD-CD drives.
- Configure Quiet Drive options (for drives that support this feature).
- Enable Quick Boot which is faster than Full Boot but does not run all of the diagnostic tests run during a Full Boot. You can set your system to:
 - ❑ always Quick Boot (default);
 - ❑ periodically Full Boot (from every 1 to 30 days); or
 - ❑ always Full Boot.
- Enable or disable Network Server Mode, which allows the computer to boot the operating system when the power-on password is enabled. The keyboard and mouse remain locked until the power-on password is entered.

- Select POST Messages Enabled or Disabled to change the display status of Power-On Self-Test (POST) messages. POST Messages Disabled suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. To manually switch to POST Messages Enabled during POST, press any key (except F10 or F12).
- Establish Ownership Tag, the text of which is displayed each time the system is turned on or restarted.
- Enter the Asset Tag or property identification number assigned by your company to this computer.
- Enable power-on password prompting during system restarts (warm boots) as well as during power-on.
- Establish a setup password that controls access to Computer Setup and the settings described in this section.
- Secure the integrated I/O functionality, including the serial, USB, or parallel ports; audio; or embedded NIC, so that they cannot be used until they are unsecured.
- Enable or disable Master Boot Record (MBR) Security.
- Enable or disable removable media boot ability.
- Enable or disable removable media write ability.
- Solve system configuration errors detected but not automatically fixed during the Power-On Self-Test (POST).
- Replicate your system setup by saving system configuration information on diskette and restoring it on one or more computers.
- Execute self-tests on a specified IDE hard drive.
- Configure various energy-saving features including energy saver mode, system and hard drive timeouts, power button mode, and power LED behavior.

2.1.1 Using Computer Setup Utilities

To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer. To restart the computer in Windows or Windows NT, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.




If you do not press the F10 key while the message is displayed, you must turn the computer off, then on again, to access the utility.

Pressing the F12 key initiates Network Service Boot for Remote System Installation.

A choice of five headings appears in the Computer Setup Utilities menu: File, Storage, Security, Power, and Advanced. Section 2.1.2 in this chapter provides more information about the features that are available.

3. Using the arrow keys or the Tab key, select the option you want and press the Enter key. To return to the Computer Setup Utilities menu, press the Esc key.

4. To apply and save changes, select File → Save Changes and Exit.
- ❑ If you selected an option that automatically restarted the computer, changes were applied at that time.
 - ❑ If you have made changes that you do not want applied, select Ignore Changes and Exit.
 - ❑ If you have already applied changes you now want to eliminate, select Set Defaults and Exit. This option will restore the original system defaults.
-  Be sure to configure new options and drivers in the operating system after they have been configured by the Setup Utility.

Power-On Self-Test (POST)

POST is a series of diagnostic tests that runs automatically when the system is turned on, POST checks the following items to ensure that the computer system is functioning properly:

- Keyboard
- Memory modules
- Diskette drives
- All IDE and SCSI mass storage devices
- Processors
- Controllers



If the Power-On Password is set, a key icon appears on the screen while POST is running. You will need to enter the password before continuing. Refer to Chapter 3 for information on setting, deleting, or bypassing the password.

If POST finds an error in the system, an audible and/or visual message occurs. Refer to Appendix C for POST error messages and their solutions.

2.1.2 Computer Setup Menu

Heading	Option	Description	
File	System Information	Lists product name, processor type/speed/stepping, cache size, system ROM family and version, installed memory size, system board revision, chassis serial number, integrated MAC for embedded, enabled NIC (if applicable), and asset tracking number.	
	About	Provides copyright information.	
	Set Time and Date	Allows you to set system time and date.	
	Save to Diskette	Saves system configuration to a blank 1.44-MB diskette.	
	Restore from Diskette	Restores system configuration from a diskette.	
	Set Defaults and Exit	Restores factory default settings and clears all passwords.	
	Ignore Changes and Exit	Exits Computer Setup without applying or saving any changes.	
	Save Changes and Exit	Saves changes to system configuration and exits Computer Setup.	
Storage	Device Configuration	Lists all installed storage devices. The following options appear when a device is selected:	
		Diskette Type (<i>For legacy diskette drives only</i>) Identifies the highest capacity media type accepted by the diskette drive. Options are 3.5" 1.44 MB, 3.5" 720 KB, 5.25" 1.2 MB, 5.25" 360 KB, and Not Installed.	
		Drive Emulation (<i>IDE devices only</i>) Allows you to select a drive emulation type for a storage device. (For example, a Zip drive can be made bootable by selecting disk emulation.)	
		Drive Type	Emulation Options
		Hard disk	No emulation options available.
		Diskette	None (treated as diskette drive)
			Disk (treated as hard drive)
		CD-ROM	None (treated as CD-ROM drive)
			Diskette (treated as diskette drive)
			Disk (treated as hard drive)
Other (e.g., Zip drive)	None (treated as Other)		
	CD-ROM (treated as CD-ROM drive)		
	Diskette (treated as diskette drive)		
	Disk (treated as hard drive)		
		Transfer Mode (<i>IDE devices only</i>) Specifies the active data transfer mode. Options (subject to device capabilities) are PIO 0, Max PIO, Enhanced DMA, Ultra DMA 0, and Max UDMA.	

Continued

Computer Setup Menu Continued

Heading	Option	Description
Storage	Device Configuration (continued)	Translation Mode (<i>IDE disks only</i>) Lets you select the translation mode to be used for the device. This enables the BIOS to access disks partitioned and formatted on other systems and may be necessary for users of older versions of Unix (e.g., SCO Unix 3.2). Options are Bit-Shift, LBA Assisted, User, and None.



CAUTION: Ordinarily, the translation mode selected automatically by the BIOS should not be changed. If the selected translation mode is not compatible with the translation mode that was active when the disk was partitioned and formatted, the data on the disk will be inaccessible.

Translation Parameters (*IDE Disks only*)

Allows you to specify the parameters (logical cylinders, heads, and sectors per track) used by the BIOS to translate disk I/O requests (from the operating system or an application) into terms the hard drive can accept. Logical cylinders may not exceed 1024. The number of heads may not exceed 256. The number of sectors per track may not exceed 63. These fields are only visible and changeable when the drive translation mode is set to User.

Multisector Transfers (*IDE ATA devices only*)

Specifies how many sectors are transferred per multi-sector PIO operation. Options (subject to device capabilities) are Disabled, 8, and 16.

Quiet Drive (*available on select drives only*)

- Performance
Allows the drive to operate at maximum performance.
- Quiet
Reduces noise from the drive during operation. When set to Quiet, the drive will not operate at maximum performance.

If the drive does not support Quiet mode, the Quiet Drive option will not be displayed.

Storage Options

Removable Media Boot

Enables/disables ability to boot the system from removable media.

Note: After saving changes to Removable Media Boot, the computer will restart. Manually, turn the computer off, then on.

Removable Media Write

Enables/disables ability to write data to removable media.

Note: This feature applies only to legacy diskette, IDE LS-120 Superdisk, and IDE PD-CD drives.

Primary IDE Controller

Allows you to enable or disable the primary IDE controller.

Continued

Computer Setup Menu *Continued*

Heading	Option	Description
Storage	Storage Options (continued)	Secondary IDE Controller Allows you to enable or disable the secondary IDE controller. Diskette MBR Validation Allows you to enable or disable strict validation of the diskette Master Boot Record (MBR). Note: If you use a bootable diskette image that you know to be valid, and it does not boot with Diskette MBR Validation enabled, you may need to disable this option in order to use the diskette.
	DPS Self-Test	Allows you to execute self-tests on IDE hard drives capable of performing the Drive Protection System (DPS) self-tests. Note: This selection will only appear when at least one drive capable of performing the IDE DPS self-tests is attached to the system.
	Boot Order	Allows you to specify boot order of installed peripheral devices (such as LS-120 drive, diskette drive, hard drive, SCSI drive, CD-ROM drive, or DVD-ROM drive).
	Security	Setup Password
Power-On Password		Enables power-on password. See Section 3.2, "Asset Tracking and Security," for more information.
Password Options		Enables/disables network server mode. Specifies prompting for power-on password. See Section 3.2, "Asset Tracking and Security," for more information. Note: This selection will appear only if a power-on password is set.
Smart Cover		Enables/disables Smart Cover Sensor and Cover Lock. (Feature supported on select models only.) Lists most recent cover removal. (Feature supported on select models only.) See Section 3.2, "Asset Tracking and Security," for more information.

continued

Computer Setup Menu Continued

Heading	Option	Description
Security (continued)	Master Boot Record Security *	<p>Allows you to enable or disable Master Boot Record (MBR) Security. When enabled, the BIOS rejects all requests to write to the MBR on the current bootable disk. Each time the computer is powered on or rebooted, the BIOS compares the MBR of the current bootable disk to the previously saved MBR. If changes are detected, you are given the option of saving the MBR on the current bootable disk, restoring the previously saved MBR, or disabling MBR Security. You must know the setup password, if one is set.</p> <p>Note: Disable MBR Security before intentionally changing the formatting or partitioning of the current bootable disk. Several disk utilities (such as FDISK and FORMAT) attempt to update the MBR. If MBR Security is enabled and disk accesses are being serviced by the BIOS, write requests to the MBR are rejected, causing the utilities to report errors. If MBR Security is enabled and disk accesses are being serviced by the operating system, any MBR change will be detected by the BIOS during the next reboot, and an MBR Security warning message will be displayed.</p>
	Save Master Boot Record *	<p>Saves a backup copy of the Master Boot Record of the current bootable disk.</p> <p>Note: Only appears if MBR Security is enabled.</p>
	Restore Master Boot Record *	<p>Restores the backup Master Boot Record to the current bootable disk.</p> <p>Note: Only appears if all of the following conditions are true:</p> <ul style="list-style-type: none">• MBR Security is enabled.• A backup copy of the MBR has been previously saved.• The current bootable disk is the same disk from which the backup copy of the MBR was saved.
	Device Security	<p>Enables/disables serial ports A & B; parallel and USB ports; system audio; network controller (some models); and SCSI controllers.</p>
	Network Service Boot	<p>Enables/disables Network Service Boot. (Feature supported on select models only.)</p>
	System IDs	<p>Allows you to set Asset Tag and Ownership Tag.</p> <p>Allows setting of Chassis Serial Number if current number is invalid.</p> <p>Also allows you to set keyboard locale setting (e.g., English or German) for System ID entry.</p> <p>Allows setting of Ownership Tag and UUID.</p> <p>See Section 3.2, "Asset Tracking and Security," for more information.</p>

*Option not supported on all products.

Continued

Computer Setup Menu *Continued*

Heading	Option	Description
Power	Energy Saver	<p>Allows you to set energy saver mode to Advanced, Disabled, or Minimal.</p> <p>Note: In the minimal energy saver mode setting, the hard drive and system do not go into energy saver mode, but the setting allows you to press the power button to suspend the system.</p> <p>This option does not apply under ACPI-enabled operating systems.</p>
	Timeouts	<p>Allows you to enable/disable timeouts or manually select timeout values.</p> <p>Note: This selection will appear only when energy saver mode is set to advanced. This option does not apply under ACPI-enabled operating systems.</p>
	Energy Saver Options	<p>Allows you to set power button configuration (on/off or sleep/wakeup.)</p> <p>Allows user to enable/disable power LED blink in suspend mode.</p> <p>Note: This selection will appear only if the energy saver mode is enabled. This option does not apply under ACPI-enabled operating systems.</p>
Advanced*	Power-On Options	<p>Allows you to set POST mode (QuickBoot or FullBoot every n days where $n = 1$ to 30) and enables/disables POST messages.</p> <p>Enables/disables POST messages, Safe Post, F9 prompt, F10 prompt, F12 prompt, option ROM prompt, and UUID.</p> <p>Allows you to select the wakeup boot source (local hard drive or remote server).</p> <p>Allows you to select computer state after a power loss (On or Off).</p> <p>Allows you to delay POST.</p>
	Onboard Devices	<p>Allows you to set resources for onboard system devices (serial port, parallel port, diskette controller, etc.).</p>
	PCI Devices	<p>Lists currently installed PCI devices and their IRQ settings.</p> <p>Allows you to reconfigure IRQ settings for these devices or to disable them entirely. These settings have no effect under an APIC-based operating system.</p>
	Bus Options	<p>Enables/disables PCI bus mastering, PCI VGA palette snooping, PCI SERR# generation, and ECC on select models.</p>

*These options should be used by advanced users only.

continued

Computer Setup Menu Continued

Heading	Option	Description
Advanced* (continued)	Device Options	Allows you to set printer mode (EEP+ECP), Output only, bidirectional, and NumLock state at power-on. Enable/disable PME wakeup events, processor cache, processor number, ACPI thermal mode, and ACPI S3 support. (When ACPI S3 is enabled you may also enable/disable ACPI S3 video repost, PS/2 mouse wakeup, and hard disk reset.) Allows you to select AGP aperture size (4, 8, 16, 32, 64, 128, or 256 MB). Enables monitor tracking.
	PCI VGA Configuration	Allows users to specify which VGA controller will be the "boot" or primary VGA controller. Appears only if there are multiple PCI video adapters in the system.

*These options should be used by advanced users only.

2.2 Computer Diagnostics



The following section applies only to computers equipped with a diskette drive.

Compaq strongly recommends that you create a diagnostics diskette as soon as you begin to use the computer. This is a bootable diskette that allows you to test and inspect the hardware outside of the operating system by running the Computer Checkup (TEST) or View System Information (INSPECT) diagnostic programs. The diskette will play an important role in the restoration process if you ever experience a major system failure.

Another Compaq diagnostic feature is Compaq Diagnostics for Windows, described in Section 2.2.4.

2.2.1 Create a Diagnostics Diskette

DOS-Based



The following section applies only to computers equipped with a diskette drive.

To create a bootable, DOS-based Diagnostic Diskette (some models may require two 1.44-MB diskettes), run the SoftPaq executable file found in C:\DIAGDISK\ to extract the necessary files. Insert a blank 1.44MB formatted diskette into the diskette drive, then run C:\DIAGDISK\PDIAG\MAKEDISK.BAT



To obtain the SoftPaq executable filename, run
DIR C:\DIAGDISK\SP*.EXE

Windows-Based

Not all Compaq computers equipped with Windows NT/Windows 2000 support this feature.

Using the Windows/Windows NT/Windows 2000 operating system:

Click Start → Compaq Information Center → Create Diagnostics Disk. Insert a diskette into the diskette drive and follow the instructions on the screen.

2.2.2 Computer Checkup (TEST)

Use Computer Checkup (TEST) in the following instances to:

- Determine if all the devices installed on the computer are recognized by the system and functioning properly. Running TEST is optional but recommended after installing or connecting a new device.



Third-party devices not supported by Compaq may not be detected.


- Save, print, or display the information generated by TEST. You should run TEST and have the printed report available before placing a call to the Compaq Customer Support Center.
- Reproduce the same environment on another computer for testing.




Before you run TEST, you must create a diagnostics diskette. See Section 2.2.1, “Create a Diagnostics Diskette,” for instructions.

1. Turn off the computer.
2. Disconnect all peripheral devices other than the keyboard and monitor. Do not disconnect the printer if you want to test it or use it to log error messages.
3. Install loop-back and terminating plugs to test external ports if desired.

4. Cold boot your computer from the diagnostics diskette you have created. Press Enter to bypass the title screen, if necessary.
5. Select Computer Checkup (TEST).
6. Select the option to view the device list. A list of the installed hardware devices appears.
7. Verify that TEST correctly detected the devices installed. This utility will detect all devices manufactured or supported by Compaq; devices from other manufacturers may not be detected.
 - If the list is correct, select OK and go on to step 8.
 - If the list is incorrect, be sure that any new devices are installed properly.
8. Select one of the following from the test option menu:
 - Quick Check Diagnostics—This option runs a quick, general test on each device with a minimal number of prompts. If errors occur, they are displayed when the testing is complete. This option will only test the first 16 MB of memory.
 - Automatic Diagnostics—This option runs unattended, maximum testing of each device with minimal prompts. You can choose how many times to run the tests, to stop on errors, or to print or file a log of errors.
 - Prompted Diagnostics—This option allows maximum control over the device testing process. You can choose attended or unattended testing, decide to stop on errors, or choose to print or file a log of errors.

 If attended testing is selected, the test itself may result in data loss.

Follow the instructions on the screen as the diagnostic tests are run on the devices. When the testing is complete, the TEST option menu is displayed again.
9. To exit TEST, press the Esc key to reach the Exit option. Then press Enter.

 Refer to Appendix E for a listing of the Diagnostic Error Codes.

2.2.3 View System Information (INSPECT)

Use View System Information (INSPECT) to:

- View information about the system once it has been configured.
- Save, print, or display the information generated by INSPECT. You should run INSPECT and have the printed report available before placing a call to the Compaq Customer Support Center.
- Assist your Compaq authorized dealer, reseller, or service provider in analyzing the system by allowing the service provider to reproduce the same environment on another computer for testing.

The information provided by INSPECT includes:

- Contents of the operating system startup files
- Current memory configuration
- ROM versions
- Type of processor and coprocessor
- Diskette, CD-ROM, DVD-ROM tape, or hard drives installed
- Active printer and communications interfaces
- Modem type installed
- Graphics settings
- Windows WIN.INI file details



Categories or items of information displayed by INSPECT are similar to but may vary slightly from those available in Compaq Diagnostics for Windows.

Before you run INSPECT, you must create a diagnostics diskette. See Section 2.2.1, “Create a Diagnostics Diskette,” for instructions.

1. Cold boot your computer from the diagnostics diskette you have created. Press Enter to bypass the title screen, if necessary.
2. Select View System Information (INSPECT).
3. Select one of the available options using the Esc key:
 - Print the INSPECT status.
 - Save the INSPECT status to a file.
 - Add comments to a parameter status.
 - Exit the utility.
4. To exit INSPECT, press the Esc key to reach the Exit option. Then press Enter.




2.2.4 Compaq Diagnostics for Windows

Compaq Diagnostics for Windows is a component of Intelligent Manageability that allows you to view:

- System overview
- AssetControl information
- Input devices
- Communications ports
- Storage devices
- Graphics information
- Memory configuration
- Security management settings
- System health
- Operating system
- Windows version

Depending on the version, Compaq Diagnostics for Windows may include diagnostic tests to determine if all the devices installed on the computer are recognized by the system and are functioning properly.

Using Compaq Diagnostics for Windows

1. Select the Compaq Diagnostics for Windows icon, located in the Control Panel.
2. The screen displays an overview of the computer hardware and software.
3. For specific hardware and software information, select a category from the Categories menu or from the toolbar.
 -  As you move your cursor over the toolbar icons, the corresponding category names appear near the cursor.
4. To display more detailed information in a selected category, click More in the Information Level box.
 -  Categories or items of information displayed by Compaq Diagnostics for Windows are similar to but may vary slightly from the information presented in View System Information (INSPECT).
5. Review and print this information.
 -  To print the information, click File, then select Print. Select one of the following options: Detailed Report (All Categories), Summary Report (All Categories), or Current Category. Click OK to print the report you selected.
6. To exit Compaq Diagnostics for Windows, click File, then click Exit.

Running Diagnostic Tests

If your version of Compaq Diagnostics for Windows includes diagnostic testing utilities, four tabs will appear next to Overview: Test, Status, Log, and Error.

1. Select the Test tab.
2. Select one of the following options:
 - Quick Test—Runs a quick, general test on each device with a minimal number of prompts.
 - Complete Test—Runs maximum testing of each device with minimal prompts.
 - Custom Test—Runs only the tests you select. To select specific devices or tests, find the device in the list, then click the box beside each test to select or deselect it. When selected, a red check mark appears in the box.
3. Select Interactive Mode or Unattended Mode.
4. In Interactive Mode, the diagnostic software will prompt you for input during tests that require it. Some tests require interaction and will display errors or halt testing if selected in conjunction with Unattended Mode.
5. Click the Begin Testing button.

Test Status is displayed, showing the progress and result of each test.

6. If errors are found, click the Error tab to display more detailed information and recommended actions. By following the recommended actions, you may be able to solve some problems yourself.


7. Click Print or Save the error information in case you need to contact your Compaq authorized dealer, reseller, or service provider for assistance.
8. To exit Compaq Diagnostics for Windows, click File, then click Exit.

2.3 Protecting Your Software

To protect software from loss or damage, you should keep a backup copy of all system software, applications, and related files stored on the hard drive. You can order a set of backup diskettes from Compaq at nominal cost for all of the software preinstalled on the computer, or you can make a set. Refer to the operating system or backup utility documentation for instructions on making backup copies of data files. Another option is the *Compaq Deskpro Supplement CD* or the *Compaq Restore CD* which accompanies many desktop and workstation models and enables the user to selectively restore the original system software.

2.3.1 Ordering Backup Software

You can order all software that shipped with the product from Compaq as a single set, or you can order the various software packages separately.

-  Before calling Compaq to place your order, be sure to have the serial number of your computer available. This number is necessary for all diskette purchases.

For a list of Compaq support telephone numbers, consult the *Contacting Compaq Customer Support Guide*.

2.3.2 Compaq Restore CD


The *Compaq Restore CD* that is shipped with select computers offers easy deployment and recovery of the system software. Along with the Microsoft operating system CD, the *Compaq Restore CD* enables the user to selectively restore the original system software. This can be extremely helpful in the event of hard drive failure or corruption. Required drivers that are not included on the *Compaq Restore CD* may be downloaded from the Compaq Web site at www.compaq.com

The *Compaq Restore CD* is specific to each desktop and workstation model and accompanies many computers along with the Microsoft operating system CD.

2.3.3 Compaq Restore CD for Windows NT

The *Compaq Restore CD for Windows NT* that is shipped with select Compaq Intel-based workstations is a set of Compaq specific drivers that enables the workstation to operate at optimum performance. Updates are available on the Compaq Web site at www.compaq.com and through subscription to the Compaq Support Software CD Kit.

The *Compaq Restore CD for Windows NT* installation program automatically detects the components on the workstation and determines if the drivers (support software) need to be updated.

-  When servicing the workstation, be sure it is running the latest version of the *Compaq Restore CD* for optimum performance. To determine the version of the Restore CD installed, look at the version in the file properties of the *SETUP.EXE* file in the `\WINNT\SYSTEM32\CPQNTSSD` workstation directory.

The CD has these capabilities:

- Remote capability—Allows the ability to install, remove, update, and configure components remotely by machine name (computer name). Supports distributed computing environments (DCE) perspectives.
- Silent Setup Command Line Interface—Provides the functionality of the Graphical User Interface (GUI) in a silent command line interface and provides execution output in a log file. Provides the ability to remotely install or update drivers on multiple remote machines at one time. Also useful for Microsoft Systems Management Server Configurations.

chapter 3


DESKTOP MANAGEMENT

Compaq pioneered intelligent manageability in 1995 with the introduction of the industry's first fully manageable desktop personal computers. Since then, Compaq has led an industry-wide effort to develop the standards and infrastructure required to effectively manage desktop PCs. Compaq Intelligent Manageability provides standards-based solutions for managing and controlling desktops in a networked environment. Compaq works closely with leading management software solution providers in the industry to ensure compatibility between Intelligent Manageability and these products. Desktop Management is an important aspect of Compaq's broad commitment to providing you with lifecycle management solutions and services to assist you with the four phases of the desktop PC life-cycle—planning, deployment, management, and transitions.

This chapter summarizes the capabilities and features of the four key components of Desktop Management:

- Initial Configuration and Deployment
- Asset Tracking and Security
- Fault Notification and Recovery
- Software Updating and Management

The chapter also contains an overview of the tools, utilities, and information Compaq provides to help you successfully deploy manageable desktop PCs.

-  Support for specific features described in this chapter may vary by model or software version.

3.1 Initial Configuration and Deployment

Compaq computers come with a preinstalled system software image. After a very brief software “unbundling” process, the Compaq Deskpro Personal Computer or Workstation is ready to be used.

You may prefer to replace the preinstalled software image with a customized set of system and application software. There are several methods for deploying a customized software image. They include:

- Installing additional software applications after unbundling the preinstalled software image
- Using software deployment tools, such as Microsoft MS Batch or NT Distribution Share (NTDS) to replace the preinstalled software with a customized software image
- Using a disk cloning process to copy the contents from one hard drive to another

The best deployment method depends on your information technology environment and processes. The PC Deployment section of the Deskpro Solutions and Services Web site (www.compaq.com/im/change) provides information to help you select the best deployment method. You’ll also find guides and utilities to integrate with Microsoft or PXE-based deployment tools.

The *Compaq Restore CD*, ROM-based setup, and ACPI-ready hardware provide further assistance with recovery of system software, configuration management and troubleshooting, and power management.

3.1.1 Remote System Installation

Remote System Installation allows you to start and set up your system using the software and configuration information located on a network server. The Remote System Installation feature is usually used as a system setup and configuration tool, and can be used for the following tasks:

- Deploying a software image on one or more new PCs.
- Formatting a hard drive.
- Installing application software or drivers.
- Updating the operating system, application software, or drivers.

To initiate Remote System Installation, press F12 when the F12=Network Service Boot message appears in the lower-right corner of the Compaq logo screen. Follow the instructions on the screen to continue the process.

Compaq and Altiris, Inc. have partnered to provide tools designed to make the task of corporate PC deployment and management easier and less time-consuming, ultimately lowering the total cost of ownership and making Compaq PCs the most manageable client PCs in the enterprise environment.

Altiris eXpress

Altiris eXpress allows the system administrator to create and quickly deploy a customized, corporate-standard software image across one or more networked client PCs with an interface as simple to use as Windows Explorer. Altiris eXpress supports Intel’s Wired for Management and Preboot Execution Environment (PXE). Using Altiris eXpress and the Remote System Installation features of the Compaq computer, there is no need for the system administrator to visit each new PC individually to deploy the software image.

For more information, refer to the Compaq Web site at www.compaq.com/im/swdeploy

PC Transplant Pro and PC Transplant for Compaq

PC Transplant, designed to assist you in personalizing the new Compaq computer, can be downloaded free from the Compaq Web site. It lets you preserve the “personality”—the customized settings such as Start menu entries, drive and printer mappings, software application options, and so on—of an existing PC, then transfer those unique settings to a Compaq PC so that you don’t have to invest valuable time manually recreating them.

For more information, refer to the Compaq Web site at www.compaq.com/easydeploy

3.2 Asset Tracking and Security

Compaq AssetControl features incorporated into the computer provide key asset tracking data that can be managed using Compaq Insight Manager products and Management Solutions Partners products. Seamless, automatic integration between AssetControl features and these products enables you to choose the management tool that is best suited to your environment and to leverage your investment in existing tools.




Compaq computers and Professional Workstations are manufactured with the hardware and firmware required to fully support the DMI 2.0 standard.

Compaq also offers several solutions for controlling access to valuable components and information. Security features such as the Smart Cover Sensor and the Smart Cover Lock, available on select models, help to prevent unauthorized access to the internal components of the PC. By disabling parallel, serial, or USB ports, or by disabling removable media boot capability, you can protect valuable data assets. Memory Change and Smart Cover Sensor alerts can be automatically forwarded to Compaq Insight Manager products to deliver proactive notification of tampering with a computer's internal components.

There are three ways to manage security settings on your Compaq computers:

- Locally, using the Compaq Computer Setup Utilities. See the *Computer Setup Guide* included with the computer for additional information.
- Remotely, using the Compaq Remote Security Management software. This software enables the secure, consistent deployment and control of security settings from a central point on the network using a third-party PC LAN management application such as Microsoft SMS.
- Remotely, using *Compaq Insight Manager LC*, a tool for managing PC workgroups.

The following table and sections refer to managing security features of your Computer locally through the Compaq Computer Setup Utilities. Refer to the Remote Management Setup Utilities for more information on using the Remote Security Management software. These utilities are available on the *Support Software CD* or from the Compaq Web site at www.compaq.com/im/ssmwp.html. For more information on Compaq Insight Manager LC, refer to www.compaq.com/im/lc.

Feature*	Purpose
Removable Media Boot Control	Prevents booting from the removable media drives.
Serial, Parallel, USB, or Infrared Interface Control	Prevents transfer of data through the integrated serial, parallel, USB (universal serial bus), or infrared interface.
Power-On Password	Prevents use of the computer until the password is entered. This can apply to both initial computer startup and restarts.
Setup Password	Prevents reconfiguration of the computer (use of the Computer Setup utility) until the password is entered.
Smart Cover Sensor	Indicates that computer cover or side panel has been removed. Can be set to require the setup password to restart the computer after the cover or side panel has been removed.
Smart Cover Lock	Prevents unauthorized access to internal components. This is a software-controllable cover lock, controlled by the setup password.  The Smart Cover FailSafe key, is a device for manually disabling the Smart Cover Lock, is available from Compaq. You'll need the FailSafe key in case of forgotten password, power loss, or computer malfunction.
Master Boot Record Security	May prevent unintentional or malicious changes to the Master Boot Record of the current bootable disk, and provides a means of recovering the "last known good" MBR.
Memory Change Alerts	Detects when memory modules have been added, moved, or removed; notifies end-user and system administrator.  For information on enabling Memory Change Alerts, refer to the online <i>Intelligent Manageability Guide</i> .
Ownership Tag	Displays ownership information, as defined by the system administrator, during system startup (protected by setup password).
Kensington Cable Lock Provision	Inhibits access to the interior of the computer to prevent unwanted configuration changes or component removal. Can also be used to secure the computer to a fixed object to prevent theft of the computer.  Install a Kensington cable lock to secure the computer to a fixed object.

For more information about Computer Setup, refer to Section 2.1, "Computer Setup Utilities." In some cases switches may need to be set. For more information about these switches, refer to the "Connectors, Jumpers, and Switches" section in the product-specific MSG or IPM.

*Not all features are available on all products.

3.2.1 Password Security


This computer supports two security password features—a setup password and a power-on password. The power-on password prevents unauthorized use of the computer by requiring entry of a password to access applications or data each time the computer is turned on or restarted. The setup password specifically prevents unauthorized access to Computer Setup, and can also be used as an override to the power-on password. That is, when prompted for the power-on password, entering the setup password instead will allow access to the computer.

A network-wide setup password can be established to enable the system administrator to log in to all network systems to perform maintenance without having to know the power-on password, even if one has been established.

Establishing a Setup Password Using Computer Setup

Establishing a setup password through Computer Setup prevents reconfiguration of the computer (use of the Computer Setup utility) until the password is entered.

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.


 If you do not press the F10 key while the message is displayed, you must turn the computer off, then on again, to access the utility.

3. Select Security, then select Setup Password and follow the instructions on the screen.
4. Before exiting, click File → Save Changes and Exit.

Establishing a Power-On Password Using Computer Setup


Establishing a power-on password through Computer Setup prevents access to the computer when power is turned on, unless the password is entered. The password must be entered each time the computer is turned on, when the key icon appears on the monitor.

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.

 If you do not press the F10 key while the message is displayed, you must turn the computer off, then on again, to access the utility.

3. Select Security, then Power-On Password and follow the instructions on the screen.
4. Before exiting, click File → Save Changes and Exit.

Entering a Power-On Password

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the key icon appears on the monitor, enter your current password.
 -  Type carefully; for security reasons, the characters you type do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must turn off the computer, then turn it on again before you can continue.

Changing a Power-On or Setup Password


1. Turn off or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer. To change the setup password, run Computer Setup.
2. When the key icon appears, type your current password, a slash (/) or alternate delimiter character, your new password, another slash (/) or alternate delimiter character, and your new password again as shown:

current password/new password/new password

Type carefully; for security reasons, the characters you type do not appear on the screen.

3. Press the Enter key.


The new password takes effect the next time you turn on the computer.

-  Refer to the “National Keyboard Delimiter Characters” section in this chapter for information about the alternate delimiter characters.

The power-on password and setup password may also be changed using the Security options in Computer Setup.

Deleting a Power-On or Setup Password

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer. To delete the setup password, run Computer Setup.
2. When the key icon appears, type your current password followed by a slash (/) or alternate delimiter character as shown:
 - current password/
3. Press the Enter key.

-  Refer to the “National Keyboard Delimiter Characters” section in this chapter for information about alternate delimiter characters.

The power-on password and setup password may also be changed using the Security options in Computer Setup.

National Keyboard Delimiter Characters

Each keyboard is designed to meet country-specific requirements. The syntax and keys that you use for changing or deleting your password depend on the keyboard that came with your computer.

/ Arabic	- Greek	/ Russian
= Belgian	. Hebrew	- Slovakian
- BHCSY*	- Hungarian	- Spanish
/ Brazilian	- Italian	/ Swedish/Finnish
/ Chinese	/ Japanese	- Swiss
- Czech	/ Korean	/ Taiwanese
- Danish	- Latin American	/ Thai
! French	- Norwegian	. Turkish
é French Canadian	- Polish	/ U.K. English
- German	- Portuguese	/ U.S. English

*For Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia

Clearing Passwords

If you forget your password you cannot access the computer. Refer to the “Connectors, Jumpers, and Switches” section in the product-specific MSG or IPM for instructions on clearing passwords.


3.2.2 Smart Cover Sensor

Smart Cover Sensor, a feature on select computers, is a combination of hardware and software technology that can alert you when the computer cover or side panel has been removed. There are three levels of protection, as described in the following table:

Level	Setting	Description
Level 0	Disabled	Smart Cover Sensor is disabled (default).
Level 1	Notify User	When the computer is restarted, the screen displays a message indicating that the computer cover or side panel has been removed.
Level 2	Setup Password	When the computer is restarted, the screen displays a message indicating that the computer cover or side panel has been removed. You must enter the setup password to continue.

Setting the Smart Cover Sensor Protection Level

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.

 If you do not press the F10 key while the message is displayed, you must turn the computer off, then on again, to access the utility.

3. Select Security, then Smart Cover and follow the instructions on the screen.
4. Before exiting, click File → Save Changes and Exit.


3.2.3 Smart Cover Lock

The Smart Cover Lock is a software-controllable cover lock featured on some desktop computers. This lock prevents unauthorized access to the internal components. Computers ship with the Smart Cover Lock in the unlocked position.




CAUTION: For maximum cover lock security, be sure to establish a setup password. The setup password prevents unauthorized access to the Computer Setup utility.

Locking the Smart Cover Lock

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.
 -  If you do not press the F10 key while the message is displayed, you must turn the computer off, then on again, to access the utility.
3. Select Security, then select Smart Cover and follow the instructions on the screen.
4. Before exiting, click File → Save Changes and Exit.

Unlocking the Smart Cover Lock

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.
 -  If you do not press the F10 key while the message is displayed, you must turn the computer off, then on again, to access the utility.
3. Select Security, then select Smart Cover and the Unlocked option.
4. Before exiting, click File → Save Changes and Exit.

Using the Smart Cover FailSafe Key

If you enable the Smart Cover Lock and cannot enter your password to disable the lock, you will need a Smart Cover FailSafe Key to open the computer cover. You will need the key in any of the following circumstances:

- Power outage
- Startup failure
- PC component failure (e.g., processor or power supply)
- Forgotten password




CAUTION: The Smart Cover FailSafe Key is a specialized tool available from Compaq. Be prepared; order this key before you need one.

3.2.4 Master Boot Record Security

The Master Boot Record (MBR) contains information needed to successfully boot from a disk and to access the data stored on the disk. Master Boot Record Security may prevent unintentional or malicious changes to the MBR, such as those caused by some computer viruses or by the incorrect use of certain disk utilities. It also allows you to recover the “last known good” MBR, should changes to the MBR be detected when the system is restarted.


To enable MBR Security, complete the following steps:

1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.

 If you do not press the F10 key while the message is displayed, you must restart the computer to access the utility.

3. Select Security → Master Boot Record Security → Enabled.
4. Select Security → Save Master Boot Record.
5. Before exiting, click File → Save Changes and Exit.

When MBR Security is enabled, the BIOS prevents any changes being made to the MBR of the current bootable disk while in MS-DOS or Windows Safe Mode.

 Most operating systems control access to the MBR of the current bootable disk; the BIOS cannot prevent changes that may occur while the operating system is running.

Each time the computer is turned on or restarted, the BIOS compares the MBR of the current bootable disk to the previously-saved MBR. If changes are detected and if the current bootable disk is the same disk from which the MBR was previously saved, the following message is displayed:

1999 - Master Boot Record has changed.

Press any key to enter Setup to configure MBR Security

Upon entering Computer Setup, you must

- Save the MBR of the current bootable disk;
- Restore the previously saved MBR; or,
- Disable the MBR Security feature.

You must know the setup password, if one exists.

If changes are detected and if the current bootable disk is not the same disk from which the MBR was previously saved, the following message is displayed:

2000 - Master Boot Record Hard Drive has changed.

Press any key to enter Setup to configure MBR Security

Upon entering Computer Setup, you must

- Save the MBR of the current bootable disk; or,
- Disable the MBR Security feature.

You must know the setup password, if one exists.

In the unlikely event that the previously saved MBR has been corrupted, the following message is displayed:

1998 - Master Boot Record has been lost.

Press any key to enter Setup to configure MBR Security

Upon entering Computer Setup, you must


- Save the MBR of the current bootable disk; or,
- Disable the MBR Security feature.

You must know the setup password, if one exists.

Before You Partition or Format the Current Bootable Disk

Ensure that MBR Security is disabled before you change partitioning or formatting of the current bootable disk. Some disk utilities, such as FDISK and FORMAT, attempt to update the MBR. If MBR Security is enabled when you change partitioning or formatting of the disk, you may receive error messages from the disk utility or a warning from MBR Security the next time the computer is turned on or restarted. To disable MBR Security, complete the following steps:


1. Turn on or restart the computer. If you are in Windows, click Start → Shut Down → Restart the Computer.
2. When the F10 Setup message appears in the lower-right corner of the screen, press the F10 key. Press Enter to bypass the title screen, if necessary.

 If you do not press the F10 key while the message is displayed, you must restart the computer to access the utility.

3. Select Security → Master Boot Record Security → Disabled.
4. Before exiting, click File → Save Changes and Exit.

3.2.5 Kensington Cable Lock Provision

The rear panel of the computer accommodates a cable lock so that the computer can be physically secured to a work area.

 The cable lock can be purchased from Kensington Microware Limited or from the Compaq Bequipt Web site (www.bequipt.com and search for “cable lock”). Ask for the Kensington MicroSaver Security System, Model 64068.

3.2.6 Fingerprint Identification Technology

Eliminating the need to enter user passwords, Compaq Fingerprint Identification Technology (IT) tightens network security, simplifies the login process, and reduces the costs associated with managing corporate networks. Affordably priced and supported by Compaq computers, IT isn't just for high-tech, high-security organizations anymore. See www.compaq.com/products/options/fit/index.html for more information.

3.3 Fault Notification and Recovery

Fault Notification and Recovery features combine innovative hardware and software technology to prevent the loss of critical data and minimize unplanned downtime.

When a fault occurs, the computer displays a Local Alert message containing a description of the fault and any recommended actions. You can then view current system health by using the Compaq Management Agent. If the computer is connected to a network managed by Compaq Insight Manager LC, Compaq Insight Manager, or other management products from Compaq Management Solutions Partners, the computer also sends a fault notice to the network management application.

3.3.1 Processor Fault Prediction and Prefailure Warranty

When the processor encounters an excessive number of error checking and correcting (ECC) cache memory errors, the computer displays a Local Alert Message. This message contains detailed information about the faulty processor, allowing you to take action before you experience non-correctable cache memory errors. The Prefailure Warranty allows you to replace these processors, free of charge, before they actually fail. Processors with ECC cache memory are available on select Compaq products.

3.3.2 SMART Hard Drive Fault Prediction for IDE Drives

The SMART hard drive monitors hard drive activity to predict failures and, in some cases, fix faults before failures occur. Fault prediction and failure indication parameters, such as abnormal variations in spinup and seek times, or non-correctable read and write errors, are tracked to determine the hard drive condition. Should these errors become significant, the computer displays a warning message. The warning gives you time to back up the hard drive and replace it prior to experiencing downtime or loss of data. The Prefailure Warranty for SMART hard drives allows you to replace these drives, free of charge, before the drives fail.

SMART hard drives are compliant with the Small Form Factor Committee Specification for Self-Monitoring, Analysis, and Reporting Technology (SMART). SMART is the industry standard technology, pioneered by Compaq and originally called IntelliSafe, that allows you to prevent data loss and minimize downtime, in concert with Compaq Management Agents.

3.3.3 Drive Protection System for IDE Drives


The Compaq Drive Protection System (DPS) is a diagnostic tool built into the hard drives installed in select Compaq products. DPS is designed to help diagnose problems that might result in unwarranted hard drive replacement. When Compaq products are built, each installed hard drive is tested using DPS, and a permanent record of key information is written onto the drive. Each time DPS is run, test results are written to the hard drive. You can use this information to help diagnose conditions that caused you to run the DPS software.

3.3.4 Ultra ATA Integrity Monitoring

Ultra ATA Integrity Monitoring monitors the integrity of data as it is transferred between an Ultra ATA hard drive and the system's core logic. If the computer detects an abnormal number of transmission errors, the computer displays a Local Alert message with recommended actions. An alert is also sent over the network to the system administrator.

3.3.5 ECC Fault Prediction and Prefailure Warranty

When the computer encounters an excessive number of error checking and correcting (ECC) memory errors, the computer displays a Local Alert message. This message contains detailed information about the errant memory module, allowing you to take action before you experience non-correctable memory errors. The Prefailure Warranty for ECC memory modules allows you to replace these modules, free of charge, before the modules actually fail. ECC memory modules are optional on all Compaq personal computers.

 To use this feature, you must replace the standard DIMMs or RIMMs with ECC DIMMs or ECC RIMMs.

3.3.6 Surge-Tolerant Power Supply

An integrated surge-tolerant power supply provides greater reliability when the computer is hit with an unpredictable power surge. This power supply is rated to withstand a power surge of up to 2000 volts without incurring any system downtime or data loss.

3.3.7 Thermal Sensor

The thermal sensor is a hardware and software feature that tracks the internal temperature of the computer. This feature displays a warning message when the normal range is exceeded, which gives you time to take action before internal components are damaged or data is lost.

3.4 Software Updating and Management

Compaq provides several tools for managing and updating software on desktop computers—Altiris eXpress, Altiris PC Transplant Pro, PC Transplant for Compaq, Compaq Insight Manager LC, System Software Manager, and Remote Management Setup Utilities. Using Compaq Insight Manager LC, you can also monitor a workgroup of PCs from a central console and remotely update the system software, security settings, flash ROM, or hardware device drivers, for each of the managed PCs individually.

System Software Manager (SSM) is a utility that lets you update system-level software on multiple systems simultaneously. When executed on a PC client system, SSM detects both hardware and software versions, then updates the appropriate software from a central repository, also known as a file store. Support software that works with SSM is flagged with the PC Lifecycle Management icon on the Compaq Web site. To download the utility or to obtain more information on SSM, visit the Compaq Web site at <http://www.compaq.com/im>.


In addition to its PC configuration capabilities mentioned in a previous section, Altiris eXpress also includes easy to use software distribution capabilities. You can use Altiris eXpress to update operating systems and application software from a central console. When used in conjunction with SSM, Altiris eXpress can also update ROM BIOS and device driver software.

Finally, the Compaq Remote Management Setup Utilities, when integrated with Management Solutions Partners products, delivers an ongoing management solution. These utilities supplement the capabilities of Solutions Partners products for distributing new applications, device drivers, and other system software. The Compaq Web site includes updated ROM images and device drivers which can be distributed to client PCs using these software tools.

For more information, refer to the online *Remote Management Administrators Guide*. The *Remote Management Administrators Guide* is included with the Remote Management Setup Utilities, which are available on the Compaq Web site at www.compaq.com/im/ssmwp.html. The following sections provide information on using these utilities to accomplish various remote management functions including ROM flash, changing security settings, and wakeup/shutdown.

3.4.1 Local ROM Flash

To upgrade the ROM:

1. Insert the ROMPaq diskette in the diskette drive and turn on the computer.
2. If prompted, enter the Setup Password.
 -  If the Setup password is entered correctly, the ROMPaq utility will take over and run the ROM upgrade. If the password is not entered correctly, the procedure will terminate and no changes will be made to the ROM.
3. When the utility finishes upgrading the ROM, remove the diskette from the diskette drive and restart the computer.



CAUTION: Do not turn off the power to the computer until the ROMPaq has completed the upgrade process.



CAUTION: To guard against unauthorized updates to the ROM or the system BIOS, the Setup Password must be set. Refer to Section 3.2.1, "Password Security," for more information.

3.4.2 Remote ROM Flash

This computer comes with reprogrammable flash ROM (read only memory). By establishing a setup password in Security Management, you can protect the ROM from being unintentionally updated or overwritten. This is important to ensure computer operating integrity. Should you need or want to upgrade the ROM, you may:

- Order an upgraded ROMPaq diskette from Compaq.
- Download the latest ROMPaq images from the Compaq World Wide Web site (www.compaq.com).



CAUTION: For maximum ROM protection, be sure to establish a setup password. The setup password prevents unauthorized ROM upgrades. Compaq Insight Manager LC allows the system administrator to set the setup password on one or more PCs simultaneously.

Using Remote ROM Flash

Remote ROM Flash allows the system administrator to safely upgrade the ROM on remote Compaq Deskpro computers and Compaq Professional Workstations, directly from the centralized network management console. Enabling the system administrator to perform this task remotely, on multiple computers, results in a consistent deployment of and greater control over Compaq desktop ROM images over the network. It also results in greater productivity and lower total cost of ownership.

All desktop ROMPaq ROM images from Compaq are digitally signed to ensure authenticity and minimize potential corruption. The ROM firmware includes a Boot Block that is protected during the flash process and allows the computer to be restarted, in the unlikely event of an unsuccessful ROM flash.



The computer must be powered on, or turned on through Remote Wakeup, to take advantage of Remote ROM Flash. Use of Remote ROM Flash also requires an established setup password.


For more information on enabling Remote ROM Flash, refer to the online *Remote Management Administrators Guide*. The *Remote Management Administrators Guide* is included with the

Remote Management Administration Tools, and is available on the *Support Software CD* or at the Compaq Web Site at www.compaq.com.

3.4.3 FailSafe Boot Block ROM

The FailSafe Boot Block ROM allows for system recovery in the unlikely event of a ROM flash failure, for example, if a power failure occurs during a ROM upgrade. The Boot Block is a flash-protected section of the ROM that checks to validate the system ROM each time power to the system is turned on.

- If the system ROM is valid, the system starts normally.
- If the system ROM fails the validation check, the FailSafe Boot Block ROM provides enough support to start the system from a ROMPaq diskette, which will program the system ROM with a valid image. The Flash Recovery diskette is a SoftPaq downloadable from the Compaq Website at www.compaq.com.

 The computer ships with the Diskette Boot feature enabled. If that feature is disabled, the FailSafe Boot Block ROM will override the disabled feature to accommodate a system ROM recovery in the event a system ROM failure occurs.

Because there is no video or hard drive support from the Boot Block ROM, the keyboard lights communicate information. When the Boot Block detects an invalid system ROM, the system sounds a series of beeps (one long and three short) and flashes the three keyboard lights.

To recover the system after hearing the FailSafe Boot Block beeps, complete the following steps:

1. Remove any diskettes from the diskette drive and turn off the power.
2. Insert the ROMPaq diskette into the diskette drive.
3. Turn on power to the system.

If a setup password has been established, the Caps Lock light will turn on.


If no ROMPaq diskette is found, you will be prompted to insert one and restart the computer.

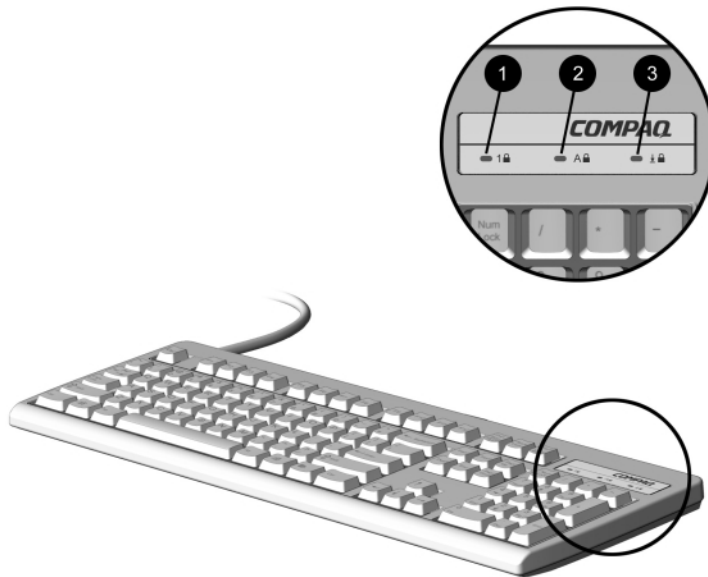
4. Enter the setup password.

If the system successfully starts from the diskette and successfully reprograms the ROM, then the three keyboard lights will turn on. A “rising tone” series of beeps also signals successful completion.

The following table lists the various keyboard light combinations as well as the meaning and action associated with each combination.

Num Lock	Caps Lock	Scroll Lock	Meaning and Required Action
OFF	ON	OFF	System requires setup password. Enter the setup password. The light remains turned on until you enter a valid setup password.
ON	OFF	OFF	System could not start from diskette because the ROMPaq diskette is not present, is bad, or the drive is not ready. Insert a valid ROMPaq diskette, turn the power off, then turn the power on.
OFF	OFF	ON	ROM upgrade failed. Try another ROMPaq diskette. If the light remains turned on, contact Compaq customer support.
ON	ON	ON	ROM upgrade successfully completed. Turn power off and back on to resume normal system operation.


 Diagnostic lights do not flash on USB keyboards.



Keyboard Lights

3.4.4 Remote Security Management


Remote Security Management allows the system administrator to safely set or modify security features on remote Compaq desktops, directly from the centralized network management console. Enabling the system administrator to perform these tasks remotely, on multiple computers, results in consistent deployment of and greater control over desktop security parameters over the network. It also results in greater productivity and lower total cost of ownership.

-  The computer must be powered on, or turned on through Remote Wakeup, to take advantage of Remote Security Management. Use of Remote Security Management also requires an established setup password.


For more information about the Remote Management Setup software and enabling Remote Security Management, refer to the online *Remote Management Administrators Guide*. The *Remote Management Administrators Guide* is included with the Remote Management Administration Tools, and is available on the *Support Software CD* or at the Compaq Web site at www.compaq.com.

3.4.5 Remote Wakeup and Remote Shutdown

If the computer has an optional network card installed, it may support the Compaq Remote Wakeup and Remote Shutdown functions. These functions allow a system administrator to power on and power off a client computer from a remote location, supported by PC LAN management tools.

-  Third-party software tools are required to remotely distribute software.

Remote Wakeup allows the network interface controller to continue functioning, even when power to the computer has been turned off.

-  The computer continues to consume a small amount of electricity even after you turn it off. Only when you disconnect the power cord from the electrical outlet does the computer stop consuming electricity.

To enable Remote Wakeup and Remote Shutdown, complete the following steps:

1. Double-click the Network icon, located in the Control Panel.
2. Double-click the appropriate network controller.
3. Click the Advanced Properties tab.
4. Select Remote Wakeup.
5. Change the value to ON.
6. Click OK to save and apply changes, then click OK to exit the Network dialog.


For more information on using Remote Wakeup and Remote Shutdown, refer to the online *Remote Management Administrators Guide*. The *Remote Management Administrators Guide* is included with the Remote Management Administration Tools, and is available on the *Support Software CD* or at the Compaq Web site at www.compaq.com.

3.4.6 NIC Alert

The NIC Alert function enables Compaq Deskpro computers to send an immediate alert to the network administrator when there is a hardware or operating system failure, or evidence of tampering, even if the system is powered off or the operating system is not yet loaded.


3.4.7 Replicating Original Setup

This procedure gives an administrator the ability to easily copy one setup configuration to other computers of the same model. This allows for faster, more consistent configuration of multiple computers. To replicate the setup:

1. Access the Computer Setup Utilities menu.
2. Click File → Save to Floppy. Follow the instructions on the screen.
 -  This requires an internal diskette drive, a MultiBay LS-120 drive, or a portable, external diskette drive.
3. To replicate the configuration, click File → Restore from Floppy, and follow the instructions on the screen.

3.4.8 Dual-State Power Button

With Advanced Configuration and Power Interface (ACPI) enabled for Windows 98 and Windows 2000, the power button can function either as an on/off switch or as a suspend button. The suspend feature does not turn off power altogether, but instead causes the computer to enter a low-power standby. This allows you to quickly power down without closing applications and to quickly return to the same operational state without any data loss.

-  The power button suspend feature is not functional in Windows NT 4.0. Under Windows NT, the power switch will act as a normal on/off button even if listed as “Suspend” in F10 Setup. If you attempt to place the system into the suspend mode, you could lose valuable data.


To change the power button’s configuration, complete the following steps:

1. Access the Computer Setup menu.
2. Select Power → Energy Saver. Set the power button configuration to either Advanced or Minimal to turn on the Energy Saver Options menu.
3. Select Power → Energy Saver Options. Set the power button configuration to either On/Off or Suspend/Wakeup, as desired.

For more information about the various screen and configuration options, refer to Section 2.1.1, “Using Computer Setup Utilities.”

4. Select File → Save Changes and Exit.

After configuring the power button to function as a suspend button, press the power button to put the system in a very low power state (suspend). Press the button again to quickly bring the system out of suspend to full power status. To completely turn off all power to the system, press and hold the power button for four seconds.

-  If you have selected the “Blink LED during Energy Save” option in Computer Setup, the power-on light will blink once every second while the computer is in suspend. Refer to Section 2.1.1, “Using Computer Setup Utilities,” for more information.

3.4.9 Power Management

Power Management is a feature that saves energy by shutting down certain components of the computer when they are not in use, saving energy without having to shut down the computer. Timeouts (the period of inactivity allowed before shutting down these components) can be enabled, customized, or disabled using Computer Setup.

1. Access the Computer Setup menu.
2. Select Power → Energy Saver. Select Advanced to turn on the Timeouts menu.
3. Select Power → Timeouts. Enable, customize, or disable timeouts.

Refer to *Hardware Reference Guide* for more detailed information about the features of Computer Setup.

4. Select File → Save Changes and Exit.



To avoid potential conflicts, never enable monitor timeouts in Windows 98 while system timeouts are enabled in Computer Setup.

Use Display Properties to establish, modify, or disable Power Management settings for the monitor. To access Display Properties, right-click on the Windows Desktop, then choose Properties.

3.4.10 World Wide Web Site

Compaq engineers rigorously test and debug software developed by Compaq and third-party suppliers, and develop operating system–specific support software, to ensure the highest level of performance, compatibility, and reliability for Compaq personal computers.

When making the transition to new or revised operating systems, it is important to implement the support software designed for that operating system. If you plan to run a version of Microsoft Windows/NT Workstation/Windows 2000 that is different from the version included with your computer, you must install corresponding Compaq device drivers and utilities to ensure all features are supported and functioning properly.

Compaq has made the task of locating, accessing, evaluating, and installing the latest support software easier. You can download the software from the Compaq World Wide Web site at www.compaq.com.

The Web site contains the latest device drivers, utilities, and flashable ROM images needed to run Windows 98/Windows 2000/Windows NT Workstation on your Compaq computer.

3.5 Building Blocks and Partners

Compaq management solutions are based on industry standards, including DMI 2.0, Web-Based Enterprise Management, Intel's "Wired for Management" (WfM), SNMP, and Net PC technologies. Microsoft, Intel, Hewlett-Packard, Novell, Veritas, Computer Associates, Tivoli, and other industry leaders work closely with Compaq to integrate their management solutions with Compaq products and initiatives, giving you, the Compaq customer, extraordinary flexibility and functionality in client management and PC ownership cost reduction.

Compaq delivers desktop management solutions through the Compaq Management Solutions Partners Program. The partnership ensures that the benefits of Intelligent Manageability are accessible through a broad range of vendors. For more information and a list of Compaq Management Solutions Partners and their products, visit www.compaq.com/im/partners/index.html on the Compaq Web site.

3.5.1 Desktop Management Interface (DMI)

The Desktop Management Task Force (DMTF) is an industry body created in 1992 with the goal of standardizing systems manageability. DMTF established the Desktop Management Interface (DMI) framework to standardize access to PC configuration data. Compaq, as a Steering Committee and Technical Committee member of the DMTF, delivers hardware and software instrumentation that supports the DMI standard.

For more information on configuring the DMI software, refer to the online *Intelligent Manageability Guide*.

3.5.2 Wired for Management

Intel's Wired for Management initiative is focused on reducing the support and administration cost of Intel architecture-based systems without compromising their flexibility and performance. The Wired for Management guidelines provide a baseline set of building blocks that Compaq utilizes in Intelligent Manageability to provide standardized management of desktop inventories, remote system configuration, off-hours maintenance, and next generation power management. But Compaq doesn't stop with these baseline features. Additional capabilities have been incorporated into Intelligent Manageability to provide an extensive solution for managing networked computing environments.

Required Wired for Management technologies include:

- Desktop Management Interface (DMI) 2.0
- Remote System Installation
- Remote Wakeup and Remote Shutdown
- ACPI-Ready Hardware
- SMBIOS
- Pre-boot execution (PXE) support


chapter 4

ULTRA ATA DRIVE GUIDELINES & FEATURES

4.1 Ultra ATA Devices

Ultra ATA drives are configured by means of a cable-select feature that identifies the drives as device 0 (primary drive) or device 1 (secondary drive).

Compaq hard drives ship with jumpers preset to cable-select mode; therefore, no jumper setting changes on the existing or optional drives are required. If you purchase a third-party hard drive, refer to the documentation included with the kit to ensure proper installation and configuration of cables.

 If installing a second device on the primary controller, you must use an 80-conductor Ultra ATA cable for optimal performance.

Newer, Ultra ATA-66 (Ultra DMA-66) and faster drives require 40-pin, 80-conductor cables to maintain the higher data transfer rates possible with the improved technology. The computer system must support Ultra ATA-66 or higher logic for it to take advantage of the higher data transfer rates.

When using Ultra ATA-100, -66, and slower -33 drives in the same system, the drives will operate at their respective data transfer rates.

4.2 Drive Installation Guidelines

This guideline standardizes the configuration of multiple Ultra ATA/ATAPI storage devices. It categorizes the devices by the type of media used and then ranks the device within each class.

Device Class		
Class 1 Hard Drives	Class 2 Magnetic Storage	Class 3 Optical Storage
	2.1 LS-120	3.1 R/W CD-ROM Drive
	2.2 Tape Drive	3.2 DVD-ROM Drive
	2.3 Iomega Zip Drive	3.3 CD-ROM Drive

4.2.1 General Application Rules

1. When replacing a hard drive, the replacement should be of the same type (Ultra ATA -33, -66, or -100) as that being removed to retain the same level of performance.
2. When possible, hard drives should be configured by themselves on the primary controller channel.
3. Ultra ATA cables should be a maximum of 18 inches in length to connect the devices to the system board.
4. If an Ultra ATA hard drive is replaced with a SCSI hard drive, a multimode LVD SCSI cable option kit will be needed.


5. When devices from all three classes are present, class 2 and class 3 devices should be combined first on the secondary controller channel.
6. When combining two devices on any controller channel, the device with the lower rank should be the primary device (master) and the higher rank the secondary device (slave).
7. The lowest class present in a configuration consisting of four devices should be placed on the primary channel with the hard drive.
8. As new devices are developed and added to the individual class lists they will be added to the bottom of the lists. This improves the chances that the new device will be configured as a primary drive (master) and lowers the chances that it will be combined with a hard drive.
9. When two hard drives are installed in a computer, an 80-conductor cable should be used. When other multiple ATAPI devices are used, a 40-conductor cable is recommended.
10. When Ultra ATA and SCSI hard drives are mixed in the same system, the Ultra ATA drive will become the boot drive unless the boot order is changed in Computer Setup (F10 Setup).

4.2.2 Special Situations

1. When combined with the Iomega Zip drive on the same controller, the DVD drive must be configured as the primary drive.
2. In all applications except an NLX minitower chassis, in which an LS-120 drive is being configured, it is assumed that the diskette drive is not present.
3. When a DVD drive using A50H firmware and an Iomega Zip drive are on the same controller, the DVD drive must be configured as the primary drive. When the DVD drive firmware is A53H, this configuration is not required.
4. DVD drives are supported on some computers that use the Intel 810 chipset. Refer to the specific documentation that came with the computer for applicability.

4.3 Device 0/Device 1 Relationship

A device 0/device 1 relationship exists when there are two hard drives connected to a single port. In this situation, one drive must be designated as the device 0 (primary drive), and the other as the device 1 (secondary drive) by the proper use of the drive jumpers. This designation is necessary because both drives cannot work simultaneously.

 All Compaq drives are preset at the factory to take advantage of the cable-select feature.

When the computer supports cable-select, the device 0/device 1 designations are determined by each drive's connector location on the data cable. Device 0 is attached to the data cable connector at the farthest distance from the system board while device 1 is attached to the connector closest to the system board. When only a single drive is used, the drive should be connected to the device 0 connector. The user must set each drive's jumpers to the cable-select setting for the computer to properly set the drive designation.

4.4 SMART

The Self Monitoring Analysis and Recording Technology (SMART) IDE and SCSI hard drives for the Compaq Personal Computers and Workstations have built-in drive failure prediction that warns the user or the network administrator of an impending failure or crash of the hard drive. The SMART drives track fault prediction and failure indication parameters such as reallocated sector count, spin retry count, and calibration retry count. If the drive determines that a failure is imminent, it generates a fault alert.

4.5 Drive Capacities

The combination of the file system and the operating system used in the computer determines the maximum usable size of a drive partition. A drive partition is the largest segment of a drive that may be properly accessed by the operating system. A single hard drive may therefore be subdivided into a number of unique drive partitions in order to make use of all of its space.

The table that follows identifies the capabilities and restrictions imposed on the computer by the combinations of file and operating systems.

Drive Partition Size

File System	Operating System	Maximum Partition Size
FAT 16	DOS/Windows 95	2 GB
FAT 16	Windows NT	4 GB
FAT 32		2 Terabytes
NTFS		2 Terabytes

For example, an 8-GB drive operating in a Windows 95 environment using FAT 16 would have a total of four 2-GB drive partitions. That same drive operating in Windows NT using FAT 16 would have two 4-GB drive partitions unless the user elected to subdivide it into smaller sections. The identical drive using FAT 32 would have a single 8-GB partition unless the user elected to subdivide it into smaller sections.

chapter 5

SCSI DEVICES

5.1 SCSI Guidelines

When installing and operating SCSI devices, you must follow these guidelines:

- A narrow (50-pin) SCSI controller allows you to daisy-chain up to 7 additional SCSI devices. Counting the controller, that amounts to 8 total SCSI devices.
- A wide (68-pin) SCSI controller allows you to daisy-chain up to 15 additional SCSI devices. Counting the controller, that amounts to 16 total SCSI devices.
- If two narrow (50-pin) SCSI controllers are each connected to separate system board SCSI connectors, each controller may have seven SCSI devices attached. Counting the controller, this gives a total of 16 SCSI devices on the system.
- Compaq does not recommend mixing different width SCSI devices on the same SCSI chain or on the same SCSI channel. Mixing devices of different widths on the same chain or channel will always result in a data transfer rate of the slowest machine in that chain. The only exception to this is that Ultra Wide SCSI devices will cause a speed degradation when mixed with other 68-pin devices.
- If multiple SCSI devices are used, split the devices between Channels A and B for optimum performance. Cable length for the second channel should not be longer than 18 inches.
- If two controllers are used, each may use SCSI devices having widths and speeds different from the other. If a 68-pin data cable is used on a controller having 50-pin SCSI devices, use an internal cable adapter (Compaq number 199618-001) or an external cable adapter (Compaq number 270187-B21).



CAUTION: Do not route data cables near the air intake to the power supply. Cables routed in this manner may block the airflow and cause the computer to overheat.

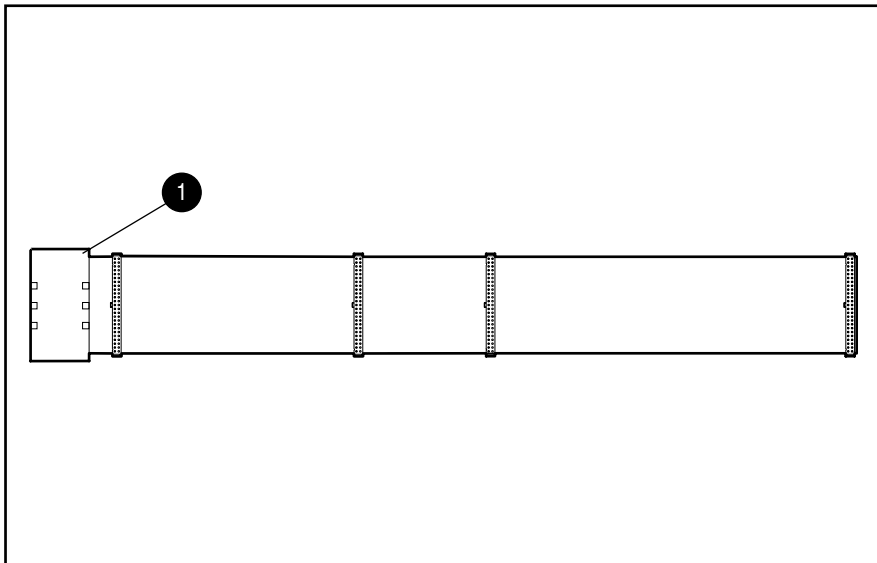
- All SCSI controllers require a unique SCSI ID (0-7 or 8-15) for each SCSI device installed. The controller identifies a SCSI device by its SCSI ID number rather than its location. Moving a SCSI device from one position to another on the SCSI chain does not affect communication between the controller and the device. The reserved and available SCSI ID numbers for SCSI devices are:
 - 0 is reserved for the primary hard drive.
 - 7 is reserved for the SCSI controller.
 - 1 through 6 and 8 through 15 are available for all other SCSI devices.
- 68-pin SCSI controllers require a 53 inch maximum length-twisted pair, LVD cable with built-in terminator, maximum of 5 drives with a minimum driving spacing of 5.25 inches.


Every SCSI chain or circuit must be terminated (closed) at both ends. Some system boards have both ends of the SCSI cable connected to, and terminated by, the system board. Termination can be accomplished in one of several ways:

- ❑ Use a cable with a built-in terminator.
 - ❑ Use a cable with a terminating resistor plug in the last connector.
 - ❑ Connect a SCSI device with its termination enabled into the last connector.
 - ❑ Connect an external SCSI device with its termination enabled to the external SCSI connector on the rear panel of the computer.
- Turn on all external SCSI devices before turning on the power to the computer. This enables the SCSI controller to recognize the external devices.

5.2 Using the Multi-Mode SCSI Cable

Some products ship standard with a multi-mode SCSI cable having a terminator ❶ on one end. This cable supports both low voltage differential (LVD) and single ended (SE) devices. One end of the cable connects to the internal LVD/SE connector on the system board, while the remaining connectors being used on the hard drives in the hard drive bays.



 The multi-mode cable included with the computer may differ from the one pictured.

For additional information about installing optional SCSI devices, refer to the documentation included with the device option kit.

5.3 Using SCSISelect with SCSI Devices

The Ultra160 and faster SCSI host adapters includes the *SCSISelect* utility to configure the host adapter and to run the SCSI disk utilities. To run the *SCSISelect* utility:

- In POST Messages Enabled mode: Press Ctrl+A when the Press<Ctrl><A> for *SCSISelect* Utility message appears during POST.
- In POST Messages Disabled mode: When the Compaq logo screen appears, press any key to exit the logo screen. Immediately after exiting the logo screen, press Ctrl+A to access the *SCSISelect* utility

A menu appears with the following options:

- Configure/View Host Adapter Settings
 - SCSI Bus Interface Definitions
 - Host Adapter SCSI ID
 - SCSI Parity Checking
 - Host Adapter SCSI Termination
 - Additional Options
 - Boot Device Options
 - SCSI Device Configuration
 - Advanced Configuration Options
- SCSI Disk Utilities

Lists all SCSI devices and SCSI ID numbers



For information about configuring POST message display status refer to the *Computer Setup Guide* for additional information.

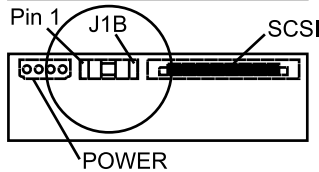
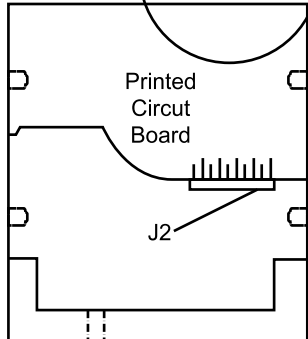
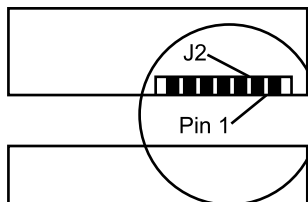
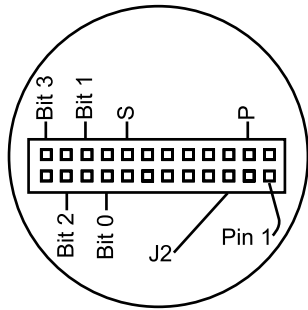
5.4 SMART

The Self Monitoring Analysis and Reporting Technology (SMART) IDE and SCSI hard drives for the Compaq Personal Computers and Workstations have built-in drive failure prediction that warns the user or the network administrator of an impending failure or crash of the hard drive. The SMART drives track fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, and calibration retry count. If the drive determines that a failure is imminent, it generates a fault alert.

5.5 Jumpers

The specifications included below are the standard drive configurations.

5.5.1 Ultra3 SCSI Hard Drive



SCSI ID Settings

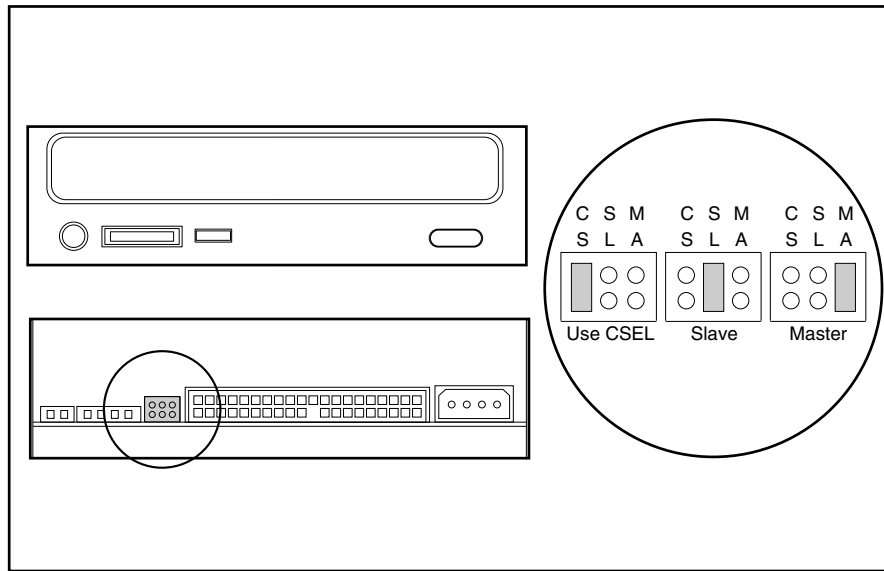
SCSI ID	Bit 2	Bit 1	Bit 0
0			
1			jumper
2		jumper	
3		jumper	jumper
4	jumper		
5	jumper		jumper
6	jumper	jumper	

Default Settings

Signal	Description	Jumper
S	Start unit command enabled	
P	Parity enabled	jumper
W	Write protect disabled	
X	Switch data transfer enabled	jumper

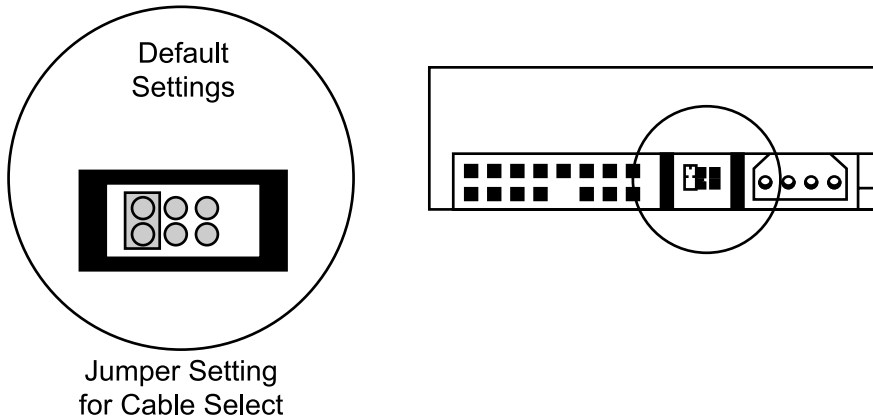
1. Drive intended only for non-pluggable applications. Migration to a hot-pluggable drive tray is not supported.
2. All jumper and switch settings shown in the factory default setting, including those not labeled.
3. Termination is disabled/removed.

5.5.2 CD-ROM or DVD-ROM Drive



5.5.3 Zip Drive


The jumper positions for 100- and 250-MB Zip drives are identical.



Jumper Setting
for Cable Select

Jumper Settings

Configuration	Pair 1	Pair 2	Pair 3
Device 0 (Master)			jumper
Device 1 (Slave)			
Cable Select (Default)	jumper		

 After changing the jumper settings, reboot the computer to recognize the new address.

chapter 6

ROUTINE MAINTENANCE AND DISASSEMBLY PREPARATION

This chapter provides general service information for the computer. Adherence to the procedures and precautions described in this chapter is essential for proper service.



CAUTION: When the computer is plugged into an AC power source voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

6.1 Electrostatic Discharge Information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

6.1.1 Generating Static

The following table shows that:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

Event	Relative Humidity		
	55%	40%	10%
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs* from plastic tube	400 V	700 V	2,000 V
Removing DIPs* from vinyl tray	2,000 V	4,000 V	11,500 V
Removing DIPs* from Styrofoam	3,500 V	5,000 V	14,500 V
Removing bubble pack from PCB	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V

*Dual Inline Packaging (DIP) is the packaging around individual microcircuitry. These are then multi-packaged inside plastic tubes, trays, or Styrofoam.



700 volts can degrade a product.

6.1.2 Preventing Electrostatic Damage to Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following proper packaging and grounding precautions are necessary to prevent damage to electric components and accessories.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.
- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

6.1.3 Personal Grounding Methods and Equipment

Use the following equipment to prevent static electricity damage to equipment:

- **Wrist straps** are flexible straps with a minimum of one-megohm +/- 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a minimum of one-megohm +/- 10% resistance between the operator and ground.

Static Shielding Protection Levels

Method	Voltage
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

6.1.4 Grounding Workstations

To prevent static damage at the workstation, use the following precautions:

- Cover the workstation with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free workstations.
- Turn off power and input signals before inserting and removing connectors or test equipment.

- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

6.1.5 Recommended Materials and Equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm +/- 10% resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm +/- 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

6.2 Routine Care

6.2.1 General Cleaning Safety Precautions

1. Never use solvents or flammable solutions to clean the computer.
2. Never immerse any parts in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
3. Always turn off the computer when cleaning with liquids or damp cloths.
4. Always turn off the computer before cleaning the keyboard, mouse, or air vents.
5. Disconnect the keyboard before cleaning it.
6. Wear safety glasses equipped with side shields when cleaning the keyboard.

6.2.2 Cleaning the Computer Case

Follow all safety precautions in Section 6.2.1 before cleaning the computer.

To clean the computer case, follow the procedures described below:

- To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.
- For stronger stains, use a mild dishwashing liquid diluted with water. Rinse well by wiping it with a cloth or swab dampened with clear water.
- For stubborn stains, use isopropyl (rubbing) alcohol. No rinsing is needed as the alcohol will evaporate quickly and not leave a residue.
- After cleaning, always wipe the unit with a clean, lint-free cloth.
- Occasionally clean the air vents on the computer. Lint and other foreign matter can block the vents and limit the airflow.

6.2.3 Cleaning the Keyboard

Follow all safety precautions in Section 6.2.1 before cleaning the keyboard.

To clean the tops of the keys or the keyboard body, follow the procedures described in Section 6.2.2.

When cleaning debris from under the keys, review all rules in Section 6.2.1 before following these procedures:



CAUTION: Use safety glasses equipped with side shields before attempting to clean debris from under the keys.

- Visible debris underneath or between the keys may be removed by vacuuming or shaking.
 - Canned, pressurized air may be used to clean debris from under the keys. Caution should be used as too much air pressure can dislodge lubricants applied under the wide keys.
 - If you remove a key, use a specially designed key puller to prevent damage to the keys. This tool is available through many electronic supply outlets.
-



CAUTION: Never remove a wide leveled key (like the space bar) from the keyboard. If these keys are improperly removed or installed, the keyboard may not function properly.

- Cleaning under a key may be done with a swab moistened with isopropyl alcohol and squeezed out. Be careful not to wipe away lubricants necessary for proper key functions. Use tweezers to remove any fibers or dirt in confined areas. Allow the parts to air dry before reassembly.

6.2.4 Cleaning the Monitor

- Wipe the monitor screen with a clean cloth moistened with water or with a towelette designed for cleaning monitors. Do not use sprays or aerosols directly on the screen; the liquid may seep into the housing and damage a component. Never use solvents or flammable liquids on the monitor.
- To clean the monitor body follow the procedures in Section 6.2.2.

6.2.5 Cleaning the Mouse

Before cleaning the mouse, ensure that the power to the computer is turned off.

- Clean the mouse ball by first removing the retaining plate and the ball from the housing. Pull out any debris from the ball socket and wipe the ball with a clean, dry cloth before reassembly.
- To clean the mouse body, follow the procedures in 6.2.2.

6.3 Service Considerations

Listed below are some of the considerations that you should keep in mind during the disassembly and assembly of the computer.

6.3.1 Power Supply Fan

The power supply fan is a variable-speed fan based on the temperature in the power supply.



CAUTION: The cooling fan is off **only** when the computer is turned off or the power cable has been disconnected.

The cooling fan is always on when the computer is either in the “On,” “Standby,” or “Suspend” modes.

You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

6.3.2 Tools and Software Requirements

To service the computer, you need the following:

- Torx T-15 screwdriver (Compaq screwdriver with bits, PN 161946-001)
- Torx T-15 screwdriver with small diameter shank (for certain front bezel removal)
- Flat-bladed screwdriver (may sometimes be used in place of the Torx screwdriver)
- Diagnostics software
- Compaq tamper-resistant T-15 wrench (Smart Cover FailSafe Key, PN 166527-001) or Compaq tamper-resistant bits (Smart Cover FailSafe Key, PN 166527-002)

6.3.3 Screws

The screws used in the computer are not interchangeable. They may have standard or metric threads and may be of different lengths. If an incorrect screw is used during the reassembly process, it can damage the unit. Compaq strongly recommends that all screws removed during disassembly be kept with the part that was removed, then returned to their proper locations.



As each subassembly is removed from the computer, it should be placed away from the work area to prevent damage.

6.3.4 Cables and Connectors

Most cables used throughout the unit are flat, flexible cables. These cables must be handled with care to avoid damage. Apply only the tension required to seat or unseat the cables during insertion or removal from the connector. Handle cables by the connector whenever possible. In all cases, avoid bending or twisting the cables, and ensure that the cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced.



CAUTION: When servicing this computer, ensure that cables are placed in their proper location during the reassembly process. Improper cable placement can damage the computer.

6.3.5 Hard Drives

Handle hard drives as delicate, precision components, avoiding all physical shock and vibration. This applies to failed drives as well as replacement spares.

- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package “Fragile: Handle With Care.”
- Do not remove hard drives from the shipping package for storage. Keep hard drives in their protective packaging until they are actually mounted in the CPU.
- Avoid dropping drives from any height onto any surface.
- If you are inserting or removing a hard drive, turn off the computer. Do not remove a hard drive while the computer is on or in standby mode.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to Section 6.1, “Electrostatic Discharge Information.”
- Do not use excessive force when inserting a drive.
- Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

6.3.6 Lithium Coin Cell Battery

The battery that comes with the computer provides power to the real-time clock and has a minimum lifetime of about three years.

See Chapter 9, “Removal and Replacement Procedures—Small Components,” for instructions on the replacement procedures.



WARNING: This computer contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140°F (60°C).



CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste.

chapter 7

REMOVAL & REPLACEMENT PROCEDURES SECURITY AND EXTERNAL COMPONENTS



CAUTION: When the computer is plugged into an AC power source voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

This chapter provides general service information for the computer. Adherence to the procedures and precautions described in this chapter is essential for proper service.

After completing all necessary removal and replacement procedures, run the Diagnostics utility to verify that all components operate properly.



Not all features listed in this guide are available on all computers.

7.1 Preparation for Disassembly

See Chapter 6, “Routine Maintenance and Disassembly Preparation,” for initial procedures.

1. Remove/disengage any security devices that prohibit opening the computer.
2. Close any open software applications.
3. Exit Windows.
4. Remove any diskette or compact disc from the computer.
5. Turn off the computer and any peripheral devices that are connected to it.



CAUTION: Turn off the computer before disconnecting any cables.



CAUTION: The cooling fan is off **only** when the computer is turned off or the power cable has been disconnected.

The cooling fan is always on when the computer is in the “On,” “Standby,” or “Suspend” modes.

You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

6. Disconnect the power cord from the electrical outlet and then from the computer.
7. Disconnect all peripheral device cables from the computer.



During disassembly, label each cable as you remove it, noting its position and routing. Keep all screws with the units removed.



CAUTION: The screws used in the computer are of different thread sizes and lengths; using the wrong screw in an application may damage the unit.

7.2 Unlocking the Cover

7.2.1 Smart Cover Lock

The Smart Cover Lock is a software-controllable cover lock found on some desktop personal computers and workstations. This lock prevents unauthorized access to the internal components when the Smart Cover Lock and setup password are enabled.

If you enabled the Smart Cover Lock, use Computer Setup to unlock it. If you cannot enter your password to disable the lock, you will need a Smart Cover FailSafe Key (Compaq spare PN 166527-001 or 166527-002) to open the computer cover. You will also need the key in any of the following circumstances:

- Power outage
- Startup failure
- PC component (e.g., processor or power supply) failure
- Lost password



CAUTION: Turn off the computer before disconnecting any cables.

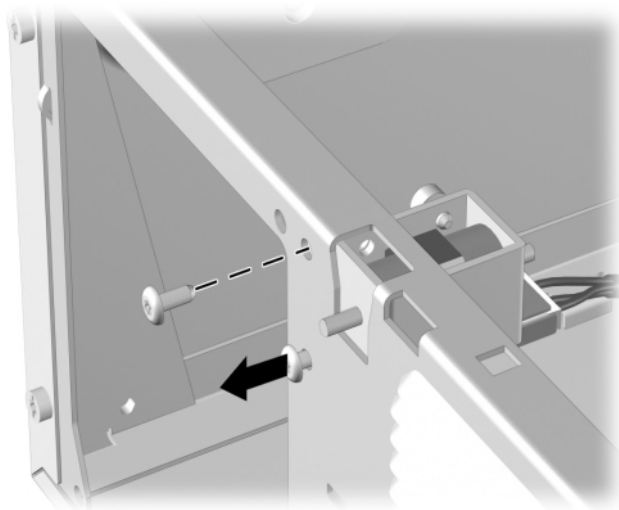


CAUTION: The cooling fan is off **only** when the computer is turned off or the power cable has been disconnected.

The cooling fan is always on when the computer is in the “On,” “Standby,” or “Suspend” modes.

You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

1. Using the Smart Cover FailSafe Key, remove the top tamper-proof screw, and loosen the bottom tamper-proof screw only enough to allow the computer access panel to be removed.



2. Remove the access panel.

To reattach the Smart Cover Lock, secure the lock in place with the tamper-proof screws.

7.3 Security Devices

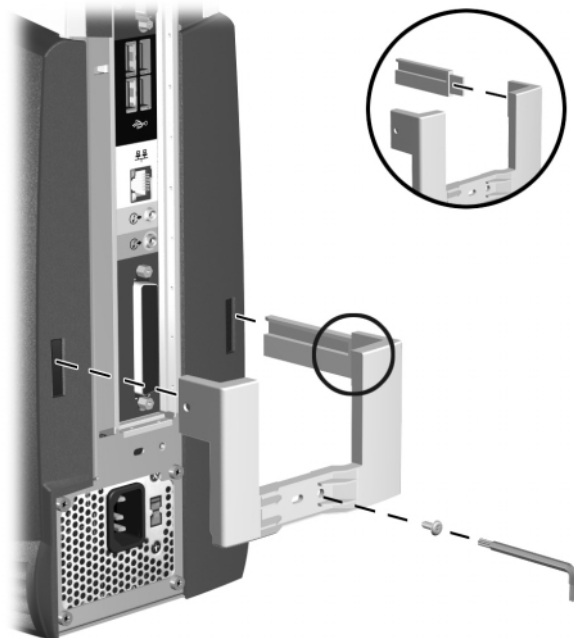
7.3.1 iPAQ Security Bar

1. Prepare the computer for disassembly.



WARNING: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

2. Remove the security bar retaining screw. Use the special Compaq tamper-resistant T-15 wrench (PN 166527-001) or screwdriver bit (PN 166527-002) for this operation
3. Remove the security bar.



To install the security bar, reverse the above procedure.

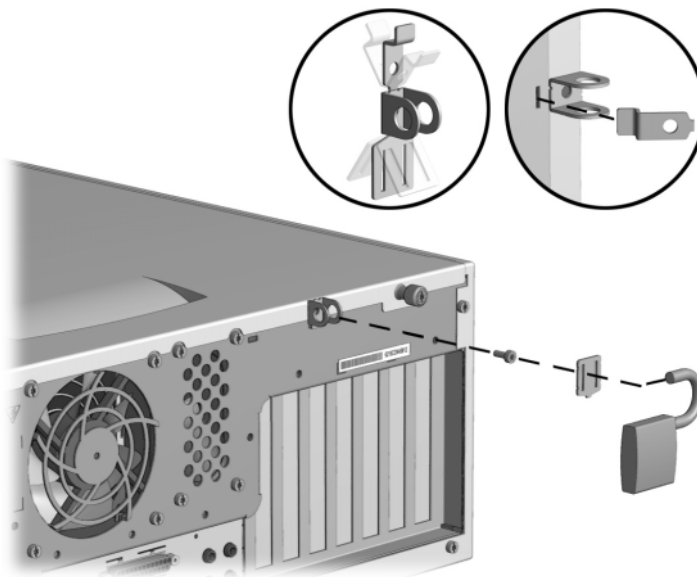
7.3.2 Compaq Type 1 Bracket



WARNING: To avoid injury, use care in handling the separated pieces of the cable lock bracket; metal edges may be sharp. Be sure to install the bracket so that sharp edges do not extend from the edges of the computer chassis.

Depending on the model, the computer includes a cable lock provision, which consists of a three-piece security bracket. The bottom part of the bracket is attached to the computer with a screw; the top part of the bracket covers the screw and prevents its removal.

1. Separate the pieces of the security bracket by bending the metal where the three pieces join.
2. Slide the tab on the narrow piece of the bracket ❶ into the notch on the back of the computer and rotate this piece toward the screw hole, then slide the U-shaped piece of the bracket ❷ between the narrow piece and the computer.
3. Position both pieces of the bracket over the screw hole and secure the bracket to the computer with the screw provided.
4. Cover the screw with the flat portion of the security bracket ❸.
5. Install a padlock (not provided) to secure the top part of the security bracket and inhibit access to the inside of the computer. Install a cable lock (not provided) to inhibit access to the interior of the computer and secure the computer to a fixed object.



To remove the cable lock provision, reverse the above procedure.

7.3.3 Compaq Type 2 Bracket

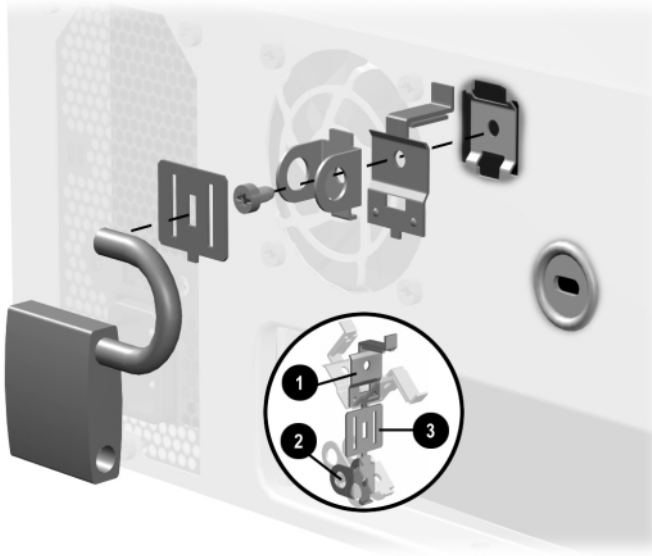
The Compaq type 2 bracket is designed for use on desktop chassis having two cable lock bracket mounting holes. The bracket may be used either with a standard padlock or a Kensington or other cable lock depending on the opening selected on the computer.



WARNING: To avoid injury, use care in handling the separated pieces of the cable lock bracket; metal edges may be sharp. Be sure to install the bracket so that sharp edges do not extend from the edges of the computer chassis.

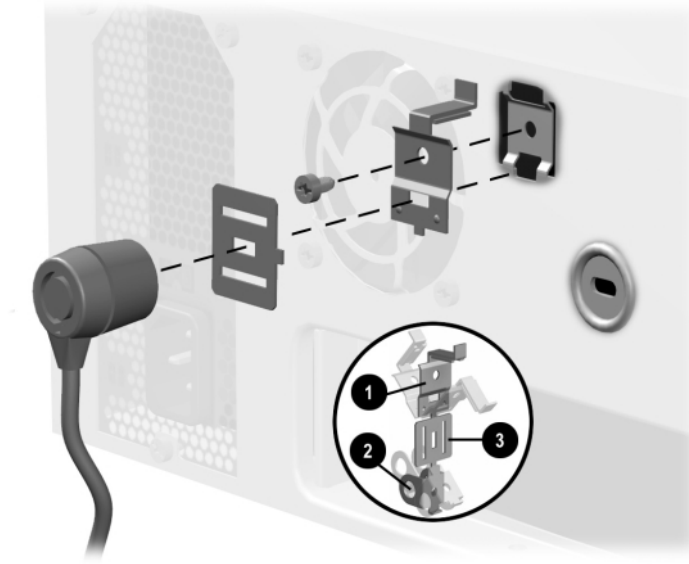
When using the upper mounting hole on the chassis with a standard padlock, complete these steps:

1. Separate the pieces of the security bracket by bending the metal where the three pieces join.
2. Slide the tab on the dog-legged piece of the bracket ❶ into the notch on the back of the computer and rotate this piece toward the screw hole, then position the U-shaped piece of the bracket ❷ over the screw hole and secure the bracket to the computer with the screw provided.
3. Cover the screw with the flat portion of the security bracket ❸. Then, install a padlock (not provided) to secure the top part of the security bracket and inhibit access to the inside of the computer. Install a cable (not provided) to inhibit access to secure the computer to a fixed object.



If a cable lock is used in the upper mounting hole on the chassis, complete these steps:

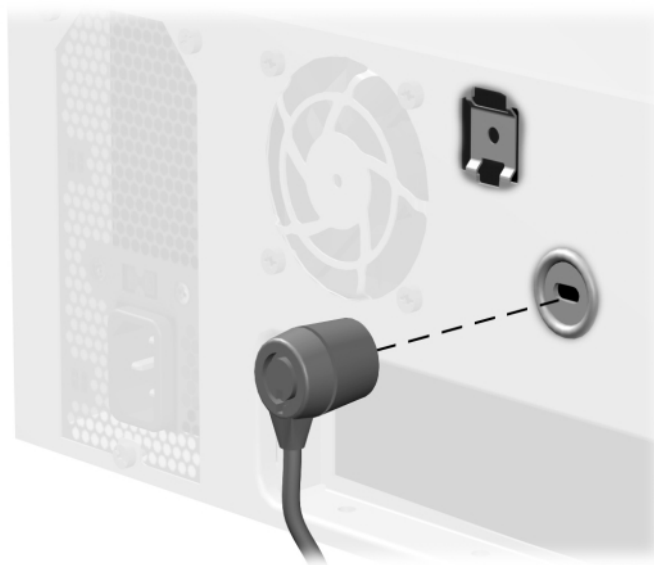
1. Separate the pieces of the security bracket by bending the metal where the three pieces join.
2. Slide the tab on the dog-legged piece of the bracket ❶ into the notch on the back of the computer and rotate this piece toward the screw hole, then secure the bracket to the computer with the screw provided.
3. Install the cable lock.

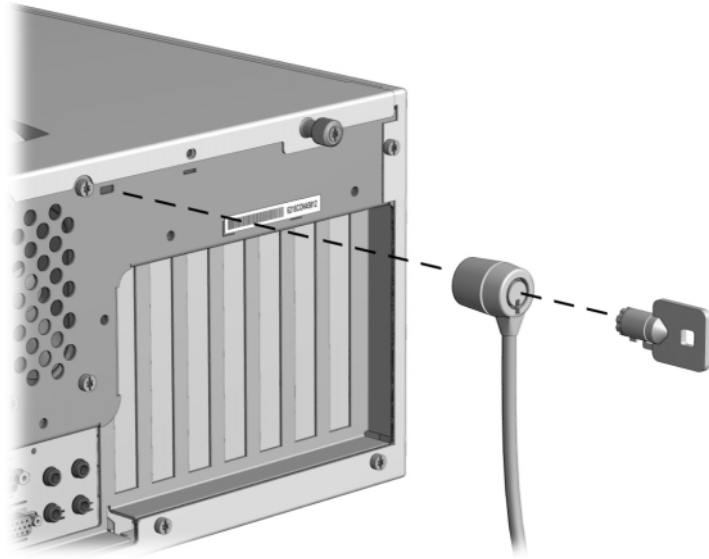


7.3.3 Kensington Cable Lock

Depending on the model, the rear panel of the computer accommodates a cable lock so that the computer can be physically secured to a work area

1. Loop the cable around a heavy, fixed object to which you want to secure the computer.
2. Insert the cable lock end of the cable through the loop end of the cable.
3. Insert the lock into the appropriate slot on the rear of the computer and lock with the key.

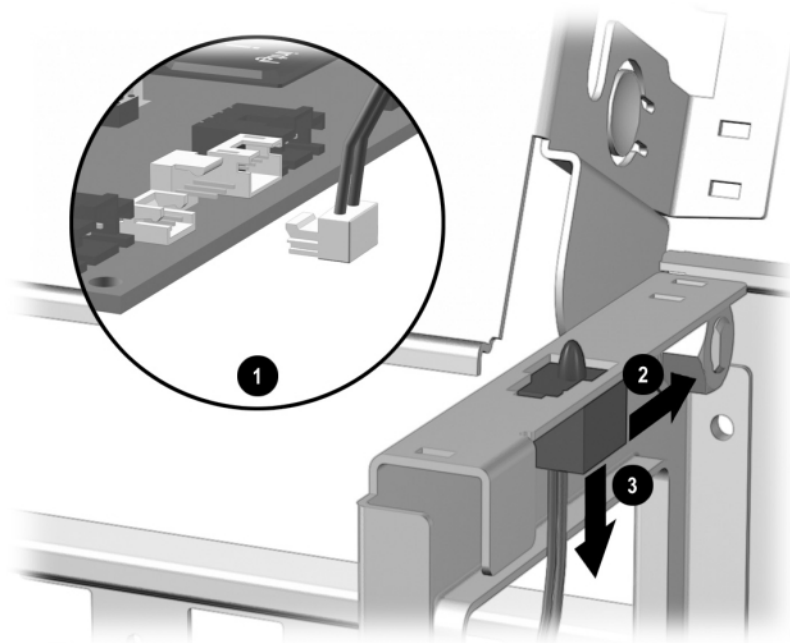




To remove the cable lock provision, reverse the above procedure.

7.4 Hood Sensor

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Rotate the drive cage to the upright position.
4. Disconnect the power cable from the system board ❶.
5. Push the sensor toward the front of the computer ❷.
6. Pull the sensor down through the hole in which it sits to remove it from the chassis ❸, and lift it out of the computer.



Slim Desktop shown

To install the hood sensor, reverse the removal procedure.

7.5 iPAQ Desk Attachment

1. Prepare the computer for disassembly.
2. Remove the left and right exterior access panels.
3. Place the computer in the desired position and mark through the mounting holes to accurately locate where the fasteners will be installed.

It will be necessary to remove the two front rubber feet before you can mark the mounting hole locations.

4. Move the computer; then drill pilot holes in the mounting surface to accept the fasteners.



Caution: Do not drill any holes through the computer chassis. Use the existing holes in the chassis to layout the location of the desired holes.

5. Reposition the computer and install the fasteners through the computer chassis.



#14 Screws are recommended for this installation.

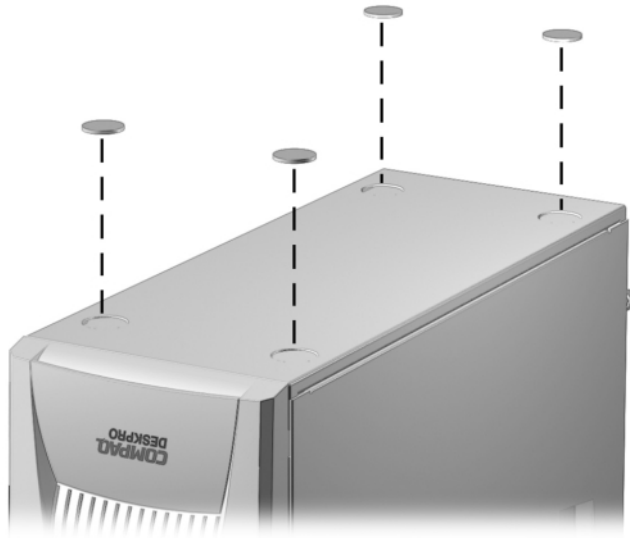


6. Reinstall the exterior access panels.

7.6 Feet Installation

Four (4) rubber feet are mounted to the chassis, as shown below. No parts have to be removed to access the feet. The replacement feet have an adhesive surface and are shipped with a protective backing in place. Remove the backing from the feet before installation.

If necessary, remove the old feet and remove any adhesive residue from the chassis.



Deskpro EXS Shown

7.7 Access Panel/Computer Cover



CAUTION: Turn off the computer before disconnecting any cables.



CAUTION: The cooling fan is off only when the computer is turned off or the power cable has been disconnected.

The cooling fan is always on when the computer is in the “On,” “Standby,” or “Suspend” modes.

You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

7.7.1 Access Panel Models

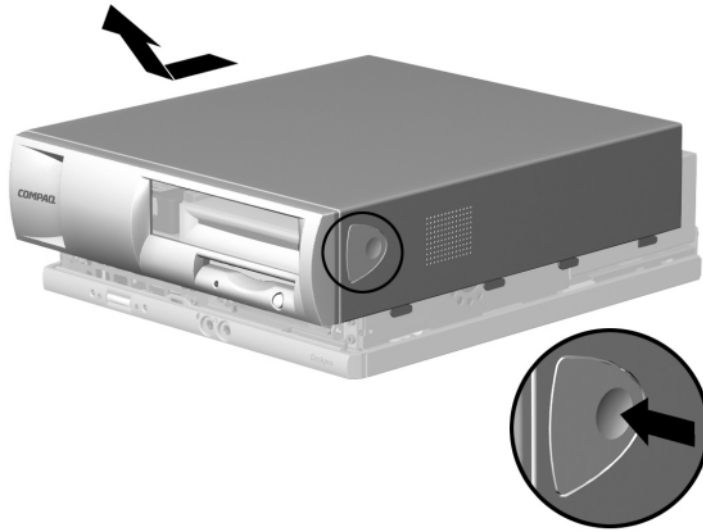
1. Prepare the computer for disassembly.
2. Loosen the thumbscrews that secure the access panel to the back of the computer chassis.
3. Slide the access panel backward approximately 1-inch (2.5-cm); then lift it up and off the unit.



To replace the access panel, reverse the previous steps.

7.7.2 Computer Cover Models

1. Prepare the computer for disassembly.
2. Press in the button on each side of the front bezel to release the quick release cover latches.
3. As you slide the computer cover forward, release the buttons and allow them to return to the original position, then lift the cover up and off the unit.



To replace the computer cover, reverse the removal procedure.

7.7.3 iPAQ Access Panels

Outer Access Panels

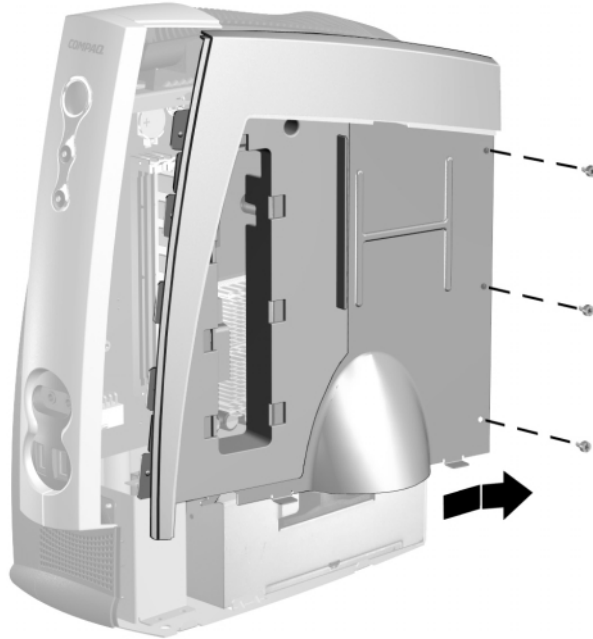
1. Prepare the computer for disassembly.
2. Eject the drive from the MultiBay.
3. Press down on the tab on the top of the access panel ❶. Rotate the panel away from the computer.
4. Lift the panel from the two tabs on the bottom wing of the chassis ❷ to gain full access to the side of the computer.



To replace the access panels, align the slots on the bottom of the panel with the tabs on the chassis ❷. Snap the panel into place.

Inner Access Panel

1. Prepare the computer for disassembly.
2. Remove the right access panel.
3. Remove the three screws that secure the inner access panel to the chassis.
4. Slide the inner panel towards the rear of the computer and lift it out.



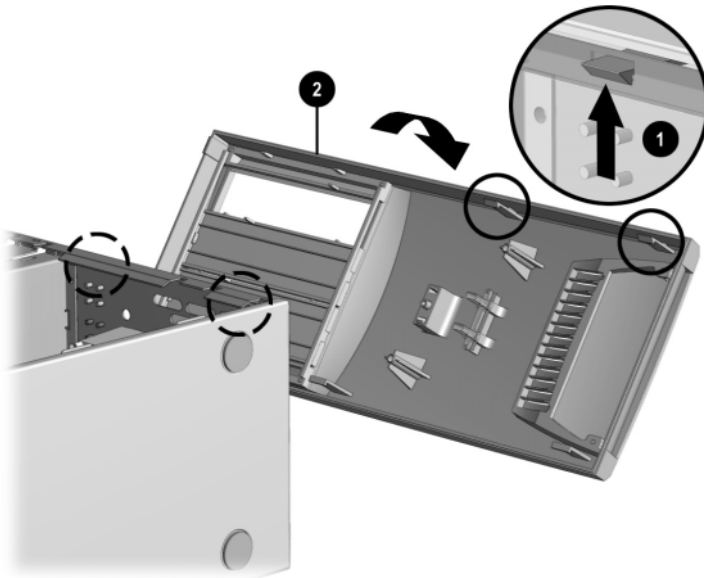
To replace the inner access panel, reverse the previous steps. Angle the inner panel towards the front of the computer and align the hook on the bottom of the inner panel with the slot on the chassis.

7.8 Front Bezel

Front bezels are generally connected to the chassis using either tabs or screws. The sections below provide examples of each. However, different computers may have different tab or screw locations and slightly different bezel removal procedures.

7.8.1 Secured with Tabs


1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Press the release tabs ❶ at the top of the front bezel.
4. Rotate the front bezel away from the chassis ❷ to remove it from the unit.



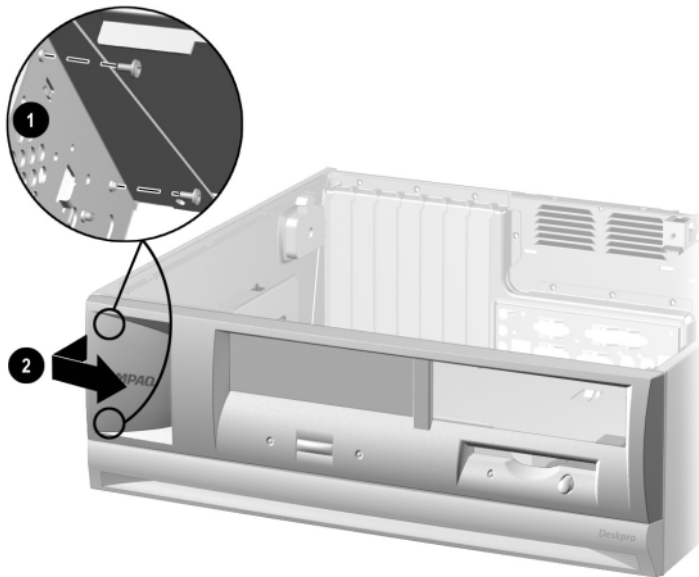
When replacing the front bezel, ensure that the bottom hinge points are properly placed in the chassis before rotating the front bezel back into its original position.

7.8.2 Secured with Screws

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. From the inside of the unit, remove the two screws from the left side of the front bezel ❶.

 A Torx T-15 screwdriver with small diameter shank may be required to remove the screws that attach the front bezel to the chassis.

4. Remove the bezel, left side first ❷, while making sure the two hooks on the right side of the bezel clear the slots in the chassis.

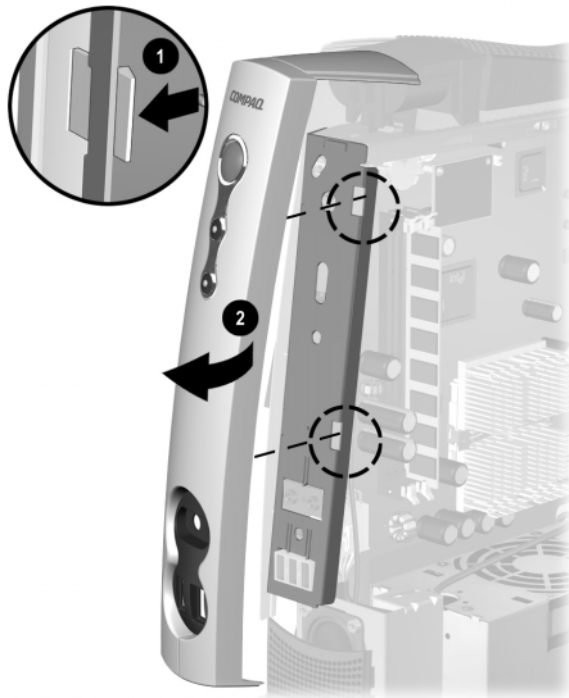


To install the front bezel, reverse the removal procedure.

7.8.3 iPAQ Front and Top Bezels

Front Bezel

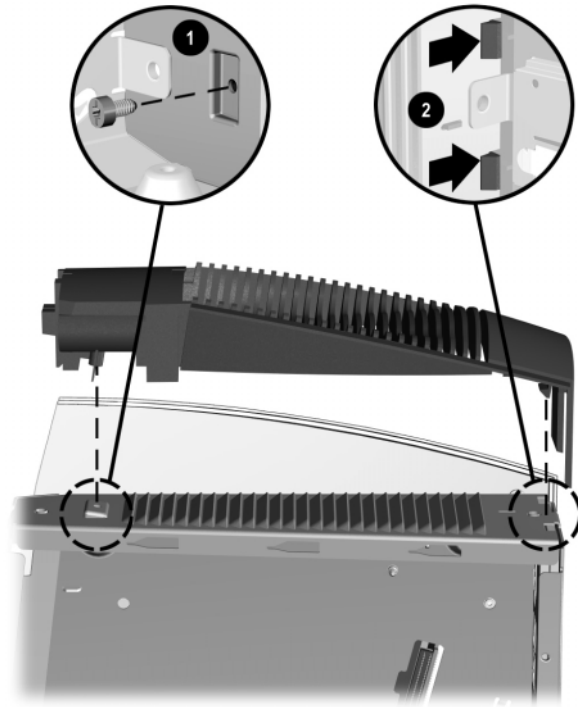
1. Prepare the computer for disassembly.
2. Eject the drive from the MultiBay.
3. Remove both outer access panels.
4. Remove the inner access panel.
5. Press the two tabs on the inside of the front bezel to release them, then rotate the bezel to the left to release the remaining two tabs.



To replace the front bezel, reverse the previous steps.

Top Bezel


1. Prepare the computer for disassembly.
2. Remove the right access panel.
3. Remove the inner access panel.
4. Remove the front bezel.
5. Remove the screw that secures the front of the top bezel to the chassis.
6. Grasp the top bezel near the front and lift it up while at the same time releasing the two tabs at the back.

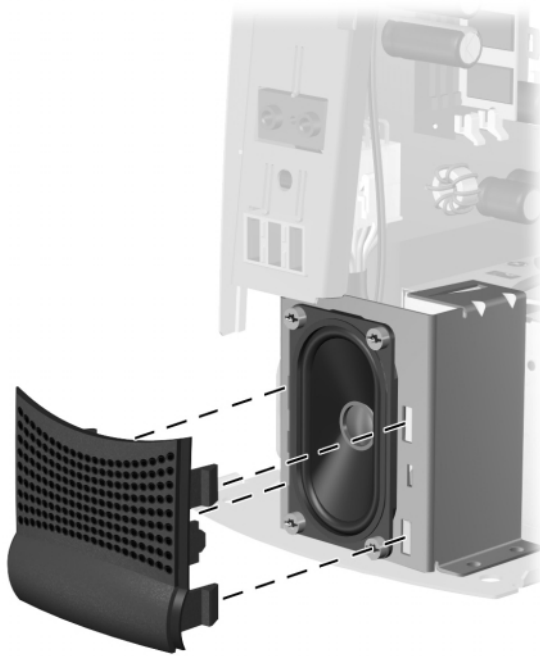


To replace the top bezel, reverse the previous steps.

Speaker Grill

1. Prepare the computer for disassembly.
2. Eject the drive from the MultiBay.
3. Remove the two outer access panels.
4. Press the four tabs on each side of the speaker bezel to release them from the chassis, then pull the speaker bezel from the chassis.

 The top edge of the speaker bezel nests under the front bezel and it may be necessary to tilt the bottom the speaker bezel up to clear the obstruction.



To replace the speaker grill, reverse the previous steps.

7.8.4 Subpanel and Bezel Blanks – Convertible Minitower

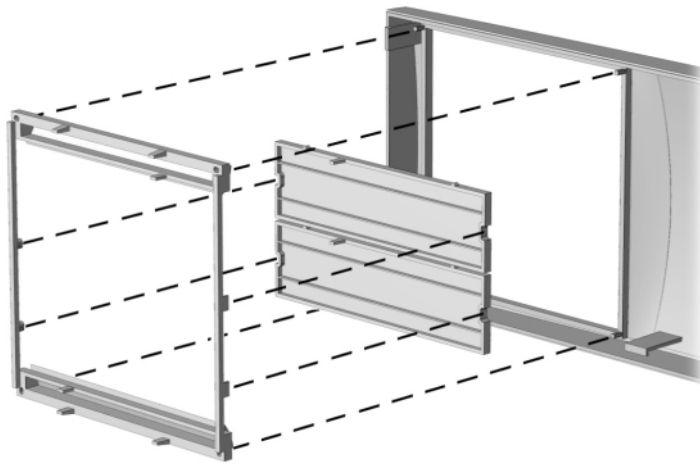
The subpanel and bezel blanks must be removed from the front bezel if you are installing a mass storage device for the first time, or if you are converting the unit from a desktop to a minitower configuration or from a minitower to a desktop. See Chapter 10 for more information on changing unit configuration.

1. Prepare the computer for disassembly.
2. Lay the computer down on its large base for greater stability.
3. Remove the access panel.
4. Remove the front bezel.
5. Pull on the subpanel to remove it from the inside of the front bezel.



CAUTION: Hold the subpanel straight when you pull it away from the front bezel. Pulling at an angle could damage the pins that align the subpanel within the front bezel.

6. Gently push on the bezel blanks to remove them from the subpanel.



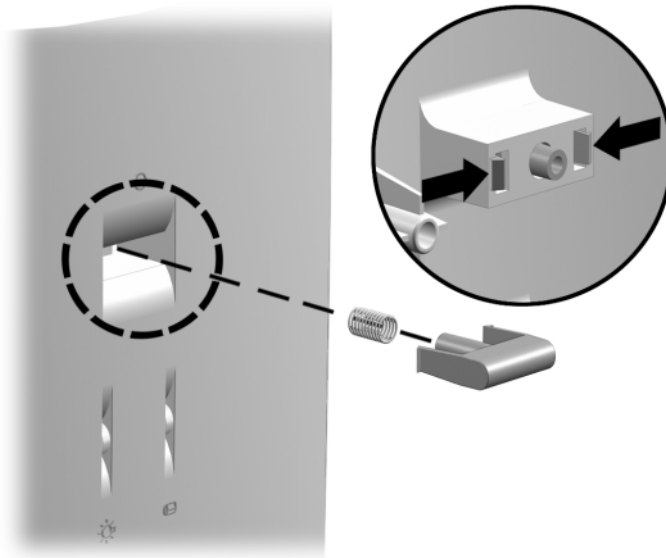
CAUTION: When replacing the subpanel, ensure that the aligning pins and any remaining bezel blanks are in the proper orientation to prevent damage to the alignment pins.



The subpanel has markings on it to facilitate installation.

7.8.5 Power Button – Convertible Minitower

1. Prepare the computer for disassembly.
2. Lay the computer down on its large base for greater stability.
3. Remove the access panel.
4. Remove the front bezel.
5. Pinch the two tabs of the power button together and pull the button out of the front bezel. The spring will follow the button out of the housing.



Deskpro EXS Shown

To replace the power button, reverse the above procedure.

7.9 Front Trim

Some computers have a removable front trim, located below the front bezel. The front trim is generally connected to the chassis using either tabs or screws. The sections below provide examples of each. However, different computers may have different tab or screw locations and slightly different trim removal procedures.

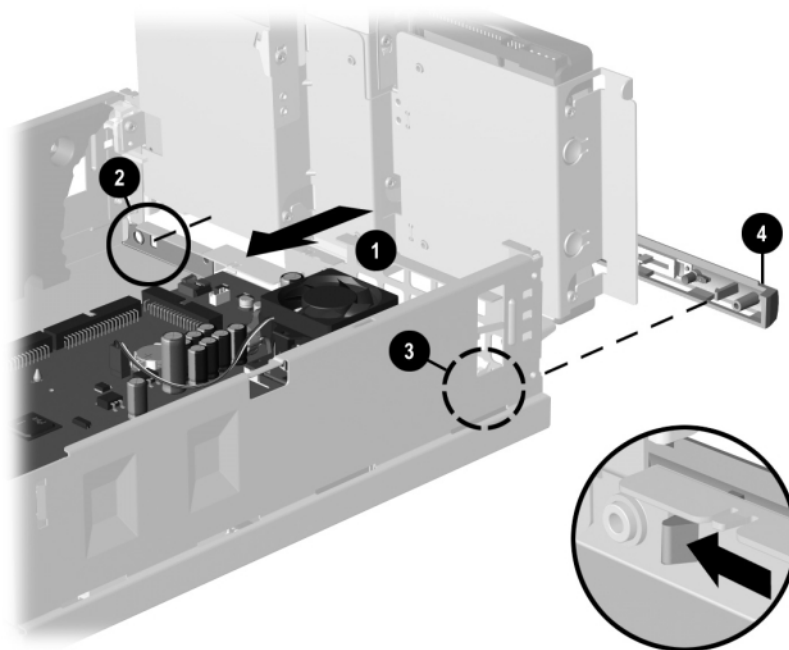
7.9.1 Secured with Tabs

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Remove the I/O panel.
4. Rotate the drive cage to the upright position.
5. Slide the system board back until the six metal standoffs that extend up from the base pan are positioned in the larger part of the keyhole slots in the system board ❶.



It is not necessary to remove the system board from the computer to remove the front trim.

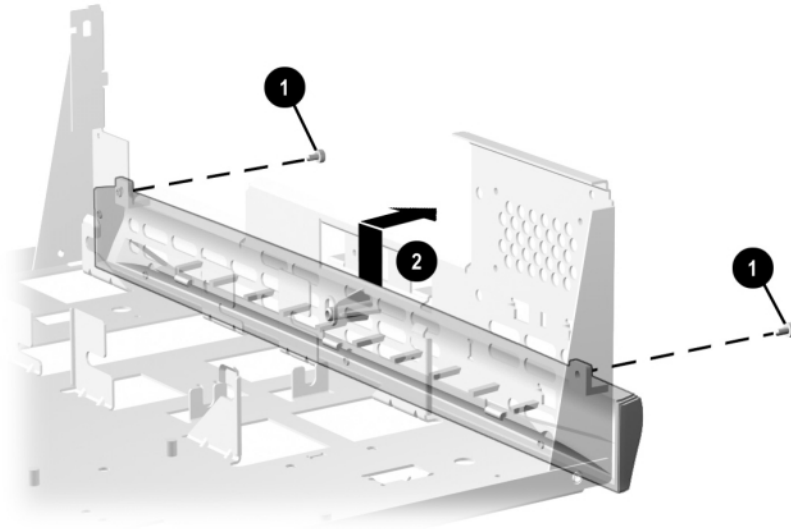
6. Press the left tab that connects the front trim to the chassis ❷.
7. Press the right tab that connects the front trim to the chassis ❸.
8. Remove the front trim from the computer ❹.




To replace the front trim, reverse the removal procedures.

7.9.2 Secured with Screws

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Remove the front bezel.
4. Remove the two screws connecting the trim to the front of the base pan ❶.
5. Remove the trim from the computer ❷.



To install the trim, reverse the removal procedure.

-  When installing the front trim, make sure the three hooks on the bottom of the trim fit into the three associated slots in the base pan.

chapter 8

REMOVAL & REPLACEMENT PROCEDURES EXPANSION COMPONENTS



WARNING: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

8.1 Drives

When installing additional drives, follow these guidelines:

- For optimal performance, connect hard drives to the primary controller. Connect expansion devices, such as CD-ROM, IDE tape, and diskette drives to the secondary controller.



Refer to chapter 4 for more detailed information on Ultra ATA drives and to chapter 5 for SCSI drives.

- You must install guide screws to ensure that the drive lines up correctly in the drive cage. Compaq has provided extra guide screws, which are installed in the front of the computer chassis, behind the front bezel. Some options require metric hardware. Compaq-supplied metric screws are black.
- Drive installation requires no jumper setting changes on the existing or optional drives. All Compaq drives have the jumpers preset for cable-select installation.
- The system automatically recognizes hard drives sold by Compaq (or any other Plug and Play hard drive) and will automatically reconfigure the computer. If you installed a third-party hard drive, or one that is not a Plug and Play device, you must run Computer Setup to reconfigure the computer.



If installing a second device on the primary controller, you must use an 80-conductor Ultra ATA cable for optimal performance. This cable is available as a Compaq option.



CAUTION: When servicing the computer, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

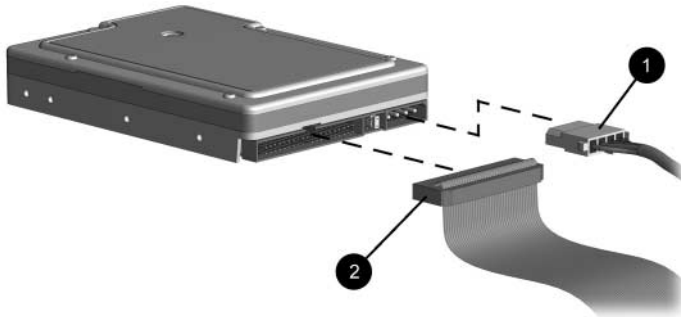


CAUTION: All removable media should be taken out of the drive before removing the drive from the computer.

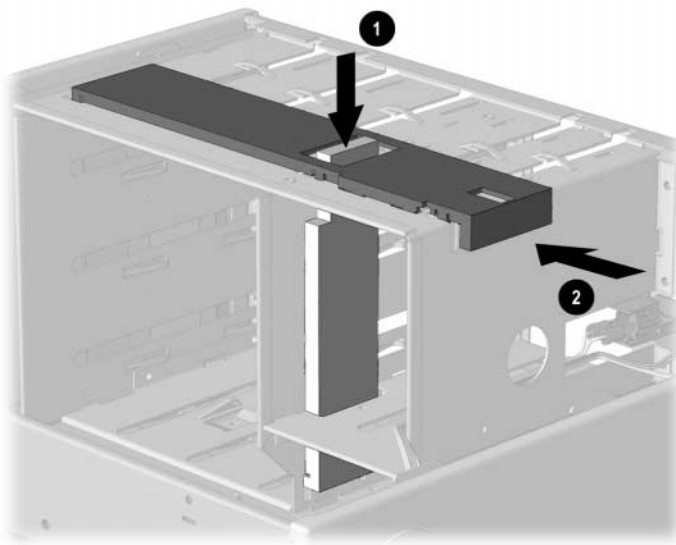
8.1.1 Convertible Minitower

Removing a Drive

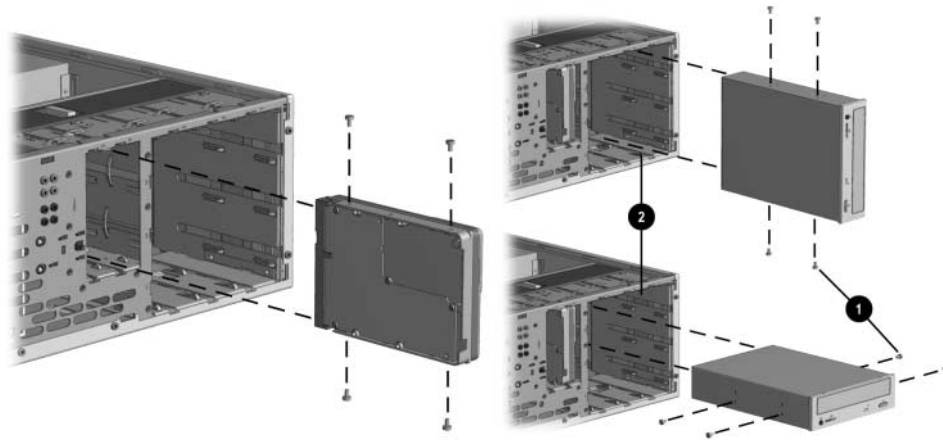
1. Prepare the computer for disassembly.
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel.
4. Remove the front bezel.
5. Disconnect the power ❶ and data ❷ cables from the back of the hard drive.



6. Press the drivelock mechanism to unlock the drives. Drivelock ❶ secures the external drives in the desktop configuration; drivelock ❷ secures all drives in the minitower configuration and the internal drives in the desktop configuration.



7. While holding the drivelock in the unlocked position, remove the drive from the drive bay.



8. Remove the four guide screws from the drive.
9. Install two guide screws on each side of the replacement drive.



Metric screws (M3) have a black finish; U.S. screws have a silver finish.

Replace the drive by reversing the above procedure.



CAUTION: Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

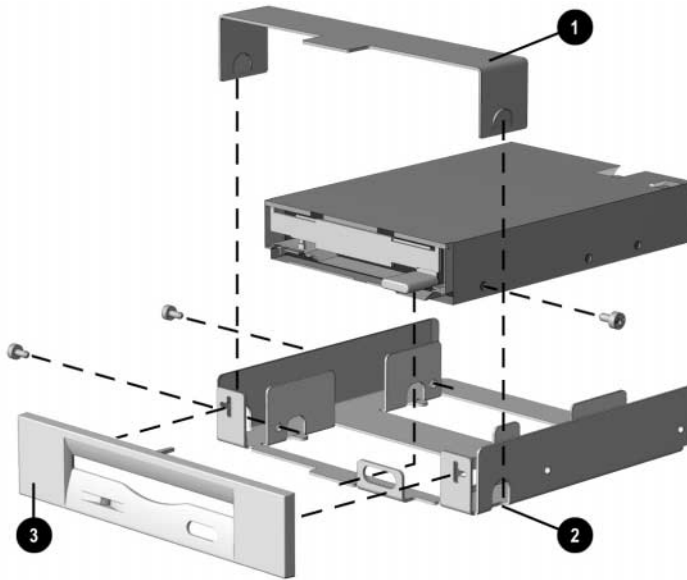
Installing a New Drive

1. Install two guide screws on each side of the replacement drive ❶.
2. Ensure that the guide screws line up with the guide slots ❷, then slide the drive into the drive bay until it snaps into place.
3. Connect the power and signal cables to the back of the drive.
4. Remove the bezel blank from the subpanel, if necessary.
5. Reinstall the subpanel and the front bezel.

Removing a 3.5-Inch Drive from a 5.25-Inch Drive Adapter

A 3.5-inch drive must be installed into a 5.25-inch drive adapter in order to install the smaller drive into a standard 5.25-inch drive bay.

1. Remove the bracket brace ❶ from the top of the drive adapter by squeezing inward on both sides ❷, then rotating the brace up and out.
2. Remove the drive bezel ❸.
3. Remove the two screws that secure the drive to the left side of the drive adapter.
4. Slide the drive to the rear of the drive adapter until the diskette drive eject button is free of the button protector, then lift the drive out of the drive adapter.
5. Remove the guide screw from the right side of the drive.



To replace the drive, reverse the previous procedures.



The primary 3.5-inch diskette drive should only be installed into bay 3. Bay 3 is the bottom bay in the minitower and the topmost bay in the desktop configuration.

When replacing the drive, use the existing screws. Metric screws (M3) have a black finish while U.S. screws (#6) have a silver finish.




CAUTION: Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

8.1.2 Slim Desktop/Small Form Factor

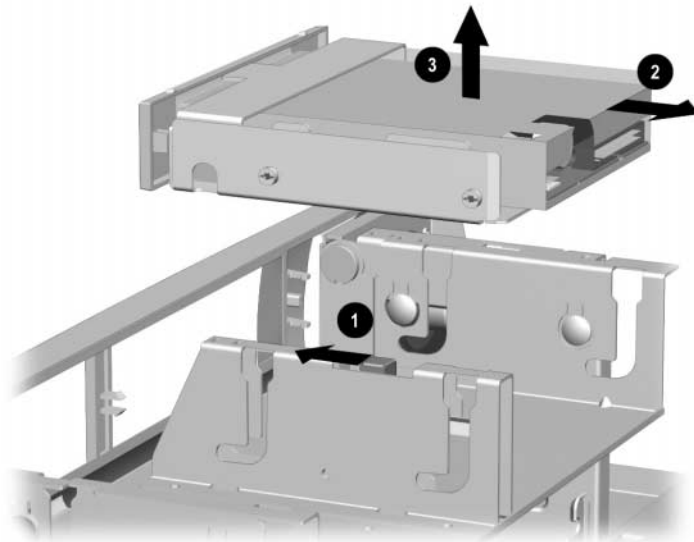
Drives secured with J-slots have release levers in varying locations near the drive.

Drives Secured with J-slots


1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Disconnect the drive power cable, signal cable, and audio connector from the drive, if applicable.
4. Slide the drive release latch forward ❶.

 The drive release latch may be in a different location.

5. At the same time, push the drive ❷ so the guide screws release from the J-slots, then lift it out of the drive cage ❸.



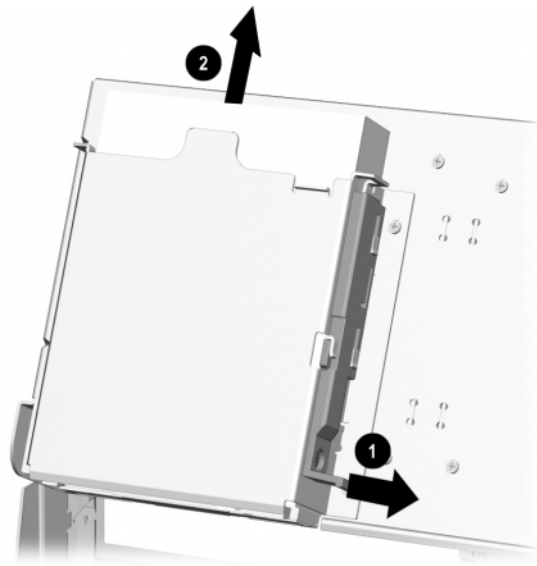
Slim Desktop 5.25-inch drive shown

 When replacing the drive, transfer the four screws from the old drive to the new one. The screws take the place of drive rails.

To install a drive, reverse the removal procedure.

Diskette Drive – Slim Desktop

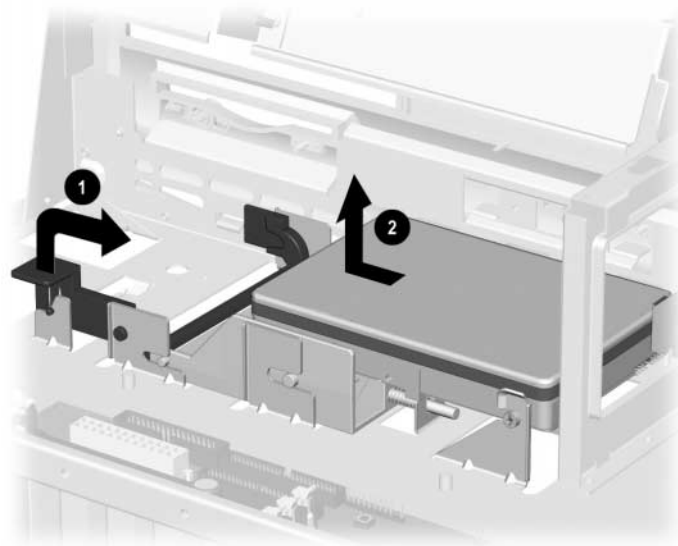
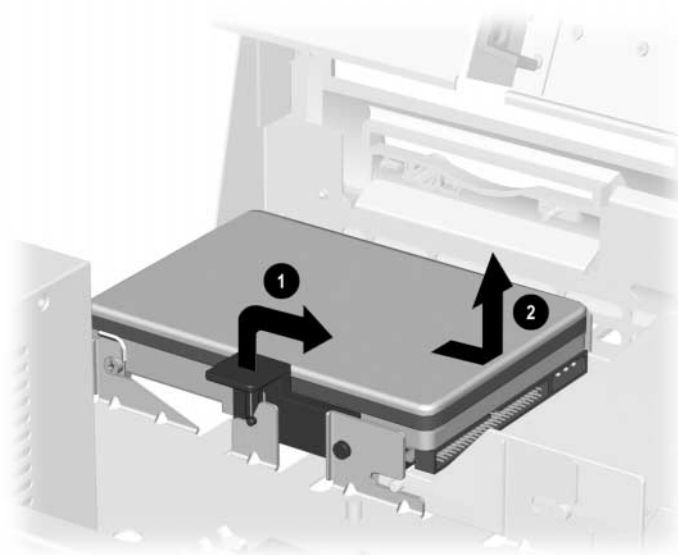
1. Prepare the computer for disassembly.
2. Remove access panel.
3. Rotate the drive cage to the upright position.
4. Disconnect the drive power cable and signal cable from the drive.
5. Pull the green drive release latch away from the drive ❶.
6. Slide the drive out of the drive cage ❷.



To install a drive, reverse the removal procedure.

Hard Drive – Slim Desktop

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Rotate the drive cage to the upright position.
4. Lift up to unlock the green drive release latch **1**.
5. Slide the hard drive toward the center of the computer, then lift up the back of the hard drive and pull the drive out of the drive cage **2**.
6. Disconnect the drive power cable and signal cable from the drive.




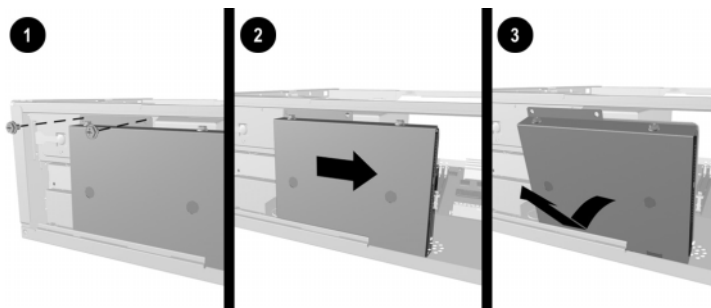
To install a drive, reverse the removal procedure.

8.1.3 Standard Desktop

Removing the Internal, Side-Mounted, 3.5-Inch Hard Drive

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Disconnect the power and data cables from the back of the hard drive.
4. Remove the two screws at the top of the hard drive adapter that connect the adapter to the chassis ❶.
5. Slide the adapter toward the right until the two slots on the bottom of the adapter clear the tabs ❷.
6. Tilt and lift the hard drive adapter out of the chassis ❸.


 The bottom of the adapter must be tilted inward to remove it from the chassis.



7. Remove the drive from the drive adapter by first removing the four screws that connect the drive to the adapter, and then sliding the drive out of the adapter.




To install a side-mounted hard drive, reverse the above procedure.

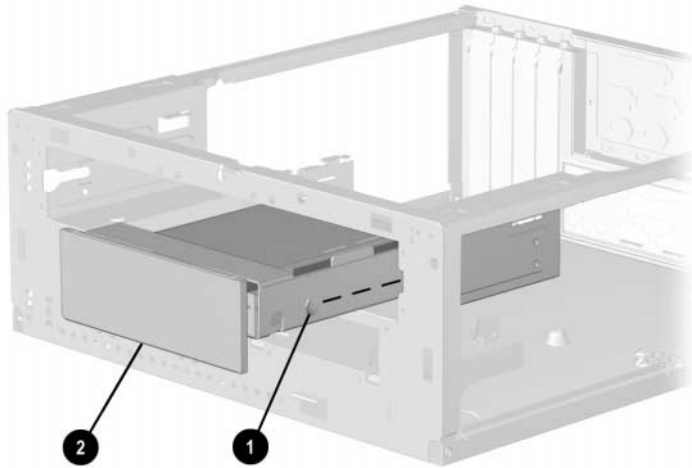
 When installing the drive adapter into the computer, the slots in the bottom of the adapter must be lined up with the tabs in the chassis.



CAUTION: Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

Removing an External 5.25-Inch Drive from the Drive Bay

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Disconnect the drive power cable, signal cable, and audio connector, if applicable.
4. Remove the screw from the side of the drive **1**.
 -  There may be more than one screw securing the drive in the drive bay.
5. Pull the drive out of the bay **2**.



Right Drive Bay shown

To install a 5.25-inch drive into the drive bay, reverse the above procedure.

 It may be necessary to remove a bezel blank.

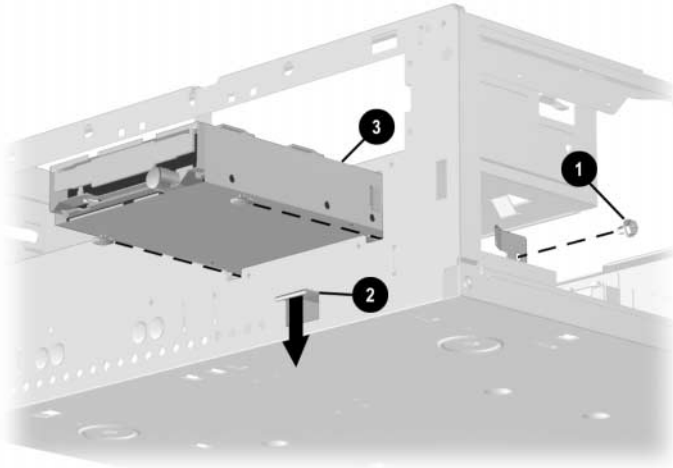
When replacing the drive, use the existing screws. Metric screws (M3) have a black finish; U.S. screws (#6-32) have a silver finish.



CAUTION: Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

Removing the Diskette Drive

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Remove the side-mounted hard drive.
4. Disconnect the data cable and the drive power cable.
5. Facing the drive, remove the retaining screw on the right side of the drive that secures the drive in the bay ❶.
6. While pushing down the release latch on the bottom of the bay ❷, pull the diskette drive out of the bay ❸.



To install a diskette drive, reverse the above procedure.



When installing a new diskette drive, be sure to exchange the guide screws from the old drive.

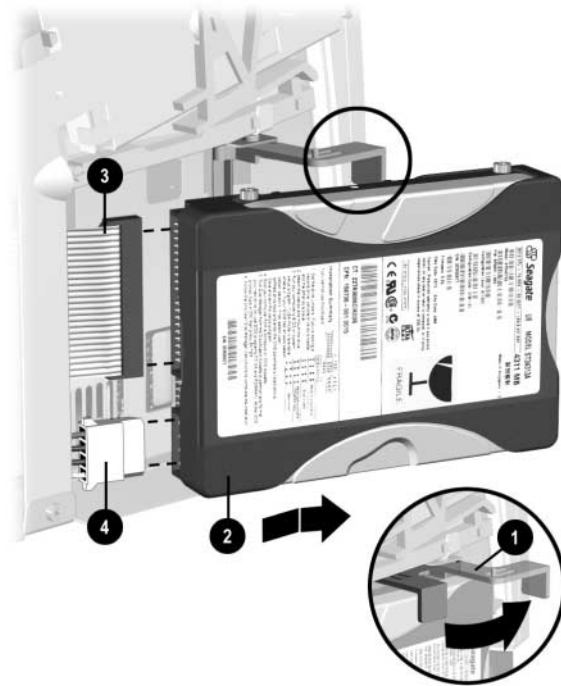
When replacing the drive, use the existing screws. Metric screws (M3) have a black finish; U.S. screws (#6-32) have a silver finish.




CAUTION: Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

8.1.4 iPAQ Hard Drive

1. Prepare the computer for disassembly.
2. Eject the drive from the MultiBay.
3. Remove the left access panel.
4. Release the green drive latch **1** by pressing the handle and swinging it out from the drive. The drive will swing forward and away **2** from the inner access panel.
5. Disconnect the data **3** and power cables **4** from the back of the hard drive.
6. Lift the drive out of the drive cage.



To install a drive, reverse these procedures.

-  When installing a drive, always verify that the mounting/guide screws in the new drive are in the same position as in the drive that it is replacing.

When installing the data cable, the colored wire should be closest to the drive's power cable.

8.2 Memory Expansion

8.2.1 440BX

The 440BX comes with at least 16 megabytes of synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs), upgradable to 256 or 384 MB. The memory sockets on the system board can be populated with 16-, 64-, or 128-MB DIMMs. Self-refresh DIMMs are required on models with three DIMM sockets.

For proper system operation, the DIMMs must be industry standard 168-pin, 66-MHz or faster unbuffered SDRAM DIMMs. If your system processor has a bus speed of 66 MHz, Compaq recommends that any additional DIMMs also be 66 MHz. If the system bus speed is 100 MHz, the use of 100-MHz DIMMs is required. (Run Compaq Computer Setup to determine your system bus speed; see the *Software Reference Guide* for instructions.)

The SDRAM DIMMs must support CAS Latency 2 or 3 (CL = 2 or CL = 3). They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information.

DIMMs constructed with x4 SDRAM are not supported; the system will not start using unsupported DIMMs.

8.2.2 Intel 810/810e



The Intel 810 does not support 66-MHz memory.

The Intel 810 comes with at least 32 MB of SDRAM DIMMs, and the Intel 810e comes with at least 64-MB of SDRAM DIMMs, upgradable to 512 MB.

The memory sockets on the system board can be populated with industry-standard DIMMs. These memory module slots are populated by at least one preinstalled memory module. To achieve the maximum memory support, you may be required to replace the preinstalled DIMM with a higher capacity DIMM.

For proper system operation, the DIMMs must be industry standard 168-pin, 100 MHz, unbuffered, PC100-compliant SDRAM DIMMs, depending on the model. The SDRAM DIMMs must support CAS Latency 2 or 3 (CL = 2 or CL = 3). They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information. DIMMs constructed with x4 SDRAM are not supported; the system will not start using unsupported DIMMs.



CAUTION: The DIMM sockets have gold metal contacts. When upgrading memory, it is important to use DIMMs with gold metal contacts (not tin-lead) to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

8.2.3 Intel 815e

The memory sockets on the Intel 815e chipset-based system board can be populated with industry-standard DIMMs. These memory module slots are populated with at least one preinstalled memory module. To achieve the maximum memory support, you may be required to replace the preinstalled DIMM with a higher capacity DIMM.

For proper system operation, the DIMMs must be industry-standard 168-pin, unbuffered PC100- or PC133-compliant SDRAM DIMMs, depending on the model. The SDRAM DIMMs must support CAS Latency 2 or 3 (CL = 2 or CL = 3). They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information. DIMMs constructed with x4 SDRAM (16 ICs per side) are not supported; the system will not start using unsupported DIMMs.

The Intel 815e chipset supports both PC100 and PC133 SDRAM DIMMs. PC133 DIMMs should be used for optimal performance. If both PC100 and PC133 SDRAM DIMMs are installed in a computer, the system memory will run at the lower, 100 MHz speed. Some configurations of PC133 SDRAMs may run at 100 MHz instead of 133 MHz.




CAUTION: Your memory module sockets have gold metal contacts. When upgrading your memory, it is important to use memory modules with gold metal contacts to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

8.2.4 Intel 820

The memory sockets on the Intel 820 chipset–based system board can be populated with industry-standard RIMMs. All slots must be occupied by either a memory module or a continuity module (CRIMM). RIMM upgrade kits are available as options from Compaq.

For proper system operation, the RIMMs must be industry-standard 184-pin, PC800–compliant RAMBUS memory modules, depending on the model. They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information (1.0 or later)

-  If you install RIMMs of varying speeds, the system will run at the speed of the slowest installed RIMM.

Follow the guidelines listed below when installing RIMMs:

- Install RIMMs in pairs across both memory channels. Each RIMM socket populated with a RIMM or CRIMM on Channel A must be populated with an identical RIMM or CRIMM on Channel B. For examples of the correct configuration sequence, refer to the section, “RIMM Installation.”
- RIMMs must be installed correctly. Be sure to match the two key sockets on the RIMM with the tabs on the RIMM socket. Push the RIMM down into the RIMM socket, ensuring that it is fully inserted and properly seated, and that the retaining arms are locked in place.
- CRIMMs must be installed in all empty RIMM sockets. The CRIMMs are removed when you populate the sockets with RIMMs. For examples of the correct configuration sequence, refer to the section, “RIMM Installation.”



CAUTION: These guidelines must be followed when installing RIMMs or your computer will not function.




CAUTION: Your memory module sockets have gold metal contacts. When upgrading your memory, it is important to use memory modules with gold metal contacts to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

8.2.5 Intel 850

The memory sockets on the Intel 850 chipset-based system board can be populated with pairs of industry-standard RIMMs. All slots must be occupied by either a memory module or a continuity module (CRIMM). RIMM upgrade kits are available as options from Compaq.

For proper system operation, the RIMMs must be industry-standard 184-pin, PC800-compliant RAMBUS memory modules, depending on the model. They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information (1.0 or later). Intel 850 chipset-based Deskpro models have two Direct RAMBUS channels.

-  If you install RIMMs of varying speeds, the system will run at the speed of the slowest installed RIMM.

Follow the guidelines listed below when installing RIMMs:

- Install RIMMs in pairs across both memory channels. Each RIMM socket populated with a RIMM or CRIMM on Channel A must be populated with an identical RIMM or CRIMM on Channel B. For examples of the correct configuration sequence, refer to the section, “RIMM Installation.”
- RIMMs must be installed correctly. Be sure to match the two key sockets on the RIMM with the tabs on the RIMM socket. Push the RIMM down into the RIMM socket, ensuring that it is fully inserted and properly seated, and that the retaining arms are locked in place.
- CRIMMs must be installed in all empty RIMM sockets. The CRIMMs are removed when you populate the sockets with RIMMs. For examples of the correct configuration sequence, refer to Section 8.2.7, “RIMM Installation.”



CAUTION: These guidelines must be followed when installing RIMMs or your computer will not function.



CAUTION: Your memory module sockets have gold metal contacts. When upgrading your memory, it is important to use memory modules with gold metal contacts to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

8.2.6 DIMM Installation

1. If the computer has a locked the Smart Cover Lock, use Computer Setup to unlock the lock and disable the Smart Cover Sensor.
2. Shut down the operating system properly, then turn off the computer and any external devices, then disconnect the power cord from the power outlet.
3. Remove the access panel and locate the memory module sockets.

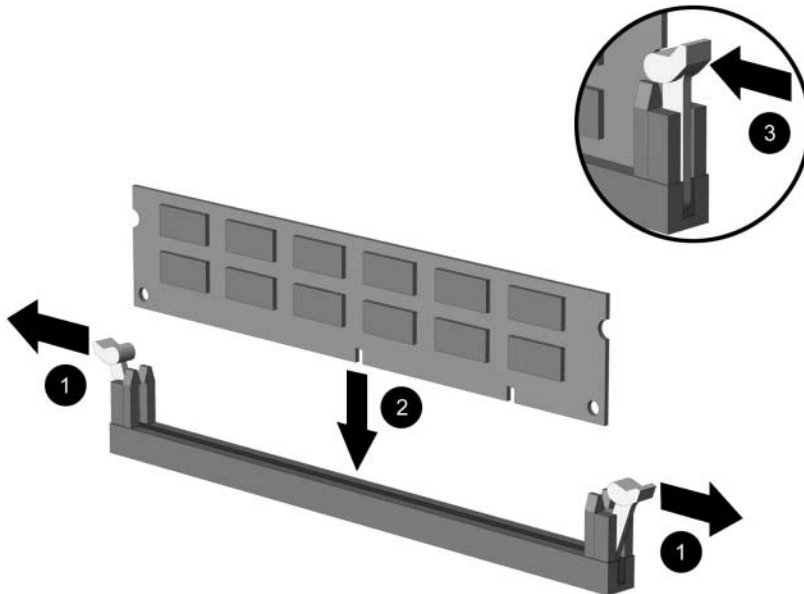


WARNING: To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

4. Open both latches of the memory module socket ❶, and insert the memory module into the socket ❷.

Begin by installing a module into the socket nearest the preinstalled module, and install the modules following the numerical order of the sockets.

A memory module can be installed only one way. Match the notch on the module with the tab on the memory socket. Push the module down into the socket, ensuring that the module is fully inserted and properly seated ❸.



When the computer starts up, it will recognize the system memory upgrades and automatically reconfigure the computer.

Do not exceed 1 GB of memory on a system. Exceeding that limit will cause the system to halt.

8.2.7 RIMM Installation

Single Memory Channel System



WARNING: To reduce the risk of personal injury when replacing or removing RIMMs, allow the module being removed from the RIMM socket sufficient time to cool. RIMM temperatures can reach 212°F (100°C).

Before installing additional RIMMs, read Sections 8.2.4 and 8.2.5 on the “Intel 820” and “Intel 850” chipsets.

- CRIMMs or RIMMs must be installed in all unpopulated RIMM sockets.
- Install RIMMs in pairs across both memory channels. Each RIMM socket populated with a RIMM or CRIMM on Channel A must be populated with an identical device on Channel B.
- Do not exceed 32 Direct RDRAM devices in each Direct Rambus memory channel. A label on the RIMM will identify the number and speed of Direct RDRAM devices on the RIMM.
- Do not mix RIMMs with different memory speeds, Performance will always reflect the speed of the slowest component.
- Use only RIMMs that have been tested and approved by Compaq for quality and reliability.

The four RIMM sockets are numbered XMM1 and XMM2 (Channel A) and XMM3 and XMM4 (Channel B).

When installing RIMMs, you must use the configurations in the following table.

RIMM Installation Configurations

Possible Configuration	Memory Channel A		Memory Channel B	
	RIMM Socket XMM1	RIMM Socket XMM2	RIMM Socket XMM3	RIMM Socket XMM4
1	RIMM	CRIMM	RIMM	CRIMM
2	RIMM	RIMM	RIMM	RIMM

 CRIMMs should never be installed in socket XMM1 or XMM3.

Dual Memory Channel System

Before installing additional RIMMs, read Sections 8.2.4 and 8.2.5 on the “Intel 820” and “Intel 850” chipsets.

- CRIMMs or RIMMs must be installed in all unpopulated RIMM sockets.
- Install RIMMs in pairs across both memory channels. Each RIMM socket populated with a RIMM or CRIMM on Channel A must be populated with an identical device on Channel B.
- Do not exceed 32 Direct RDRAM devices in each Direct Rambus memory Channel. A label on the RIMM will identify the number and speed of Direct RDRAM devices on the RIMM.

- Do not mix RIMMs with different memory speeds, Performance will always reflect the speed of the slowest component.
- Use only RIMMs that have been tested and approved by Compaq for quality and reliability.

When installing modules on the eight RIMM socket memory board, you must adhere to one of the following four configurations for best performance,

RIMM Installation Configurations

RIMM Sockets	One Pair RIMMs	Two Pair RIMMs	Three Pair RIMMs	Four Pair RIMMs
1 and 2	CRIMM	CRIMM	RIMM	RIMM
3 and 4	RIMM	RIMM	RIMM	RIMM
5 and 6	Empty	RIMM	RIMM	RIMM
7 and 8	Empty	CRIMM	CRIMM	RIMM

Installation Procedures

1. Shut down the operating system properly, then turn off the computer and any external devices, then disconnect the power cord from the power outlet.
2. Remove the access panel and locate the memory module sockets.



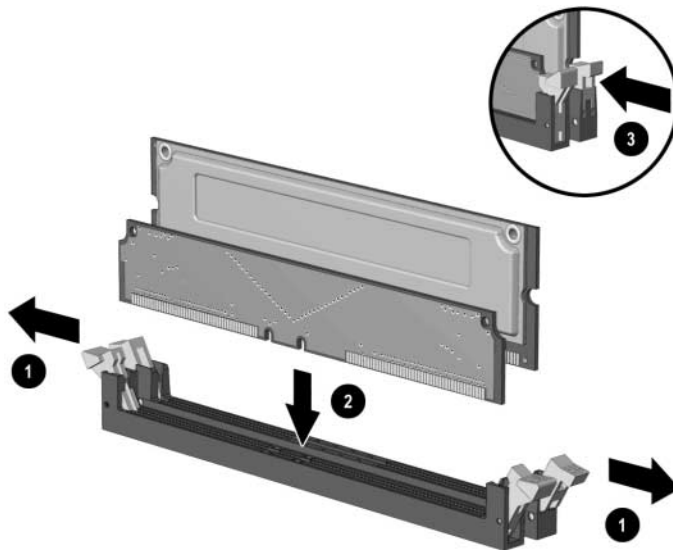
WARNING: To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

3. Open both latches of the memory module socket ❶, and insert the memory module into the socket ❷.



CAUTION: Be sure to follow the correct configuration guidelines respective to your memory board, or your system will not function.

A memory module can be installed only one way. Match the notch on the module with the tab on the memory socket. Push the module down into the socket, ensuring that the module is fully inserted and properly seated ❸.

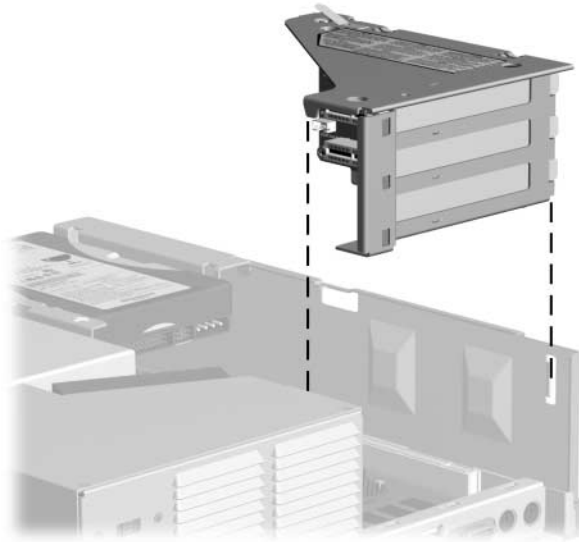


8.3 Expansion Card Cage

8.3.1 Removing an Expansion Card Cage

Expansion card cage location and removal procedures may vary.

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Pull the expansion card cage straight up to remove it from the chassis.



Small Form Factor shown

To replace the expansion card cage, reverse the removal procedures.

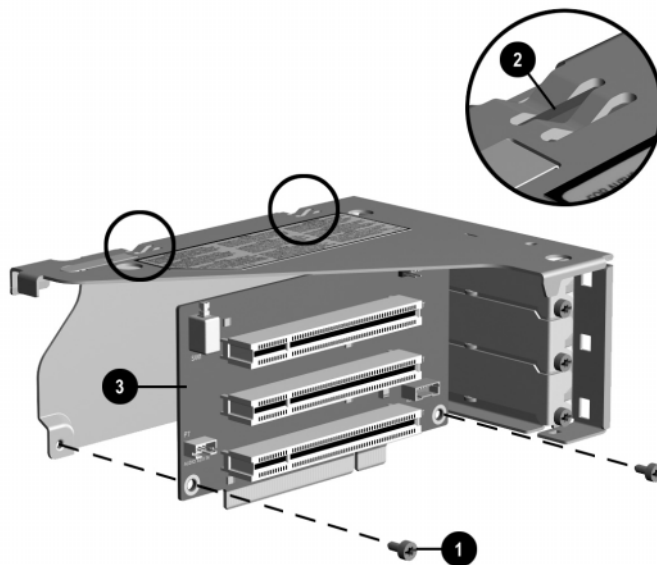


If the expansion card cage connects to the power supply, when reinstalling the expansion card cage, ensure that the tab on the brace latches into the slot on the side of the power supply.

8.3.2 Riser Board

Riser board removal procedures may vary slightly.

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Remove the expansion card cage.
4. Remove any expansion cards.
5. Disconnect any cables from the riser board.
6. Remove the screws that secure the riser board to the expansion card cage ❶.
7. Slide the board down slightly so it clears the guide slots on the top of the expansion card cage ❷.
8. Remove the riser board from the expansion card cage ❸.

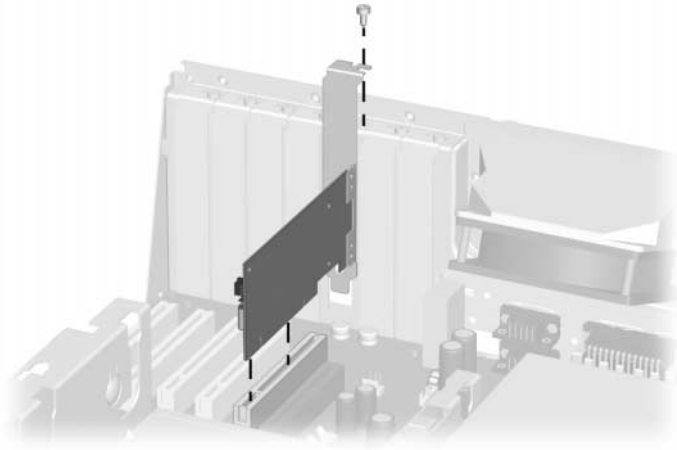


Small Form Factor shown

To replace the riser board, reverse the removal procedures.

8.4 Expansion Cards – Standard Sockets

1. Prepare the computer for disassembly.
2. Remove the access panel.
If installing an expansion card, skip to step 8.
3. To remove an expansion card, disconnect any cables attached to the expansion card.
4. Remove the screw at the top of the expansion slot.
5. Hold the card at each end and carefully rock it back and forth until the connectors pull free from the socket. Be sure not to scrape the card against other components.
6. Store the card in anti-static packaging.
7. Install an expansion slot cover or new expansion card to close the open slot.
If not installing a new expansion card, skip to step 10.
8. To install a new expansion card in an open socket, remove the expansion slot cover.
9. Slide the expansion card into the expansion socket and press it firmly into place.



When you install an expansion card, make sure you press firmly on the card so that the entire connector seats properly in the expansion card socket.

10. Replace the screw at the top of the expansion slot.
11. Replace the access panel.
12. Connect external cables to the installed card, if needed.
13. Reconfigure the computer, if necessary.

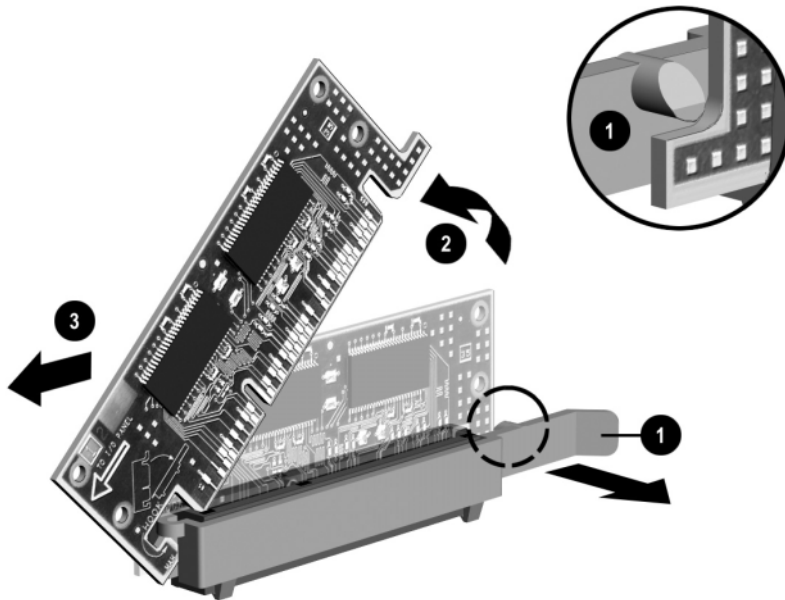
8.5 Graphics Sockets with Retention Mechanisms

The AGP expansion socket may come with a retention mechanism installed around it to hold the graphics cards securely in place. There are two different types of retention mechanisms that may be installed around the AGP expansion socket.

8.5.1 Graphics Performance Accelerator (GPA)/AGP Inline Memory Module (AIMM) Card with a Type 1 Retention Mechanism

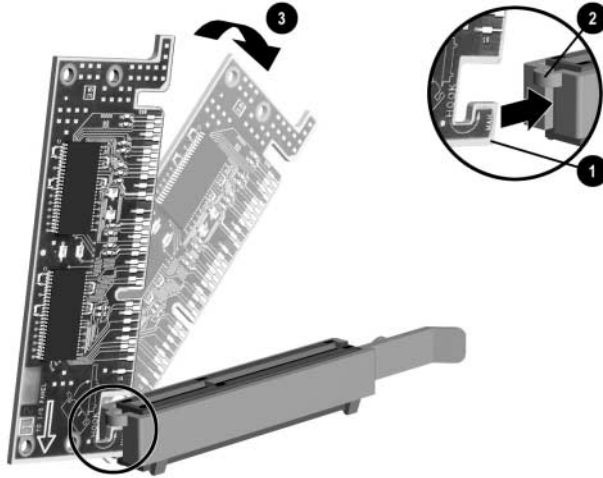
Removing a GPA/AIMM Card

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Pull the arm on the right side of the retention mechanism ❶.
4. At the same time, rotate the front of the GPA/AIMM card up until it is at a 45 degree angle ❷.
5. Remove the card from the expansion socket ❸.



Installing a GPA/AIMM Card

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Insert the hook **1** on the left side of the GPA/AIMM card under the loop **2** on the left side of the retention mechanism.
4. Rotate the right side of the card down until it is at a 45 degree angle **3**.

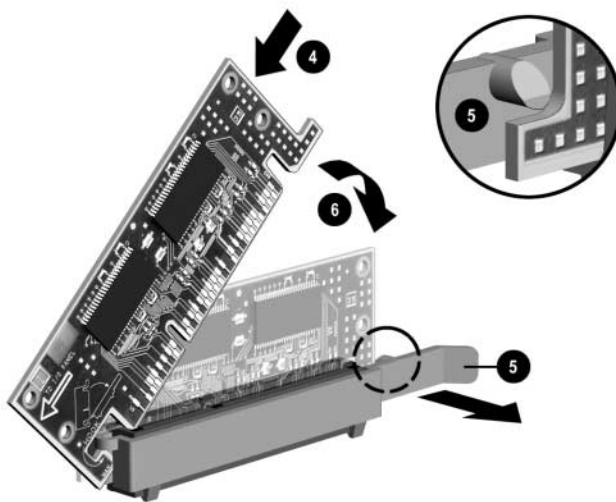


5. With the GPA/AIMM card at a 45 degree angle, slide the card back towards the back of the expansion socket **4** until the fingers on the bottom of the card line up properly with the connectors in the expansion socket.



CAUTION: The fingers on the bottom of the GPA/AIMM card must be properly aligned with the expansion slot during installation. Misalignment may result in damage to the card or the AGP connector.

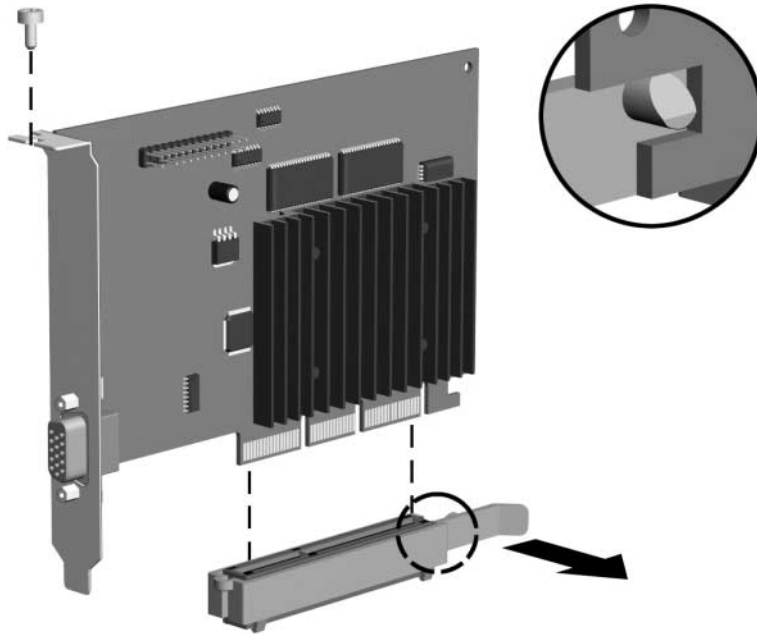
6. While pulling the arm on the right side of the retention mechanism **5**, rotate the card down into the expansion socket until seated **6**.



8.5.2 AGP Card with a Type 1 Retention Mechanism

Removing an AGP Card

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Remove the screw at the top of the expansion slot.
4. Pull the arm on the right side of the retention mechanism.
5. Pull the card straight up to remove it from the expansion socket.

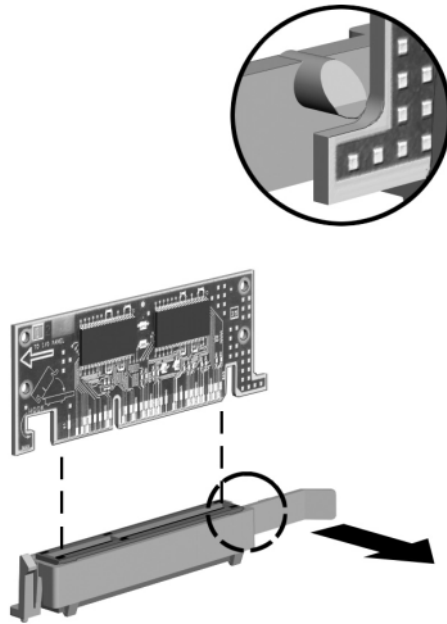


To install the graphics card, reverse the above procedures.

8.5.3 GPA/AGP Card with a Type 2 Retention Mechanism

Removing a GPA/AGP Card

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Pull the arm on the right side of the retention mechanism.
4. Pull the card straight up to remove it from the expansion socket.

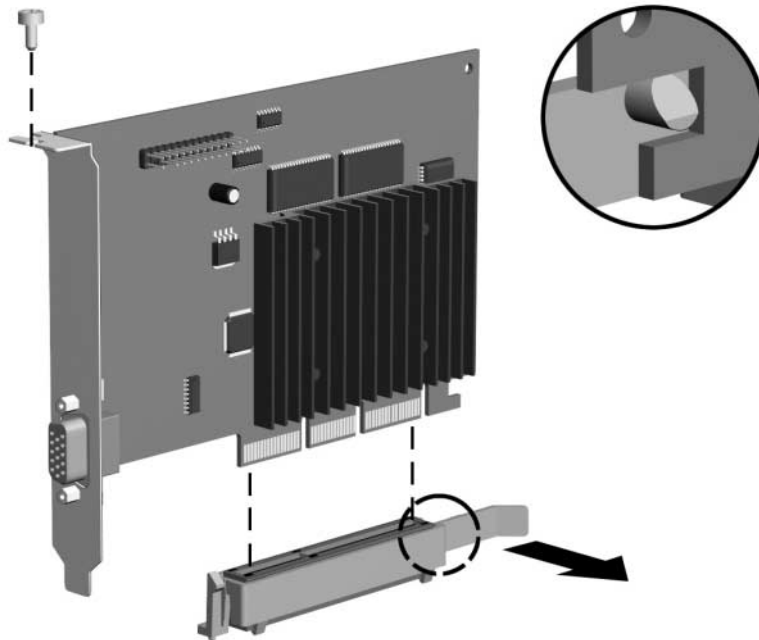


To install the graphics card, reverse the above procedures.

8.5.4 AGP Card with a Type 2 Retention Mechanism

Removing an AGP Card

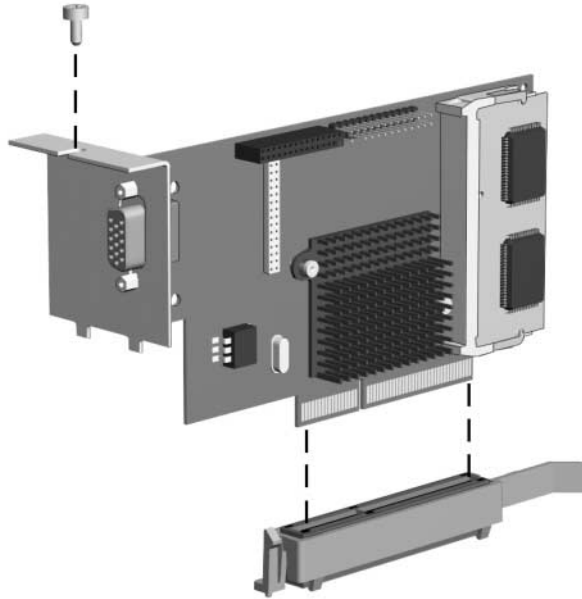
1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Remove the screw at the top of the expansion slot.
4. Pull the arm on the right side of the retention mechanism.
5. Pull the card straight up to remove it from the expansion socket.



To install the graphics card, reverse the above procedures.

8.5.5 Removing an AGP Card

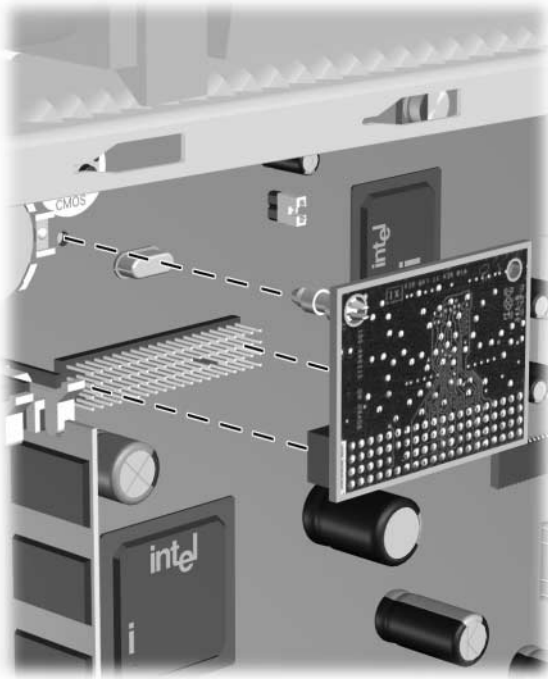
1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Remove the screw at the top of the expansion slot.
4. Remove the AGP graphics card as you would any PCI expansion card.



To install the graphics card, reverse the above procedures.

8.6 iPAQ Graphics Memory Cache

1. Prepare the computer for disassembly.
2. Remove the right access panel.
3. Remove the inner access panel.
4. Pull straight up on the cache module to disengage it from the socket on the system board.



To install the cache module, reverse the above procedures. The cache module has a large pin on one corner that ensures proper orientation.

8.7 iPAQ Legacy Module

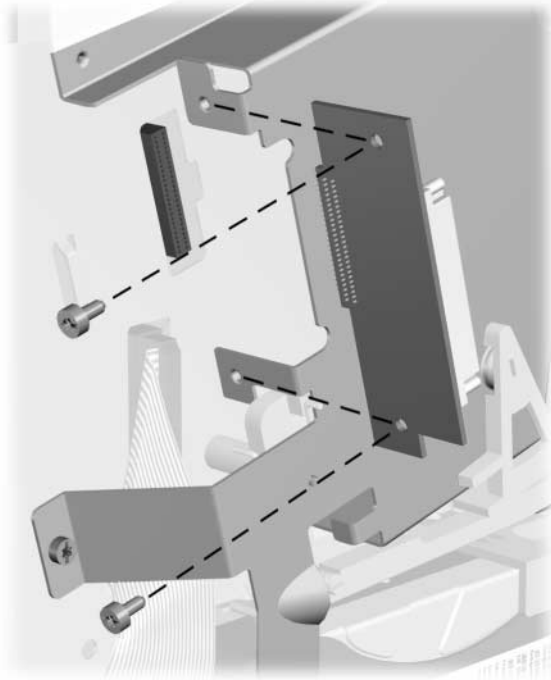
1. Prepare the computer for disassembly.
2. Pull the Legacy Module from the connector on the I/O panel.




To install the Legacy Module, align the Legacy Module over the connector on the I/O panel and snap into place.

8.8 iPAQ MultiBay Board

1. Prepare the computer for disassembly.
2. Eject the drive from the MultiBay if necessary.
3. Remove the left access panel.
4. Remove the two screws securing the MultiBay board to the housing.
5. Remove the board by pulling it straight out of the system board.



 The MultiBay board is keyed for proper orientation.
To install the MultiBay board, reverse the above procedure.

chapter 9

REMOVAL AND REPLACEMENT PROCEDURES SMALL COMPONENTS



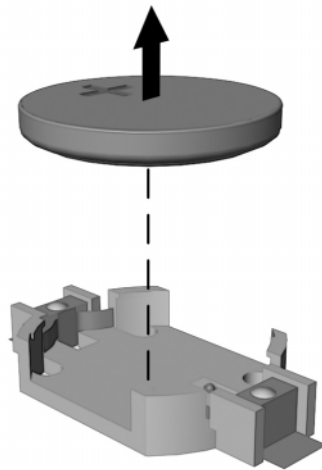
CAUTION: When the computer is plugged into an AC power source, voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

9.1 Battery

9.1.1 Standard Battery Holder

The battery that comes with the computer provides power to the real-time clock and has a lifetime of about three years. When replacing the battery, use the appropriate 3-volt lithium coin cell battery. To replace the battery:

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Move/remove any components necessary to gain access to the battery.
4. Lift the battery out of its holder.



5. Slide the replacement battery into position with the “plus” side up. The battery holder automatically secures the battery in the proper position.
6. Replace the access panel.

7. Plug in the computer and turn on power.
8. Reset the date, time, passwords, and any special system settings, using Compaq Computer Setup.



If you previously saved your CMOS settings to a diskette with F10 setup, you can restore these CMOS settings using F10 setup and the diskette with the saved CMOS configuration.




WARNING: This computer contains a lithium-ion battery pack. There is a risk of fire and chemical burn if the battery pack is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140°F (60°C).

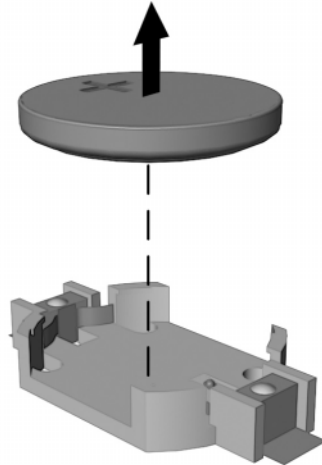


In North America, dispose of nickel metal hydride or lithium-ion batteries by taking advantage of the Compaq battery recycling program. You will be provided with a postage-paid battery pack mailer preaddressed to a reclamation facility where the metals are recycled. Call the telephone number listed for your location in the *Contacting Customer Support Guide* for more information.

In Europe, do not dispose of batteries with general household waste. Dispose of or recycle them by using the public collection system or returning them to Compaq, your authorized Compaq partners, or their agents.

9.1.2 iPAQ Battery

1. Prepare the computer for disassembly.
2. Remove the right outer access panel.
3. Remove the inner access panel.
4. Lay the computer down on its side for greater stability.
 -  Place a protective pad beneath the computer to prevent scratching the side panel.
5. Remove the battery from the holder.



6. Slide the replacement battery into position with the positive side up. The battery holder automatically secures the battery in the proper position.
7. Replace the access panels.
8. Plug in the computer and turn on the power.
9. Reset the date, time, passwords, and any special system setups, using Compaq Computer Setup.



WARNING: This computer contains a lithium-ion battery pack. There is a risk of fire and chemical burn if the battery pack is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140°F (60°C).



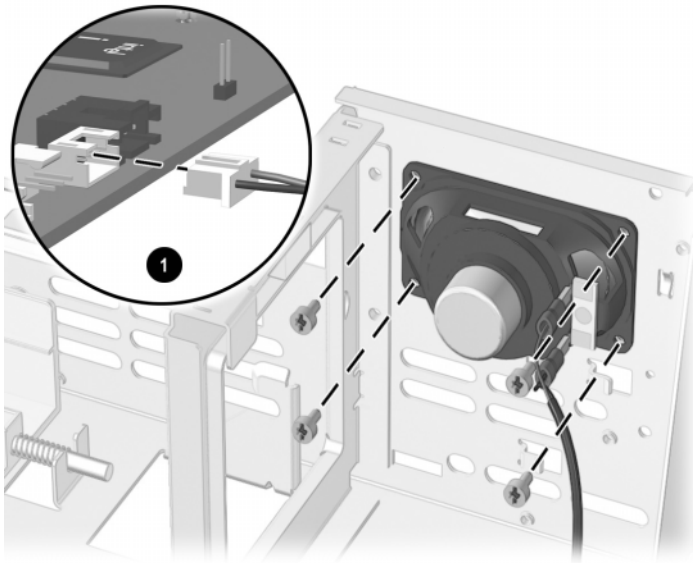
In North America, dispose of nickel metal hydride or lithium-ion batteries by taking advantage of the Compaq battery recycling program. You will be provided with a postage-paid battery pack mailer preaddressed to a reclamation facility where the metals are recycled. Call the telephone number listed for your location in the *Contacting Customer Support Guide* for more information.

In Europe, do not dispose of batteries with general household waste. Dispose of or recycle them by using the public collection system or returning them to Compaq, your authorized Compaq partners, or their agents.

9.2 Speaker

9.2.1 Standard Speaker

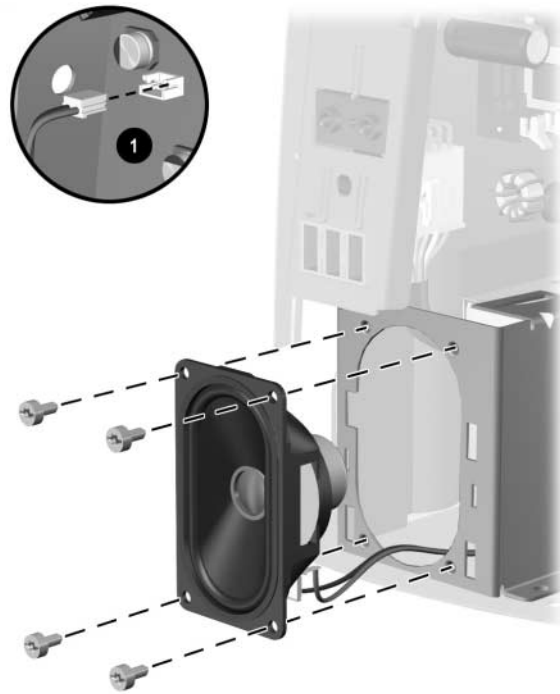
1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Move/remove any components necessary to gain access to the speaker.
4. Disconnect the speaker wire from the P6 connector located on the corner of the system board near the battery ❶.
5. Remove the four screws that connect the speaker to the chassis.
6. Remove the speaker.



To install the speaker, reverse the removal procedure.

9.2.2 iPAQ Speaker

1. Prepare the computer for disassembly.
2. Remove both the left and right outer access panels.
3. Remove the inner access panel.
4. Remove the speaker grill.
5. Disconnect the audio cable from the system board.
6. Remove the four screws from the front of the chassis that secure the speaker to the chassis.
7. Remove the speaker from the chassis.




To replace the speaker, reverse the previous steps making sure that the wire leads on the speaker are pointing down towards the bottom of the chassis.

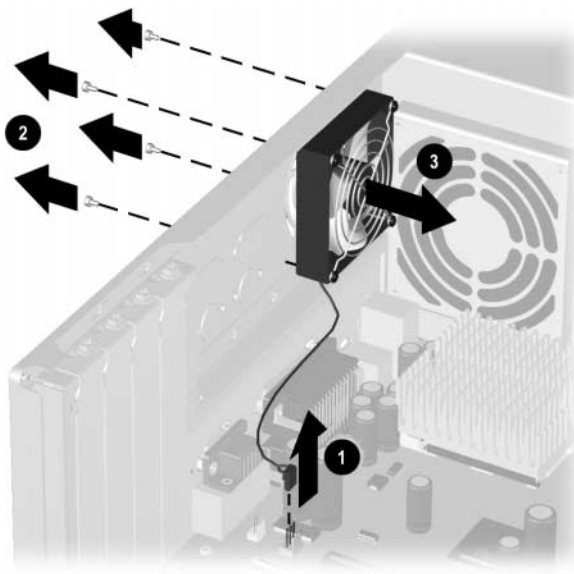
9.3 Chassis Fan

Fan chassis location and power cable system board connector locations may vary.

9.3.1 Standard Fan

1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Disconnect the fan power cable from the system board ❶.
4. Remove the screws that connect the fan to the back of the chassis ❷.
5. Lift the fan out of the chassis ❸.

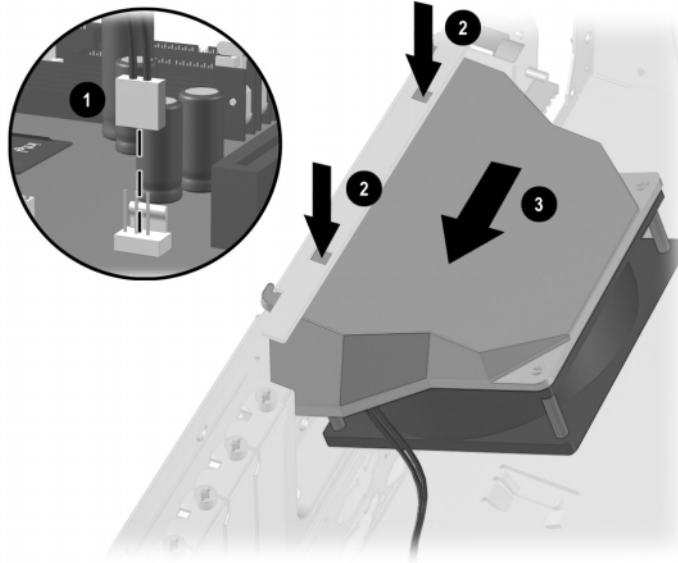
 Make sure the fan is installed so that it blows air out of the computer.



To replace the chassis fan, reverse the above procedure

9.3.2 Chassis Fan with Cover

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Disconnect the fan power cable from the system board ❶.
4. Press down on both tabs on the back of the fan ❷.
5. From the front of the computer, slide the fan to the left until the hooks clear the notches in the chassis ❸.
6. Pull the fan assembly toward the front and then lift it out of the computer.



To install the fan, reverse the removal procedure.

9.4 Air Baffles

Computers are sometimes equipped with internal air baffles that redirect air flow in order to help regulate internal temperature. This section contains examples of the types of baffles currently being used. The baffle in your computer may vary.



CAUTION: Always reinstall an air baffle after it has been removed. Failure to do so may cause the computer to overheat and could result in loss of data or damage to the computer.

9.4.1 Component Access Without Baffle Removal

To gain access to the heatsink, the air baffle can be disassembled and lifted out of the way while still attached to the computer. The chassis fan does NOT have to be removed to disassemble the air baffle while it is in the computer.

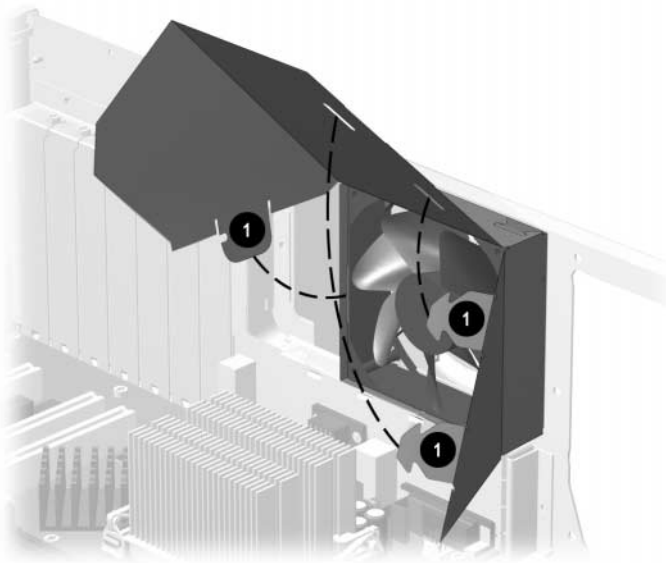
1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Remove the three tabs from the slots on both sides of the air baffle ❶.
4. Lift up the main flap of the air baffle. The baffle is perforated to make it easy to maneuver without completely removing it from the chassis.



CAUTION: Do not force the baffle or it could tear.



The air baffle remains connected to the chassis fan. To remove the air baffle from the computer, the chassis fan must be removed from the unit.

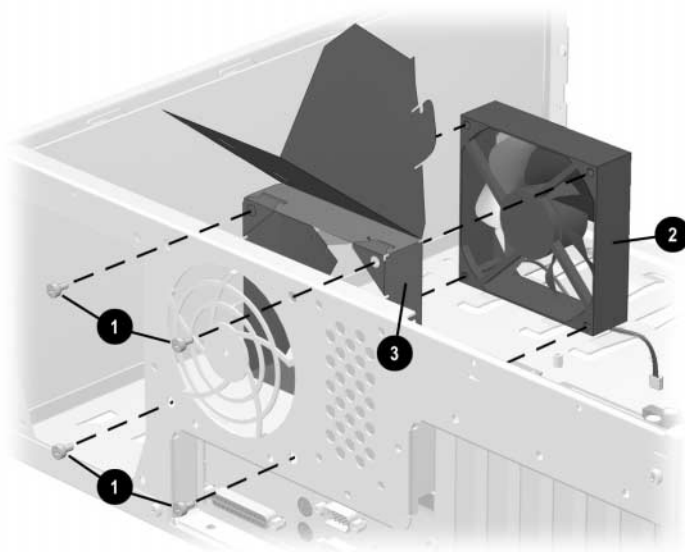


To reassemble the air baffle, reverse the above procedure.

9.4.2 Air Baffle Removal

The air baffle is connected to the chassis fan. When removing the fan, you also have to remove the air baffle from the chassis.

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Disassemble the air baffle.
4. Disconnect the fan power cable from the system board.
5. Remove the four screws that secure the fan to the chassis ❶.
6. Remove the fan from the chassis ❷.
7. Remove the three tabs from the associated slots in the air baffle that are located on the top and on the bottom of the chassis fan.
8. Remove the air baffle from the fan ❸.



To install the fan/air baffle assembly, reverse the above procedure.

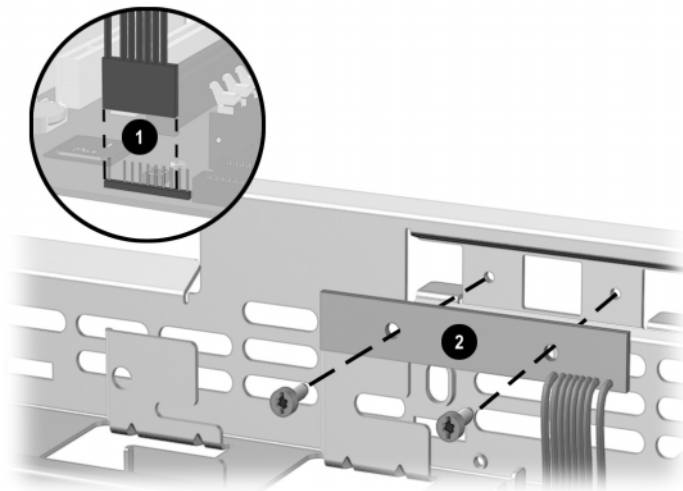


When installing the fan/air baffle assembly, be sure to place the chassis fan power cable through the opening in the air baffle.

9.5 Power Switches and Switch Cables

9.5.1 Switch Secured with Screws

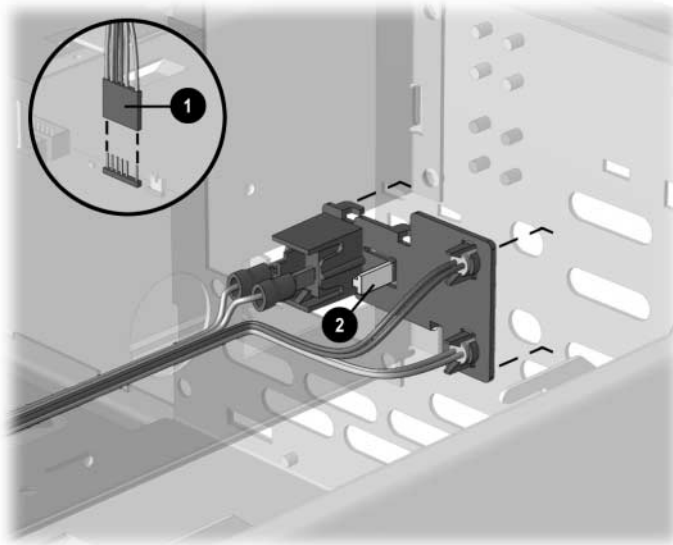
1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Move/remove any components necessary to gain access to the power switch.
4. Disconnect the power cable from the system board ❶.
5. Remove the two screws connecting the board to the chassis.
6. Remove the board from computer ❷.



To install the power button/LED board, reverse the above procedure.

9.5.2 Switch Secured with Tabs – Type 1

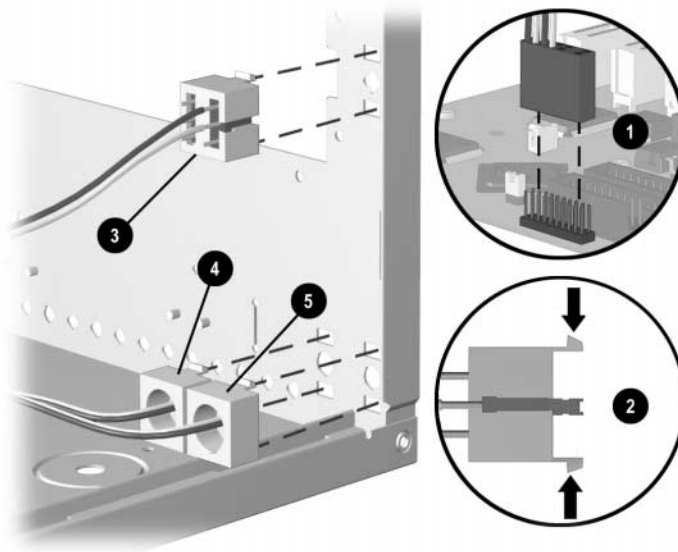
1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Remove the front bezel, if necessary.
4. Move/remove any components necessary to gain access to the power switch.
5. Disconnect the power/LED cable from the system board **1**.
6. Push the release tab **2** toward the drive bays, then remove the power switch assembly from the chassis.



To install the new power switch, reverse the above procedure, pushing the switch assembly until it snaps into place. The power/LED connector is keyed to ensure proper installation.

9.5.3 Switch Secured with Tabs – Type 2

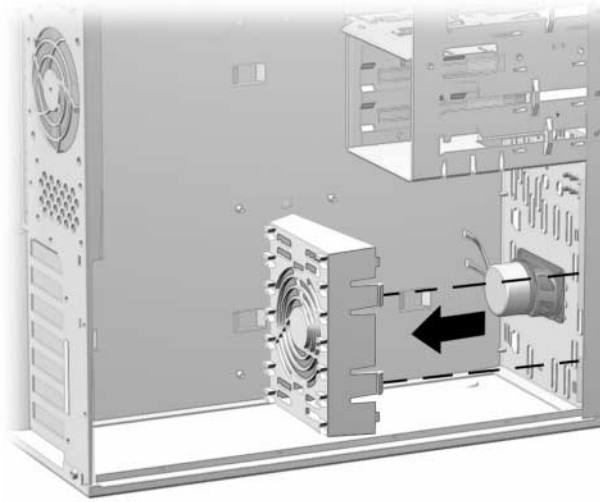
1. Prepare the computer for disassembly.
2. Remove the computer cover.
3. Disconnect the flat ribbon cable and the CD audio cable from the CD-ROM drive.
4. Disconnect the power/LED cable from the system board **1**.
5. Pinch the two tabs of the power switch assembly together **2** and pull the assembly **3** from the chassis.
6. Pinch the two tabs of the Drive Activity Light assembly together **2** and pull the assembly **4** from the chassis.
7. Pinch the two tabs of the Power-on Light assembly together **2** and pull the assembly **5** from the chassis.



To install a power switch/LED cable, reverse the above procedure.

9.6 Board Guide

1. Prepare the computer for disassembly.
2. Remove the access panel.
3. Move/remove any components necessary to gain access to the board guide.
4. Remove any full-length expansion boards.
5. Push down on the two tabs on the side of the board guide.
6. While holding the tabs down, remove the guide from the chassis.




Convertible Minitower shown

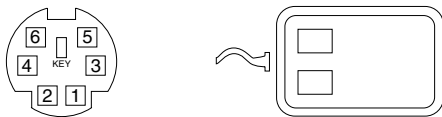
To replace the board guide, reverse the above procedures.

appendix A


CONNECTOR PIN ASSIGNMENTS

This appendix contains the pin assignments for many computer and workstation connectors. Some of these connectors may not be used on the product being serviced.

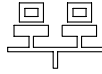
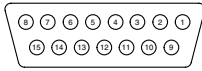
Connector and Icon		Enhanced Keyboard	
		Pin	Signal
		1	Data
		2	Unused
		3	Ground
		4	+5 VDC
		5	Clock
		6	Unused

Connector and Icon		Mouse	
		Pin	Signal
		1	Data
		2	Unused
		3	Ground
		4	+5 VDC
		5	Clock
		6	Unused

Connector and Icon		Ethernet BNC	
		Pin	Signal
		1 (Inside)	Data
		2 (Outside)	Ground

Connector and Icon		Ethernet RJ-45	
		Pin	Signal
		1	(+) Transmit Data
		2	(-) Transmit Data
		3	(+) Receive Data
		4	Unused
		5	Unused
		6	(-) Receive Data
		7	Unused
		8	Unused

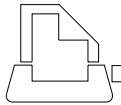
Connector and Icon



Ethernet AUI

Pin	Signal
1	Ground
2	Negative AUI Differential Collision
3	Positive AUI Differential Collision
4	Negative AUI Differential Transmit
5	Positive AUI Differential Transmit
6	Ground
7	Ground
8	Negative AUI Differential Receive
9	Positive AUI Differential Receive
10	+12V
11	Ground
12	Ground
13	Not Used
14	Not Used
15	Not Used
16	Not Used

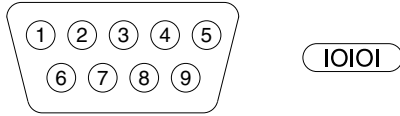
Connector and Icon



Parallel Interface

Pin	Signal
1	Strobe
2	Data Bit 0
3	Data Bit 1
4	Data Bit 2
5	Data Bit 3
6	Data Bit 4
7	Data Bit 5
8	Data Bit 6
9	Data Bit 7
10	Acknowledge
11	Busy
12	Paper End
13	Select
14	Auto Linefeed
15	Error
16	Initialize Printer
17	Select IN
18-25	Signal Ground

Connector and Icon



Serial Interface

Pin	Signal
1	Carrier Detect
2	Receive Data
3	Transmit Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Request to Send
8	Clear to Send
9	Ring Indicator

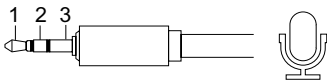
Connector and Icon



USB

Pin	Signal
1	VCC
2	- Data
3	+ Data
4	Ground

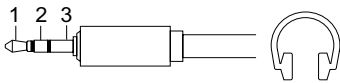
Connector and Icon (1/8" miniphone)



Microphone

Pin	Signal
1 (Tip)	Audio
2 (Ring)	Power
3 (Shield)	Ground

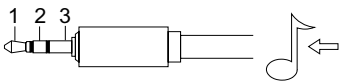
Connector and Icon (1/8" miniphone)



Headphone

Pin	Signal
1 (Tip)	Audio_Left
2 (Ring)	Audio_Right
3 (Shield)	Ground

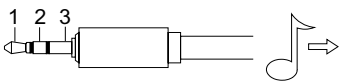
Connector and Icon (1/8" miniphone)



Line-In Audio

Pin	Signal
1 (Tip)	Audio_In_Left
2 (Ring)	Audio_In_Right
3 (Shield)	Ground

Connector and Icon (1/8" miniphone)

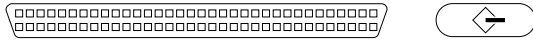


Line-Out Audio

Pin	Signal
1 (Tip)	Audio_Out_Left
2 (Ring)	Audio_Out_Right
3 (Shield)	Ground

SCSI Low Voltage Differential/Single Ended (LVD/SE)

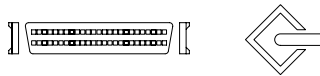
Connector and Icon



Pin	Signal	Pin	Signal	Pin	Signal
1-16	Ground	43	-D3	57	-BSY
17-18	TERMPWR	44	-D4	58	-ACK
19	Reserved	45	-D5	59	-RST
20-34	Ground	46	-D6	60	-MSG
35	-D12	47	-D7	61	-SEL
36	-D13	48	-DP0	62	-C/D
37	-D14	49-50	Ground	63	-REQ
38	-D15	51-52	TERMPW	64	-I/O
39	-DP1	53	Reserved	65	-D8
40	-D0	54	Ground	66	-D9
41	-D1	55	-ATN	67	-D10
42	-D2	56	Ground	68	-D11

Ultra SCSI

Connector and Icon



Pin	Signal	Pin	Signal	Pin	Signal
1-11	Ground	31	DB5	41	ATN #
12	Reserved	32	DB6	42	Ground
13	Open	33	DB7	43	BSY #
14	Reserved	34	DBP	44	ACK #
15-25	Ground	35	Ground	45	RST #
26	DB0	36	Ground	46	MSG #
27	DB1	37	Reserved	47	SEL #
28	DB2	38	TERMPWR	48	C/D
29	DB3	39	Reserved	49	REQ #
30	DB5	40	Ground	50	Input/Output

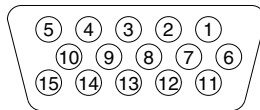
Connector and Icon



External Infrared Transceiver

Pin	Signal
1	Transmit
2	Receive
3	Ground
4	5V
5	Mode
6	Not Used
7	Not Used
8	Not used

Connector

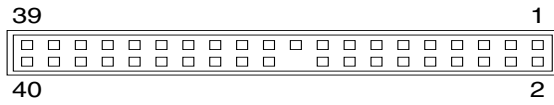


Monitor

Pin	Signal
1	Red Analog
2	Green Analog
3	Blue Analog
4	Monitor ID
5	Ground
6	Ground
7	Ground
8	Ground
9	+5V DC
10	Ground
11	Monitor ID
12	DDC Serial Data
13	Horizontal Sync
14	Vertical Sync
15	DDC Serial Clock

IDE/EIDE Drive Cable

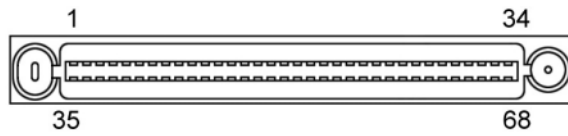
Connector



Pin	Signal	Pin	Signal	Pin	Signal
1	RESET	15	DD1	29	DMAK
2	GROUND	16	DD14	30	GROUND
3	DD7	17	DD0	31	INTRQ
4	DD8	18	DD15	32	IOCS16
5	DD6	19	GROUND	33	DA1
6	DD9	20	(KEY)	34	PDIAG (80-pin cable detect)
7	DD5	21	DMARQ	35	DA0
8	DD10	22	GROUND	36	DA2
9	DD4	23	DIOW	37	CS1FX
10	DD11	24	Ground	38	CS3FX
11	DD3	25	DIOR	39	DASP
12	DD12	26	GROUND	40	GROUND
13	DD2	27	IORDY		
14	DD13	28	CSEL		

Slimline CD-ROM Adapter

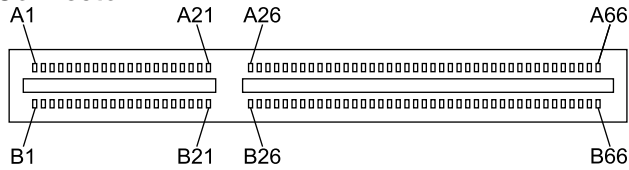
Connector



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RESDRV_	18	D15	35	A0	52	FP05
2	GROUND	19	GROUND	36	A2	53	FP06
3	DO7	20	(KEY)	37	CS1FX	54	FP07
4	D08	21	DRQ	38	CS3FX	55	FP08
5	D06	22	GROUND	39	DASP	56	FP09
6	D09	23	IOW	40	GROUND	57	FP10
7	D05	24	GROUND	41	+5VMLOG	58	FP11
8	D10	25	IOR	42	+5VMOT	59	FP12
9	D04	26	GROUND	43	GROUND	60	FP13
10	D11	27	IOCHRDY	44	AUDIO_L	61	FP14
11	D03	28	CABLE SELECT	45	A_GROUND_R	62	FP15
12	D12	29	DAK	46	A_GROUND_L	63	FP16
13	D02	30	GROUND	47	AUDIO_R	64	FP17
14	D13	31	IRQ	48	FP01	65	FP18
15	D01	32	IO16	49	FP02	66	FP19
16	D14	33	A1	50	FP03	67	FP20
17	D00	34	PDIAG	51	FP04	68	FP21

Accelerated Graphics Port (AGP)

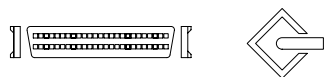
Connector



Pin	Signal A	Signal B	Pin	Signal A	Signal B	Pin	Signal A	Signal B
1	+12 V	OVRCNT#	23	Ground	Ground	45	VCC 3.3	VCC 3.3
2	TYPEDET#	+ 5V	24	Reserved	3.3 Vaux	46	TRDY#	DEVSEL#
3	Reserved	+ 5V	25	VCC 3.3	VCC 3.3	47	STOP#	Vddq
4	USB-	USB+	26	AD30	AD31	48	PME#	PERR#
5	Ground	Ground	27	AD28	AD29	49	Ground	Ground
6	INTA#	INTB#	28	VCC 3.3	VCC 3.3	50	PAR	SERR#
7	RST#	CLK	29	AD26	AD27	51	AD15	C/BE1#
8	GNT#	REQ#	30	AD24	AD25	52	Vddq	Vddq
9	VCC3.3	VCC3.3	31	Ground	Ground	53	AD13	AD14
10	ST1	ST0	32	AD_STB1#	AD_STB1	54	AD11	AD12
11	Reserved	ST2	33	C/BE3#	AD23	55	Ground	Ground
12	PIPE#	RBF#	34	Vddq	Vddq	56	AD9	AD10
13	Ground	Ground	35	AD22	AD21	57	C/BE0#	AD8
14	WBF#	Reserved	36	AD20	AD19	58	Vddq	Vddq
15	SBA1	SBA0	37	Ground	Ground	59	AD_STB0#	AD_STB0
16	VCC 3.3	VCC 3.3	38	AD18	AD17	60	AD6	AD7
17	SBA3	SBA2	39	AD16	C/BE2#	61	Ground	Ground
18	SB_STB#	SB_STB	40	Vddq	Vddq	62	AD4	AD5
19	Ground	Ground	41	FRAME#	IRDY#	63	AD2	AD3
20	SBA5	SBA4	42	Reserved	3.3VAux	64	Vddq	Vddq
21	SBA7	SBA6	43	Ground	Ground	65	AD0	AD1
22	Reserved	Reserved	44	Reserved	Reserved	66	VREFGC	VREFGC

Ultra SCSI

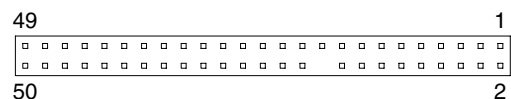
Connector and Icon



Pin	Signal	Pin	Signal	Pin	Signal
1-11	Ground	31	DB5	41	ATN #
12	Reserved	32	DB6	42	Ground
13	Open	33	DB7	43	BSY #
14	Reserved	34	DBP	44	ACK #
15-25	Ground	35	Ground	45	RST #
26	DB0	36	Ground	46	MSG #
27	DB1	37	Reserved	47	SEL #
28	DB2	38	TERMPWR	48	C/D
29	DB3	39	Reserved	49	REQ #
30	DB5	40	Ground	50	Input/Output

IDE CD-ROM

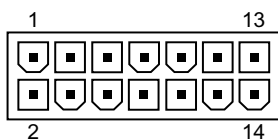
Connector



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RESDRV_	14	GROUND	27	D07	40	D08
2	D06	15	D09	28	D05	41	D10
3	D04	16	D11	29	D03	42	D12
4	D02	17	D13	30	D01	43	D14
5	D00	18	D15	31	Ground	44	(KEY)
6	DREQ	19	Ground	32	IOW	45	Ground
7	IOR	20	Ground	33	OCHRDY	46	CABLE SELECT
8	DAK	21	Ground	34	IRQ	47	IO16
9	A1	22	PDIAG	35	A0	48	A2
10	CS1FX	23	CS3FX	36	DASP	48	Ground
11	AUDIO_R	24	AUDIO_L	37	A_GND_R	49	A_GND_L
12	+5VMOT1	25	+5VMOT2	38	+5VMOT3	50	+5VMOT4
13	+5VMLOG1	26	+5VMLOG2	39	DASP		

14-Pin Power

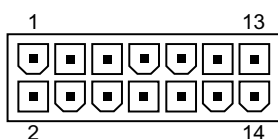
Connector for BX Chipset



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+3.3 V	5	RTN	9	-12 V	13	+3.3 V Sense return
2	+3.3 V Sense	6	+5 V	10	Fan OFF	14	+12 V
3	RTN	7	RTN	11	ON/STBY		
4	+5 V	8	+3.3 V	12	+5 V Aux		

14-Pin Power

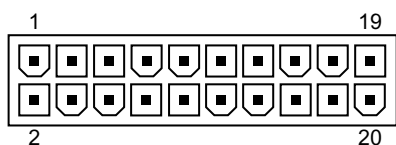
Connector for 810, 810e, and 820 Chipsets



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+3.3 V	5	RTN	9	-12 V	13	Fan speed
2	+3.3 V Aux	6	+5 V	10	Fan OFF#	14	+12 V
3	RTN	7	RTN	11	ON/STBY		
4	+5 V	8	+3.3 V	12	+5 V Aux		

20-Pin Power - Deskpro EP

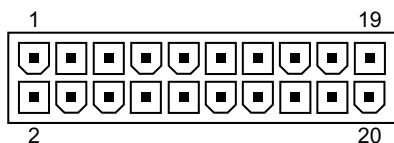
Connector



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+3.3 V	6	+5 V	11	+3.3 V	16	RTN
2	+3.3 V	7	RTN	12	-12 V	17	RTN
3	RTN	8	Fan OFF	13	RTN	18	-5 V
4	+5 V	9	+5 V Aux	14	ON/STBY	19	+5 V
5	RTN	10	+12 V	15	RTN	20	+5 V

20-Pin Power - Deskpro EN

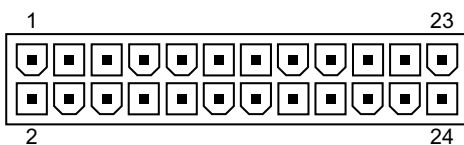
Connector



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	3 V	6	5 V	11	3 V	16	RTN/RS
2	3 V/RS	7	Aux RTN	12	-12 V	17	RTN
3	RTN	8	Fan OFF	13	RTN	18	-5 V
4	5 V	9	5 Vaux	14	ON/STBY	19	5 V
5	RTN	10	12 V	15	RTN	20	5 V

24-Pin Power

Connector

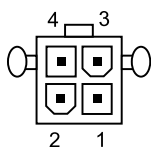


Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+3.3 V	7	aux RTN	13	+3.3V	19	RTN
2	+3.3 V	8	Fan OFF	14	-12 V	20	-5 V/+3.3V
3	RTN	9	+5 V aux	15	RTN	21	+5 V
4	+5 V	10	+12 V	16	ON/STBY	22	+5 V
5	RTN	11	3.3 Vaux	17	RTN	23	3.3 V R/S
6	+5 V	12	Fan CMD	18	RTN / (R/S)	24	Fan Sink

* The voltage of pin 20 differs depending on model.

4-Pin Power

Connector



Pin	Signal
1	RTN
2	RTN
3	12.8 Vcpu
4	12.8 Vcpu

appendix **B**

POWER CORD SET REQUIREMENTS

The voltage select switch feature on the computer permits it to operate from any line voltage between 100-120 or 220-240 volts AC.

The power cord set received with the computer meets the requirements for use in the country where you purchased the equipment.

Power cord sets for use in other countries must meet the requirements of the country where you use the computer. For more information on power cord set requirements, contact your authorized Compaq dealer, reseller, or service provider.

General Requirements

The requirements listed below are applicable to all countries:

1. The length of the power cord set must be at least 6.00 feet (1.8 m) and a maximum of 9.75 feet (3.0 m).
2. All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
3. The power cord set must have a minimum current capacity of 10A and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
4. The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector, for mating with appliance inlet on the Switch Box.

Country-Specific Requirements

Additional requirements specific to a country are shown in parentheses and explained below.

Country	Accrediting Agency	Country	Accrediting Agency
Australia (1)	EANSW	Italy (1)	IMQ
Austria (1)	OVE	Japan (3)	JIS
Belgium (1)	CEBC	Norway (1)	NEMKO
Canada (2)	CSA	Sweden (1)	SEMKO
Denmark (1)	DEMKO	Switzerland (1)	SEV
Finland (1)	SETI	United Kingdom (1)	BSI
France (1)	UTE	United States (2)	UL
Germany (1)	VDE		

(1) The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

(2) The flexible cord must be Type SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A 250V) configuration.

(3) The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 0.75 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (15A, 125V) configuration.

appendix C

POST ERROR MESSAGES

An error message results if the Power-On Self-Test (POST) encounters a problem. This test runs when the system is turned on, checking assemblies within the computer and reporting any errors found.

Screen Message	Beeps*	Probable Cause	Recommended Action
101-Option ROM Error	1L, 1S	System ROM checksum.	<ol style="list-style-type: none">1. Verify the correct ROM.2. Flash the ROM if needed.3. If an expansion card was recently added, remove it and see if the problem remains.4. Clear CMOS.5. If the message disappears, there may be a problem with the expansion card.6. Replace the system board.
102-System Board Failure	None	DMA, timers, etc.	<ol style="list-style-type: none">1. Clear CMOS.2. Remove expansion boards.3. Replace the system board.
103-System Board Failure	None	DMA, timers, etc.	<ol style="list-style-type: none">1. Clear CMOS.2. Remove expansion boards.3. Replace the system board.
150-SafePost Active	None	A PCI expansion card is not responding.	<ol style="list-style-type: none">1. Restart the computer.2. Disable SafePost.3. If the expansion card does not respond, replace the card.
162-System Options Not Set	2S	Configuration incorrect. RTC (real-time clock) battery may need to be replaced. Battery life is approximately 3 years.	Run Computer Setup (F10 Setup). Set the date and time under Control Panel or in F10 Setup depending on the operating system. If the problem persists, replace the RTC battery.

* L = Long, S = Short

continued

POST Error Messages *Continued*

Screen Message	Beeps*	Probable Cause	Recommended Action
163-Time & Date Not Set	2S	Invalid time or date in configuration memory. RTC (real-time clock) battery may need to be replaced. Battery life is approximately five years. CMOS jumper may not be properly installed.	Set the date and time under Control Panel or in F10 Setup depending on the operating system. If the problem persists, replace the RTC battery. Check for proper placement of the CMOS jumper.
164-Memory Size Error	2S	Memory configuration is incorrect.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup) or Windows utilities.2. Make sure memory module(s) (if any) are installed properly.3. If third party memory has been added, test using Compaq-only memory.4. Verify proper memory module type.
183-Invalid Processor Jumper Setting	2S	System board jumper improperly set.	Reset system board jumpers to match processor and bus speeds.
201-Memory Error	None	RAM failure.	<ol style="list-style-type: none">1. Run ComputerSetup (F10 Setup) or Windows utilities.2. Ensure memory and continuity modules are installed correctly.3. Verify proper memory module type.4. Remove and replace memory module(s) one at a time to isolate faulty module.5. Replace the faulty memory module(s).6. If error persists after replacing memory modules, replace the system board.
202-Memory Type Mismatch	None	Memory modules do not match each other.	Replace memory modules with matched sets.

* L = Long, S = Short

continued

POST Error Messages Continued

Screen Message	Beeps*	Probable Cause	Recommended Action
207-ECC Corrected Single Bit Errors in Memory Socket(s) y,y	2S	Single Bit ECC error.	<ol style="list-style-type: none"> 1. Verify proper memory module type. 2. Try another memory socket. 3. Replace memory module if problem persists.
212-Failed Processor	None	Processor has failed to initialize.	<ol style="list-style-type: none"> 1. Reseat the processor in its socket. 2. If the processor does not respond, replace it.
213-Incompatible memory Module in memory Socket(s) X,X, X	2S	A memory module in memory socket identified in the error message is missing critical SPD information, or is incompatible with the chipset.	<ol style="list-style-type: none"> 1. Verify proper memory module type. 2. Try another memory socket. 3. Replace memory with a module conforming to the SPD standard.
214-Memory Device Failure. Error Code: XX Memory Module Socket(s):XX	None	A specific error has occurred in a RDRAM device installed in the identified socket.	<ol style="list-style-type: none"> 1. Verify proper memory module type. 2. Try another memory socket. 3. Replace memory module if problem persists.
215-RIMM Configuration Error	None	RIMMs not properly installed.	Populate RIMM sockets starting with slot no. 1 and do not leave any memory sockets empty.
301-Keyboard Error	None	Keyboard failure.	<ol style="list-style-type: none"> 1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. 3. Ensure that none of the keys are depressed. 4. Replace keyboard.
304-Keyboard or System Unit Error	None	Keyboard failure.	<ol style="list-style-type: none"> 1. Reconnect the keyboard with computer turned off. 2. Ensure that none of the keys are depressed. 3. Replace keyboard. 4. Replace system board.
401-Parallel Port 1 Address Assignment Conflict	2S	IRQ address conflicts with another device.	Reset the IRQ.
* L = Long, S = Short			<i>continued</i>

POST Error Messages *Continued*

Screen Message	Beeps*	Probable Cause	Recommended Action
402-Monochrome Adapter Failure	1L, 2S	Monochrome display controller.	Replace monochrome display controller.
403-Parallel Port 3 Address Assignment Conflict	2S	IRQ address conflicts with another device.	Reset the IRQ.
404-Parallel Port Address Conflict Detected	2S	Both external and internal ports are assigned to parallel port X.	<ol style="list-style-type: none">1. Remove any parallel expansion cards.2. Clear CMOS.3. Reconfigure card resources and/or run Computer Setup (F10 Setup).
410-Audio Interrupt Conflict	2S	IRQ address conflicts with another device.	Reset the IRQ.
411-Network Interface Card Interrupt Conflict	2S	IRQ address conflicts with another device.	Reset the IRQ.
501-Display Adapter Failure	1L, 2S	Graphics display controller.	<ol style="list-style-type: none">1. Reseat the graphics card (if applicable).2. Clear CMOS.3. Verify that the monitor is attached and turned on.4. Replace the graphics controller.
510-Splash Screen image corrupted	None	Splash Screen image has errors.	Install latest version of ROMPaq to restore image.
511-CPU, Rear, or Front Fan not detected	None	Fan is not connected or may have malfunctioned.	<ol style="list-style-type: none">1. Reseat fan cable.2. Replace the fan.
601-Diskette Controller Error	None	Diskette controller circuitry or floppy drive circuitry incorrect.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Check and/or replace cables.3. Clear CMOS.4. Replace diskette drive.5. Replace the system board.
602-Diskette Boot Record Error	None	Diskette in drive A not bootable.	Replace the diskette.

* L = Long, S = Short

continued

POST Error Messages Continued

Screen Message	Beeps*	Probable Cause	Recommended Action
605-Diskette Drive Type Error	2S	Mismatch in drive type.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup) or Windows NT, Windows 95, or Windows 98 utilities.2. Disconnect any other diskette controller devices (tape drives).3. Clear CMOS.
610-External Storage Device Failure	None	External tape drive not connected.	Reinstall tape drive or press F1 and allow system to reconfigure without the drive.
611-Primary Floppy Port Address Assignment Conflict	2S	Configuration error.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Remove expansion cards.3. Clear CMOS.
612-Secondary Floppy Port Address Assignment Conflict	2S	Configuration error.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Remove expansion cards.3. Clear CMOS.
660-Display Cache is Detected Unreliable	None	Integrated video controller display cache not working properly and will be disabled.	Replace system board if minimal video degrading is an issue.
912-Computer Cover Has Been Removed Since Last System Start Up	None		No action required.
914-Hood Lock Coil is not Connected	None	Hood lock mechanism is missing or not connected.	<ol style="list-style-type: none">1. Reconnect or replace hood locking mechanism.2. Reseat or replace hood locking mechanism cable.
916-Thermal Sensor from Processor Heatsink is not Connected.	None	Processor heatsink cable not connected to system board.	Reseat or replace the processor heatsink cable going to the system board.
917-Expansion Riser not Detected	None	Riser board not seated or not installed.	Install riser board if missing or remove and reseat to ensure good connection.

* L = Long, S = Short

continued

POST Error Messages Continued

Screen Message	Beeps*	Probable Cause	Recommended Action
1151-Serial Port 1 Address Conflict Detected	2S	Both external and internal serial ports are assigned to COM1.	<ol style="list-style-type: none"> 1. Remove any Comm port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup (F10 Setup). Run Computer Setup or Windows utilities.
1152-Serial Port 2 Address Conflict Detected	2S	Both external and internal serial ports are assigned to COM2.	<ol style="list-style-type: none"> 1. Remove any Comm port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup (F10 Setup). Run Computer Setup or Windows utilities.
1155- Serial Port Address Conflict Detected	2S	Both external and internal serial ports are assigned to same IRQ.	<ol style="list-style-type: none"> 1. Remove any Comm port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup (F10 Setup).Run Computer Setup or Windows utilities.
1201-System Audio Address Conflict Detected	2S	Device IRQ address conflicts with another device.	Reset the IRQ.
1202-MIDI Port Address Conflict Detected	2S	Device IRQ address conflicts with another device.	Reset the IRQ.
1203-Game Port Address Conflict Detected		Device IRQ address conflicts with another device.	Reset the IRQ.
1611- Fan failure detected	None	Chassis fan not connected to the system board.	<ol style="list-style-type: none"> 1. Reconnect the fan. 2. Replace the fan. 3. Replace the system board.
1720-SMART Hard Drive Detects Imminent Failure	None	Hard drive is about to fail. (Some hard drives have a firmware patch that will fix an erroneous error message.)	<ol style="list-style-type: none"> 1. Determine if hard drive is giving correct error message. Run the Drive Protection System test available. 2. Apply firmware patch if applicable (see www.compaq.com/support/techpubs/customer_advisories). 3. Back up contents and replace hard drive.

* L = Long, S = Short

continued

POST Error Messages *Continued*

Screen Message	Beeps*	Probable Cause	Recommended Action
1721-SMART SCSI Hard Drive Detects Imminent Failure	None	Hard drive is about to fail. (Some hard drives have a firmware patch that will fix an erroneous error message.)	<ol style="list-style-type: none">1. Determine if hard drive is giving correct error message. Run the Drive Protection System test available.2. Apply firmware patch if applicable.3. Back up contents and replace hard drive.
1771-Primary Disk Port Address Assignment Conflict	2S	Internal and external hard drive controllers are both assigned to the primary address.	<ol style="list-style-type: none">1. Remove any disk controller expansion cards.2. Clear CMOS.3. Reconfigure card resources and/or run Computer Setup (F10 Setup).
1772-Secondary Disk Port Address Assignment Conflict	2S	Internal and external hard drive controllers are both assigned to the primary address.	<ol style="list-style-type: none">1. Remove any disk controller expansion cards.2. Clear CMOS.3. Reconfigure card resources and/or run Computer Setup (F10 Setup).
1780-Disk 0 Failure	None	Hard drive/format error.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Clear CMOS.3. Check cables/jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Run the Drive Protection System test if available.7. Replace the hard drive.
1781-Disk 1 Failure	None	Hard drive/format error.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Clear CMOS.3. Check cable seating/jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Run the Drive Protection System test if available.7. Replace the hard drive.

* L = Long, S = Short

continued

POST Error Messages Continued

Screen Message	Beeps*	Probable Cause	Recommended Action
1782-Disk Controller Failure	None	Hard drive circuitry error.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Clear CMOS.3. Check cable seating /jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Run the Drive Protection System test if available.7. Check www.compaq.com\support\techpubs\customer_advisories for possible changes when using Windows NT4.0 Service Pack 4.8. Replace the hard drive.9. Replace the system board.
1790-Disk 0 Failure	None	Hard drive error or wrong drive type.	<ol style="list-style-type: none">1. Run Computer Setup (F10 Setup).2. Clear CMOS.3. Check cable seating /jumper settings.4. Run hard drive diagnostics.5. Disconnect additional drives.6. Confirm that drive is supported on this computer (large drive ROM support).7. Run the Drive Protection System test if available.8. Replace the hard drive.9. Replace the system board.

* L = Long, S = Short

continued

POST Error Messages Continued

Screen Message	Beeps*	Probable Cause	Recommended Action
1791-Disk 1 Failure	None	Hard drive error or wrong drive type.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Clear CMOS. 3. Check cable seating /jumper settings. 4. Run hard drive diagnostics. 5. Disconnect additional drives. 6. Confirm that drive is supported on this computer (Large drive ROM support). 7. Run the Drive Protection System test if available. 8. Replace the hard drive. 9. Replace the system board.
1792-Secondary Disk Controller Failure	None	Hard drive circuitry error.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Clear CMOS. 3. Check cable seating /jumper settings. 4. Run hard drive diagnostics. 5. Disconnect additional drives. 6. Run the Drive Protection System test if available. 7. Replace the hard drive.
1793-Secondary Controller or Disk Failure	None	Hard drive circuitry error.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). 2. Clear CMOS. 3. Check cable seating /jumper settings. 4. Run hard drive diagnostics. 5. Disconnect additional drives. 6. Run the Drive Protection System test if available. 7. Replace the hard drive.
1800-Temperature Alert	None	Internal temperature exceeds specification.	<p>Check that computer air vents are not blocked and cooling fan is running.</p> <p>Verify processor speed selection.</p> <p>Replace the processor.</p> <p>Replace the system board.</p>
1801-Microcode Patch Error	None	Processor not supported by ROM BIOS.	Upgrade BIOS to proper version.

* L = Long, S = Short

continued

POST Error Messages *Continued*

Screen Message	Beeps*	Probable Cause	Recommended Action
Audible	1L, 3S	System ROM is bad; system is running in Failsafe Boot Block mode.	Reflash the ROM using a ROMPaq diskette. Refer to the "Failsafe Boot Block ROM" section of the Software Reference Guide.
Audible	2S	Power-on successful.	None.
Fixed Disk Parameter Table or BIOS Error System Halted	3L	Configuration or hardware failure.	Run Computer Setup and Diagnostic Utilities.
Flashing Caps Lock LED on Keyboard	1L, 2S	Graphics controller not present or incorrectly initialized.	<ol style="list-style-type: none"> 1. Clear CMOS. 2. If graphics card has been added, remove and reseat. 3. Reset the riser board.
Flashing Num Lock LED on Keyboard (Most models. Blue LED glows on Professional Workstation 800.)	1S, 2L	System memory not present.	<ol style="list-style-type: none"> 1. Check memory module. 2. Remove and reseat memory module. 3. See "Memory" in Appendix F.
Flashing Power and Hard Drive Green LEDs (Most models. Blue LED glows on Professional Workstation 800.)	None	Unseated riser board.	<ol style="list-style-type: none"> 1. Remove riser board. 2. Wipe connector with a dry, clean cloth. 3. Reinstall riser board.
Flashing Scroll Lock LED on Keyboard (Most models. Orange LED glows on Professional Workstation 800)	2L, 1S	System board hardware failure (prior to video).	Replace system board.
Green Power LED Blinks Once per Second	None	Computer in normal Suspend mode.	None.
Green Power LED ON	None	Computer on.	None.
Invalid Electronic Serial Number	None	Electronic serial number has become corrupted.	<ol style="list-style-type: none"> 1. Run Computer Setup (F10 Setup). If Setup already has data in the field or will not allow the serial number to be entered, download and run SP5572.EXE (SNZERO.EXE). 2. Run F10 Setup and try to enter serial number under Security, System ID, then save changes.

* L = Long, S = Short

continued


POST Error Messages Continued

Screen Message	Beeps*	Probable Cause	Recommended Action
Num Lock LED on Keyboard	None	Failed Boot Block.	Reflash the ROM using a ROMPaq diskette.
Red Power LED Blinks Every 2 or More Seconds	None	Power supply overloaded.	<ol style="list-style-type: none">1. Push in power button. LED should be green.2. Remove all AC power from computer, wait 30 seconds, then apply power.3. Remove load from power supply by removing options one at a time until computer runs.4. Check for damage to system board.5. Replace system board.6. Replace power supply.
Green Power LED Blinks Every Second	None	System memory error.	<ol style="list-style-type: none">1. Check memory module.2. Remove and reseat memory module.3. See the "Solving Memory Problems" section of this guide.
Red power LED ON	None	Processor unseated.	Reseat processor in system board.
(Resume = F1 KEY)	None	As indicated to continue.	Press F1.
XXOOOYZZ Parity Check	None	Parity RAM failure.	Run Computer Setup and Diagnostic Utilities.

* L = Long, S = Short

appendix **D**

DIAGNOSTIC INDICATOR LIGHTS

 All indicator lights are not available on all products.

Keyboard Lights

LED	Color	LED Activity	State/Message
Num Lock	Green	Flashing	Memory error
Caps Lock	Green	Flashing	No video
Scroll Lock	Green	Flashing	System board failure, prior to video

System Board Lights - Desktop Computers and Workstations

LED	Color	LED Activity	State/Message
Power	Green	On	Computer on
Power	Green	1 blink/second	Normal suspend mode
Power	Green	1 blink/second	Suspend to RAM
Power	None		Computer off
Power	Red	4 blinks/second	CPU thermal shutdown
Power	Red	On	CPU not installed/fetching code
Power	Red	1 blink/second	ROM error
Power	Red	1 blink/2 or more seconds	Power supply overloaded
Power and Hard Drive	Red	On	Riser board not seated

appendix **E**

DIAGNOSTIC ERROR CODES

Diagnostic error codes occur if the system recognizes a problem while running the Compaq Diagnostics program. These error codes help identify possibly defective subassemblies.

Diagnostic error messages consist of three components, AABB-CC, where

AA = Device Code

BB = Subtest Code


CC = Error Code

The following table lists the device codes (AABB-CC) and the subtest code (ABB-CC) covered by Compaq Diagnostics Tests. Some codes listed in this table will not apply to the computers described in this manual and will not be detailed in the tables that follow.

Summary of Test Error Codes

Error Code Range	Device Description	Error Code Range	Device Description
0100 - 0199	Processor (P1)	3113 - 3199	Third Processor (P3)
0200 - 0210	Memory	3206 - 3206	Audio System
0301 - 0304	Keyboard	3300 - 3333	Mediavision Spectrum 16 Multimedia
0401 - 0498	Parallel Port	3400 - 3401	TV Tuner Card
0501 - 0516	Video Display Unit	4113 - 4199	Fourth Processor
0600 - 0699	Diskette Drive	5100 - 5130	Plasma Display System
0802 - 0824	Monochrome Video Card	5234 - 5240	Advanced Color Graphics (AGC)
1101 - 1109	Serial Port	6000 - 6089	Network Card
1201 - 1210	Modem	6500 - 6599	SCSI Hard Drives
1700 - 1799	Hard Drive	6600 - 6699	CD-ROM Drives
1800 - 1823	CD-ROM	6700 - 6799	SCSI Tape Drives
1900 - 1906	Tape Drive	7000	Server Manager/R Card
2113 - 2199	Second Processor (P2)	8601	Auxiliary Input Interface
2402 - 2480	Enhanced Color Graphics (ECG/VGA)	8700 - 8702	Game Port
2502 - 2502	Pen/Digitizer		

The remaining tables list possible error codes (AABB-CC), descriptions of each error condition, and recommended actions to resolve the error condition.

-  Retest the system after completing each step. If the problem has been resolved, do not proceed with the remaining steps.

For assistance in the removal and replacement of a particular subassembly, see the “Removal and Replacement Procedures” chapter in the product-specific MSG.

Microprocessor

Error Code	Description	Recommended Action
0101-xx	CPU test failed.	The following steps apply to 0101-xx through 0102-xx:
0102-xx	Coprocessor error.	<ol style="list-style-type: none"> 1. Run Computer Checkup or Computer Setup and retest. 2. Replace processor and retest. 3. Replace the system board and retest.
0103-xx	DMA controller failed.	The following step applies to 0103-xx through 0106-xx:
0104-xx	Interrupt controller failed.	Replace the system board and retest.
0105-xx	Port error.	
0106-xx	Keyboard controller self-test failed.	
0107-xx	CMOS RAM test failed.	The following steps apply to 0107-xx through 0109-xx:
0108-xx	CMOS interrupt test failed.	<ol style="list-style-type: none"> 1. Replace the battery/clock module and retest.
0109-xx	CMOS clock test failed.	<ol style="list-style-type: none"> 2. Replace the system board and retest.
0110-xx	Programmable timer test failed.	Replace the system board and retest.
0113-01	Protected mode test failed.	Replace the system board and retest.
0114-01	Speaker test failed.	<ol style="list-style-type: none"> 1. Verify the speaker connection. 2. Replace speaker (if applicable) and retest. 3. Replace the system board and retest.
0199-xx	Installed devices test failed.	<ol style="list-style-type: none"> 1. Check system configuration. 2. Verify cable connections. 3. Check switch settings. 4. Run Diagnostics utility. 5. Remove all devices except processor and replace one-at-a-time until a failure occurs. 6. Replace the system board.

Memory

Error Code	Description	Recommended Action
0200-xx	Machine ID test failed.	Reinsert memory modules and retest.
0202-xx	System ROM checksum failed	The following steps apply to 0202-xx through 0212-xx: <ol style="list-style-type: none">1. Remove one memory module at a time until the error message stops.2. Replace other removed modules one at a time, testing each to ensure the error does not return.3. Replace defective modules.4. If error continues, replace system board and retest.
0203-xx	Write/read test failed.	
0204-xx	Address test failed.	
0205-xxx	Walking 1s test failed.	
0209-xxx	RAM long test failed.	
0211-xx	Random pattern test failed.	
0212-xxx	Cache test failed.	
0214-xx	Noise test failed.	The following steps apply to 0214-xx through 0215-xx: <ol style="list-style-type: none">1. Remove one memory module at a time until the error message stops.2. Replace other removed modules one at a time, testing each to ensure the error does not return.3. Replace the system board and retest.
0215-xx	Random address test failed.	

Keyboard

Error Code	Description	Recommended Action
0300-xx	ID test failed.	The following steps apply 0300-xx through 0304-xx: <ol style="list-style-type: none">1. Check the keyboard connection. If disconnected, turn the computer off and connect the keyboard.2. Replace the keyboard and retest.3. Replace the system board and retest.
0301-xx	Self-test/interface test failed.	
0302-xx	Individual key test failed.	
0304-xx	Repeat test failed.	



Holding any key down during the boot-up sequence causes the Basic Input Output System (BIOS) to beep, as a warning of possible keyboard problems. Wait until after the system has booted, then press the Num Lock key. If the Num Lock light on the keyboard toggles on and off with each press of the key, the keyboard is functioning properly.

Parallel Port

Error Code	Description	Recommended Action
0401-xx	Failed or not connected.	The following steps apply to 0401-xx through 0403-xx: <ol style="list-style-type: none">1. Connect the printer.2. Check power to the printer.3. Install the loop-back connector and retest.4. Replace system board and retest.
0402-xx	Printer port test failed.	
0403-xx	Pattern test failed.	

Diskette Drive

Error Code	Description	Recommended Action
0600-xx	ID drive types test failed.	The following steps apply to 0600-xx through 0698-xx: <ol style="list-style-type: none">1. Replace the diskette media and retest.2. Reseat and/or replace the diskette power and signal cables and retest.3. Replace the diskette drive and retest.4. Replace the system board and retest.
0601-xx	Format failed.	
0602-xx	Read test failed.	
0603-xx	Write, read, compare test failed.	
0604-xx	Random seek test failed.	
0605-xx	ID media test failed.	
0606-xx	Speed test failed.	
0609-xx	Diskette reset controller failed.	
0610-xx	Change line test failed.	
0697-xx	Diskette type error.	
0698-xx	Diskette drive speed not within limits.	
0699-xx	Diskette drive/media error.	

Serial Port

Error Code	Description	Recommended Action
1101-xx	Serial port test failed.	<ol style="list-style-type: none">1. Run Computer Setup or Windows NT, Windows 98/Windows 2000/Windows ME utilities.2. Replace the system board and retest.

Modem Communications

Error Code	Description	Recommended Action
1201-xx	Internal test failed.	The following steps apply to 1201-xx through 1210-xx: 1. Disconnect from the phone line and retest. 2. Check the phone number. 3. Check the modem line. 4. Replace the modem and retest.
1203-xx	External termination test failed.	
1204-xx	Auto originate test failed.	
1205-xx	Auto answer test failed.	
1210-xx	Direct connect test failed.	

Hard Drive

Error Code	Error	Recommended Action
1701-xx	Format test failed.	The following steps apply to 1701-xx through 1736-xx: 1. Run Computer Setup and verify drive type. 2. Reseat or replace the hard drive signal and power cables and retest. 3. Clear CMOS. 4. Run the hard drive DPS test. 5. Replace the hard drive and retest. 6. Replace the system board and retest.
1702-xx	Read test failed.	
1703-xx	Write/read/compare test failed.	
1704-xx	Random seek test failed.	
1705-xx	Controller test failed.	
1708-xx	Format bad track test failed.	
1710-xx	Park head test failed.	
1715-xx	Head select test failed.	
1716-xx	Conditional format test failed.	
1717-xx	ECC* test failed.	
1719-xx	Power mode test failed.	
1724-xx	Network preparation test failed.	
1736-xx	Monitoring test failed.	

*Error Correction Code

Tape Drive

Error Code	Description	Recommended Action
1900-xx	ID test failed.	The following steps apply to 1900-xx through 1910-xx: <ol style="list-style-type: none">1. Replace the tape cartridge and retest.2. Reseat and/or replace the signal cable and retest.3. Check the switch settings on the adapter card (if applicable).4. Replace the tape adapter card (if applicable) and retest.5. Replace the tape drive and retest.6. Replace the system board and retest.
1901-xx	Servo test failed.	
1902-xx	Format or format verification test failed.	
1903-xx	Sensor test failed.	
1904-xx	BOT/EOT test failed.	
1905-xx	Read test failed.	
1906-xx	Write/read/compare failed.	
1910-xx	Tape erase test failed.	

Video

Error Code	Description	Recommended Action	
501-xx	Graphics controller test failed.	The following steps apply to 501-xx through 516-xx: <ol style="list-style-type: none">1. Replace the monitor and retest.2. Replace the graphics controller and retest.3. Replace the system board and retest.	
502-xx	Video memory test failed.		
503-xx	Video attribute test failed.		
504-xx	Video character test failed		
505-xx	Video 80 × 25 mode 9 × 14 character cell test failed.		
506-xx	Video 80 × 25 mode 8 × 8 character cell test failed.		
507-xx	Video 40 × 25 mode test failed.		
508-xx	Video 300 × 200 mode color set 0 test failed.		
509-xx	Video 320 × 200 mode color set 1 test failed.		
510-xx	Video 640 × 200 mode test failed.		
511-xx	Video screen memory page test failed.		
512-xx	Video gray scale test failed.		
514-xx	Video white screen test failed.		
516-xx	Video noise pattern test failed.		
2401-xx	Graphics controller test failed.		<ol style="list-style-type: none">1. Reseat the video card (if applicable) and retest.2. Replace the video card and retest.3. Replace the system board and retest.

Continued

2402-2419 Continued

Error Code	Description	Recommended Action
2402-xx	Memory test failed.	The following steps apply to 2402-xx through 2419-xx:
2403-xx	Attribute test failed.	1. Reseat the video card (if applicable) and retest.
2404-xx	Character set test failed.	2. Run the Configuration and Diagnostics utilities.
2405-xx	80 × 25 mode 9 × 14 character cell test failed.	3. Replace the monitor and retest.
2406-xx	80 × 25 mode 8 × 8 character cell test failed.	4. Replace the video/system board and retest.
2408-xx	320 × 200 mode color set 0 test failed.	
2409-xx	320 × 200 mode color set 1 test failed.	
2410-xx	640 × 200 mode test failed.	
2411-xx	Screen memory page test failed.	
2412-xx	Gray scale test failed.	
2418-xx	ECG/VGC memory test failed.	
2419-xx	ECG/VGC ROM checksum test failed.	
2420-xx	Graphics attribute test failed.	Replace the monitor and retest.
2421-xx	ECG/VGC 640 × 200 graphics mode test failed.	1. Reseat the video card (if applicable) and retest. 2. Replace the video/system board and retest.
2422-xx	ECG/VGC 640 × 350 16 color set test failed.	The following steps apply to 2422-xx through 2456-xx:
2423-xx	ECG/VGC 640 × 350 64 color set test failed.	1. Reseat the video card (if applicable) and retest.
2424-xx	ECG/VGC monochrome text mode test failed.	2. Run the Configuration and Diagnostics utilities.
2425-xx	ECG/VGC monochrome graphics mode test failed.	3. Replace the monitor and retest.
2431-xx	640 × 480 graphics test failed.	4. Replace the video/system board and retest.
2432-xx	320 × 200 graphics (256 color mode) test failed.	
2448-xx	Advanced VGA Controller test failed.	
2451-xx	132-column Advanced VGA test failed.	
2456-xx	Advanced VGA 256 Color test failed.	
2458-xx	Advanced VGA BitBLT test.	The following steps apply to 2458-xx through 2480-xx:
2468-xx	Advanced VGA DAC test.	1. Reseat the video card (if applicable) and retest.
2477-xx	Advanced VGA data path test.	2. Replace the video card and retest.
2478-xx	Advanced VGA BitBLT test.	3. Replace the system board and retest.
2480-xx	Advanced VGA Linedraw test.	

Audio

Error Code	Description	Recommended Action
3206-xx	Audio System Internal Error.	Replace the system board and retest.

Note: When Windows 98/2000/ ME is installed, changes to ESS sound device configuration do not take effect until the computer is restarted (turned off and on).

Network Interface

Error Code	Description	Recommended Action
6000-xx	ID test failed.	The following steps apply to 6000-xx through 6089-xx:
6014-xx	Configuration test failed.*	1. Run Computer Setup or Windows NT, Windows 95, Windows 98, Windows 2000, or Windows ME utilities.
6016-xx	Reset test failed.*	2. Verify test procedures.
6028-xx	Internal test failed.*	3. Replace the network card, if installed.
6029-xx	External test failed.*	4. Replace the system board.
6054-xx	Configuration test failed.**	
6056-xx	Reset test failed.**	
6068-xx	Internal test failed.**	
6069-xx	External test failed.**	
6089-xx	Open test failed.**	

* Ethernet only.

** Token Ring only.

CD-ROM and DVD-ROM

Error Code	Description	Recommended Action
3301-xx	CD-ROM drive read test failed.	The following steps apply to 3301-xx through 3305-xx and 6600-xx through 6623-xx:
3305-xx	CD-ROM drive seek test failed.	1. Replace the CD media and retest.
6600-xx	ID test failed.	2. Check the jumper settings on the adapter card.
6605-xx	Read test failed.	3. Verify that the speakers are connected.
6608-xx	Controller test failed.	4. Reseat and/or replace the power and signal cables and retest.
6623-xx	Random read test failed.	5. Replace the CD-ROM drive and retest.

Pointing Device

Error Code	Description	Recommended Action
8601-xx	Mouse test failed.	The following steps apply to 8601-xx through 8602-xx:
8602-xx	Interface test failed.	1. Replace with a working mouse and retest.
		2. Replace the system board and retest.

Special Error Codes

This section includes the error codes for the following devices:

- SCSI hard drives
- SCSI tape drives
- SCSI PD-CD drives
- All CD-ROM drives

The SCSI error codes consist of three components, AABB-CC, where

AA = Device Name

BB = Test Name

CC = Error Code

For example, a diagnostic error code of 6523-05 indicates that the diagnostics program was testing the hard drive random-read function and received a seek failure. The device is faulty and must be replaced.

Device Names

65XX-XX	Hard Drive
66XX-XX	CD-ROM Drive and PD-CD Drive
67XX-XX	Tape Drive

Test Names

XX00-XX	ID
XX05-XX	Read
XX06-XX	SA/Media
XX08-XX	Controller
XX09-XX	Media erase
XX23-XX	Random read
XX28-XX	Media load/unload

Test Error Codes

Error Code	Description	Recommended Action
XXXX-02	Drive not installed.	Check cable connections.
XXXX-03	Media not in drive.	Check for and install DATA CD or write-enabled tape in drive.
XXXX-05	Seek failure.	Replace the indicated device.
XXXX-06	Drive timed out.	Replace the indicated device.
XXXX-07	Drive busy.	Replace the indicated device.
XXXX-08	Drive already reserved.	Replace the indicated device.
XXXX-09	Unknown.	
XXXX-10	Unknown.	
XXXX-11	Media soft error.	Replace the indicated device.
XXXX-12	Drive not ready.	Replace the indicated device.
XXXX-13	Media error.	Replace the indicated device.
XXXX-14	Drive hardware error.	Replace the indicated device.
XXXX-15	Illegal drive command.	Replace the indicated device.
XXXX-16	Media was changed.	Replace the indicated device.
XXXX-17	Tape write-protected.	<ol style="list-style-type: none">1. Disable write-protect on tape cartridge.2. Replace tape drive.
XXXX-18	No data detected.	Replace the indicated device.
XXXX-21	Drive command aborted.	Replace the indicated device.
65XX-24	Media hard error.	<ol style="list-style-type: none">1. Back up data and perform Surface Analysis to reallocate defect.2. Replace drive.
66XX-24	Media hard error.	<ol style="list-style-type: none">1. Replace current DATA CD with different DATA CD.2. Replace drive.
67XX-24	Media hard error.	<ol style="list-style-type: none">1. Ensure correct media type for this tape drive.2. Replace current tape with new tape.3. Replace tape drive.
XXXX-25	Unknown.	
XXXX-30	Controller timed out.	Replace the indicated device.
XXXX-31	Unrecoverable error.	Replace the indicated device.
XXXX-32	Controller/drive disconnected.	Replace the indicated device.
XXXX-33	Illegal controller command.	Replace the indicated device.

continued

Test Error Codes Continued

Error Code	Description	Recommended Action
XXXX-34	Invalid SCSI bus phase.	Replace the indicated device.
XXXX-35	Invalid SCSI bus phase.	Replace the indicated device.
XXXX-36	Invalid SCSI bus phase.	Replace the indicated device.
XXXX-39	Error status from drive.	Replace the indicated device.
XXXX-40	Target timed out.	Replace the indicated device.
XXXX-41	SCSI bus stayed busy.	Replace the indicated device.
XXXX-42	ACK/REQ lines bad.	Replace the indicated device.
XXXX-43	ACK did not deassert.	Replace the indicated device.
XXXX-44	Parity error.	Replace the indicated device.
XXXX-50	Data pins bad.	Replace the indicated device.
XXXX-51	Data line 7 bad.	Replace the indicated device.
XXXX-52	MSG, C/D, and/or I/O lines bad.	Replace the indicated device.
XXXX-53	BSY never went busy.	Replace the indicated device.
XXXX-54	BSY stayed busy.	Replace the indicated device.
XXXX-60	Controller CONFIG-1 register bad.	Replace the indicated device.
XXXX-61	Controller CONFIG-2 register bad.	Replace the indicated device.
XXXX-65	Media not unloaded.	Replace the indicated device.
XXXX-90	Fan failure.	<ol style="list-style-type: none">1. Ensure fan(s) connected.2. Replace nonfunctional fan(s).
XXXX-91	Over temperature.	<ol style="list-style-type: none">1. Ensure proper air flow.2. Perform required maintenance and cleaning.
XXXX-99	Autoloader reported tapes not loaded properly.	<ol style="list-style-type: none">1. Install tape(s) in autoloader tape drive according to test instructions.2. Change autoloader magazine.

appendix **F**

TROUBLESHOOTING WITHOUT DIAGNOSTICS

Preliminary Checklist

This section describes some simple, preliminary tests and guidelines for troubleshooting the computer without using the diagnostics.

If you encounter some minor problem with the computer or a software application, go through the following checklist for possible solutions before running any of the diagnostic utilities:

- Are the computer and monitor connected to a working electrical outlet?
- Is the computer turned on?
- Is the green power light illuminated?
- Is the monitor turned on?
- Is the green monitor light illuminated?
- Turn up the monitor brightness and contrast controls if the monitor is dim.
- Press and hold any key. If the system beeps, then the keyboard is operating correctly.
- Check all cables for loose or incorrect connections.
- Reconfigure the computer after installing a non-Plug and Play expansion board or other option, such as a diskette drive.
- Are all of the necessary device drivers installed?
- Have all printer drivers been installed for each application?
- Remove all diskettes from the diskette drives before you turn on the system.
- Are all switches set correctly?
- Is the NIC Remote Wakeup cable (featured on some models) connected between the NIC and the riser/system board?
- Are all memory sockets filled on computers using RIMMs?
- Ensure that memory module types are not mixed on the same system board. The system will not boot if RIMMs and DIMMs are mixed.

Solving Minor Problems

Problem	Possible Solution
Computer will not turn on.	<ol style="list-style-type: none">1. Ensure that the computer is properly connected to an external power source and the wall outlet is active.2. A PCI or ISA card that has been installed is defective. Remove any expansion card that was just installed.3. Reseat drive power, data, and power supply cables.4. Disconnect all drive cables and reboot. Add devices back one at a time to isolate problem.
Computer appears locked up and won't turn off when the power button is pressed.	Software control of the power button may not be functional. Press and hold the button for four seconds, then release. This invokes the hardware override for the power button.
Computer date and time display is incorrect.	<p>First, reset the date and time under Control Panel. If the problem persists, the real-time clock (RTC) battery may need to be replaced. Refer to Section 9.1 in this guide.</p> <p>When booting from a network, the PC clock may be reset to that of the server. The PC clock may also change when using other services through the server.</p>
Computer powered off automatically.	<ol style="list-style-type: none">1. The unit temperature was exceeded because the unit is in an exceedingly hot environment or the fan is blocked. Let the unit cool down.2. The fan may not be functioning correctly or the air vents are blocked.3. The unit temperature was exceeded because the computer was functioning with the cover or side panel removed. Replace cover or side panel, and let the computer cool down.4. The unit temperature was exceeded because the air baffle is not properly installed to direct air flow over the processor.
Insufficient power to the components.	Ensure that both power supply cables are connected to the system board (on some workstations).
Computer appears to pause periodically.	Network driver is loaded and no network connection is established. Establish a network connection, or use Computer Setup or Windows Device Manager to disable the network controller.
Cannot remove computer cover or side panel.	<ol style="list-style-type: none">1. Smart Lock, featured on some computers, is locked. Unlock the Smart Cover Lock using Computer Setup.2. The Smart Cover FailSafe Key, a device for manually disabling the Smart Cover Lock, is available from Compaq. You need the FailSafe Key in cases of forgotten password, power loss, or computer malfunction.
Computer does not boot up and power and hard drive LEDs are blinking.	Ensure that the riser board is properly seated.
Computer does not boot up and Num Lock LED is blinking; you may hear one short and two long beeps.	Memory may be improperly installed or may be bad.

continued

Solving Minor Problems Continued

The Caps Lock LED is flashing; you may hear one long and two short beeps.

Computer does not boot up and the Scroll Lock LED is flashing; you may hear two long and one short beeps.



If the standard keyboard has been replaced with a Universal Serial Bus (USB) keyboard, you will hear the beep sequences mentioned above but will not see the flashing lights.

The video controller is not present or is incorrectly initialized. Clear configuration memory (CMOS). If a video card has been added, remove and reseal it.

System board hardware failure (prior to video). Replace system board.

Diskette Drive

Problem

Diskette drive light stays on.

Possible Solution

1. Diskette is damaged. In Windows 98, Windows 2000, or Windows Me run ScanDisk. Click Start → Programs → Accessories → System Tools → ScanDisk.

In Windows NT, right-click Start, click Explore, and select a drive. Select File → Properties → Tools. Under Error-checking, click Check Now.

2. Diskette is incorrectly inserted. Remove the diskette and reinsert.
3. Software program may be damaged. Check the program diskettes.
4. Drive button is not pushed in. Push in drive button.
5. Drive cable is not properly connected. Reconnect drive cable.

Diskette drive cannot write to a diskette.

1. Diskette is not formatted. Format the diskette.
2. Diskette is write-protected. Either use another diskette that is not write-protected or disable the write protection on the diskette.
3. Writing to the wrong drive. Check the drive letter in the path statement.
4. Not enough space is left on the diskette. Use another diskette.
5. Diskette write control is enabled. Check the Removable Media write settings in Computer Setup.

Cannot format diskette.

Invalid media reported. When formatting a diskette in DOS, you may need to specify diskette capacity. For example, to format a 1.44-MB diskette, type the following command at the DOS prompt:

```
FORMAT A: /F:1440
```

Diskette drive cannot read a diskette.

1. Diskette is not formatted. Format the diskette.
2. Using the wrong diskette type for the drive type. Check the drive type and use a compatible diskette.
3. Reading the wrong drive. Check the drive letter in the path statement.
4. Diskette drive has been disabled by Computer Setup, Windows NT, Windows 98, Windows 2000 or Windows Me utilities. Run Computer Setup and enable the diskette drive.

continued

Diskette Drive Continued

A problem has occurred with a disk transaction.

The directory structure is bad, or there is a problem with a file. In Windows 98, Windows 2000, or Windows Me run ScanDisk. Click Start → Programs → Accessories → System Tools → ScanDisk.

In Windows NT, right-click Start, click Explore, and select a drive. Select File → Properties → Tools. Under Error-checking, click Check Now.

Non-system disk message.

The system is trying to start from a nonsystem diskette. Remove the diskette from the drive.

Drive not found.

1. Reseat the diskette drive cable.
2. If a second diskette drive has been installed, follow the computer reconfiguration directions in the "Hardware Installation Problems" section.

System has misidentified the diskette drive type.

If a diskette drive other than a 3.5-inch, 1.44-MB drive has been installed, ensure that the drive type is identified correctly under Computer Setup.

Display

Problem

Screen is blank.

Possible Solution

1. Monitor is not turned on and the monitor light is not on. Turn on the monitor and check that the monitor light is on.
2. Screen save has been initiated. Press any key or move the mouse to light the screen.
3. The cable connections are not correct. Check the cable connection from the monitor to the computer and to the electrical outlet.
4. The brightness need adjusting. Adjust the brightness control.
5. The energy saver feature has been enabled. Press any key or click the mouse button and, if one has been set, type the password.
6. The RGB (Red, Green, Blue) input switch on the back of the monitor is incorrectly set. Set the monitor's input switch to 75 ohms and, if there is a sync switch, set it to External.
7. System ROM is bad and system is running in FailSafe Boot Block mode (indicated by one long beep and three short beeps). Reflash the ROM using a ROMPaq diskette. Refer to "FailSafe Boot Block ROM" in section 3.4.3 of this book.
8. If a fixed-sync monitor is used, be sure that the monitor can accept the same sweep rate as the resolution chosen.
9. Ensure the VGA/BNC selector is properly set.

Graphics colors are wrong.

Either the cabling or the monitor impedance is incorrect.

1. Ensure that the Red, Green, and Blue BNC cables are connected to the corresponding monitor connectors.
2. Be sure the monitor's RGB inputs are set to 75 ohms.

continued

Display Continued

Characters are dim.	<ol style="list-style-type: none">1. Adjust the monitor's brightness and contrast controls.2. Check that the video cable is securely connected to the graphics card and monitor.3. Set the RGB switch (and sync options, if available) to 75 ohms, with the sync set to External. Refer to the documentation included with the monitor.
Monitor does not function properly when used with the energy saver features.	Monitor without the energy saver feature is being used with energy saver features enabled. Disable the monitor energy saver features.
Blurry display or requested resolution cannot be set.	If the graphics controller was upgraded, the correct display drivers may not be loaded. Install the correct display drivers from the diskette included in the upgrade kit.
The picture is broken up; it rolls, jitters, or blinks.	<ol style="list-style-type: none">1. Be sure the monitor cable is securely connected to the computer.2. In a two-monitor system or if another monitor is in close proximity, move the monitors apart to be sure they are not interfering with the other's magnetic field.3. Fluorescent lights or fans may be too close to the monitor.
Screen goes blank.	A screen blanking utility may be installed or energy saver features may be enabled. Press any key or type password.
Monitor overheats.	There is not enough ventilation space for proper airflow. Leave at least 3 inches (7.6 cm) of ventilation space. Be sure there is nothing on top of the monitor obstructing the air flow.
Cursor will not move using the arrow keys on the numeric keypad.	The Num Lock key is on. Press the key to turn it off. The Num Lock light should not be on when you want to use the arrow keys.

SCSI

Problem

System with IDE and SCSI drives will not boot from SCSI hard drive.

System will not boot from a SCSI drive.

Possible Solution

The IDE drive needs to be disabled. Under the Computer Setup Advanced menu, disable the primary IDE controller.

1. The SCSI drive is not configured correctly.
2. Ensure that drive cabling and jumpers are set correctly. To boot a SCSI drive, the drive ID number must be set to 0.

Printer

Problem

Printer will not print.

Possible Solution

1. Printer is not turned on and online. Turn the printer on and ensure it is online.
2. Run printer self-test.
3. Reseat both ends of the printer cable.
4. Verify that printer port is enabled in BIOS and in Windows using F10 Setup.
5. Try printing using the DOS command
C:\ [printer port].
Where [printer port] is the port address to which the printer is connected.
If the printer works, the problem is with the printer driver. Reload the driver.
6. If the computer is on a network, you may not have made the connection to the printer. Make the proper network connections to the printer.

Printer will not turn on.

The cables may not be connected properly. Reconnect all cables and check the power cord and electrical outlet.

Prints garbled information.

1. The correct printer driver for the application are not installed. Install the correct printer driver for the application.
2. The cables may not be connected properly. Reconnect all cables.

Printer is offline.

The printer may be out of paper. Check the paper tray and refill it if empty. Select online.

Hard Drive

The information provided by the diagnostics tests includes: error code, system serial number, drive serial number, drive model, and drive firmware revision. Specific details of the drive failure are not included.

When you run the diagnostics, the test results are stored in a log. After completing the test, you can print this log to a local printer or save it to a file. Alternatively, before running the test, you can configure the test options to send the results to a local printer or file.

Problem	Possible Solution
Hard drive error occurs.	Hard disk has bad sectors or has failed. Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk.
Disk transaction problem.	Either the directory structure is bad or there is a problem with a file. In Windows 98, Windows 2000, or Windows Me run ScanDisk. Click Start → Programs → Accessories → System Tools → ScanDisk. In Windows NT, right-click Start, click Explore, and select a drive. Select File → Properties → Tools. Under Error-checking, click Check Now.
Drive not found (identified).	<ol style="list-style-type: none">1. Cable could be loose. Check cable connections.2. The system may not have automatically recognized a newly installed device. See reconfiguration directions in the "Hardware Installation Problems" section. If system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem.3. Check drive jumper settings. If the drive is a secondary drive that has just been installed on the same controller as the primary drive, verify that the jumpers for both drives are set correctly.4. Check SCSI IDs to ensure none are duplicated.
Nonsystem disk message.	<ol style="list-style-type: none">1. The system is trying to start from a diskette that is not bootable. Remove the diskette from the diskette drive.2. The system is trying to start from the hard drive but the hard drive may have been damaged. Insert a bootable diskette into the diskette drive and restart the computer.3. Diskette boot has been disabled in Computer Setup. Run Computer Setup and enable diskette boot.
Second Ultra ATA hard drive does not perform optimally.	The cable is not compatible with the drive type. Reinstall the second Ultra ATA hard drive using an 80-conductor cable.

Audio

Problem

Sound does not come out of the speaker.

Possible Solution

Software volume control is turned down electronically, or CD-ROM volume control on the front or back of the computer is turned down. Double-click on the speaker icon located on the taskbar, then set the volume by adjusting the volume slider.

CD or DVD volume control on the front of the computer may be turned down. Increase the volume by turning the volume control dial.

External speakers not turned on. Turn on the speakers.

External speakers plugged into wrong jacks. Refer to the *Computer User's Guide* or sound card documentation for proper speaker connection.

Audio cable not connected. Connect audio cable between CD or DVD drive and the system board.

Noise or silence comes from the speakers or headphones.

Computer may not detect correct speaker/headphone type or output or analog-to-digital auto-sense is not engaged.

1. If using digital speakers with a stereo jack, use the stereo-to-mono adapter to engage the auto-sense feature.
2. If a the stereo-to-mono adapter is not available, use the multimedia device properties to manually switch the audio signal from analog to digital.
3. If the headphones have a mono jack, use the multimedia device properties to manually switch the system to analog out.

NOTE: If you set digital as the Output mode, the internal speaker and external analog speakers will no longer output audio until you switch back to an auto-sense or analog mode.

If you set analog as your Output Mode, external digital speakers will not function until you change the output mode back to auto-sense or digital mode.

Hardware Installation

You may need to reconfigure the computer when you add or remove hardware, such as an additional diskette drive. If you install a Plug and Play device, Windows 98, Windows 2000, or Windows Me in most cases will automatically recognize the device and configures the computer. If a third-party Plug and Play device is not recognized, contact the device manufacturer. If you install a non-Plug and Play device, you must reconfigure the computer after completing installation of the new hardware. In Windows 98, Windows 2000, or Windows Me, select the Add New Hardware icon in the Control Panel and follow the instructions that appear on the screen. To reconfigure the computer in Windows NT Workstation 4.0 after installing new hardware, use the utility provided with the hardware.

Problem

A new device is not automatically recognized as part of the computer system.

Possible Solutions

1. The computer needs to be reconfigured to recognize the new device. Follow the reconfiguration instructions above. If system still does not recognize the new device, but the device is listed within Computer Setup, use Computer Setup to address any resource conflicts.
2. When the system advised you of changes to the configuration, you did not accept them. Reboot the computer and follow the instructions for accepting the changes.
3. A Plug and Play board may not automatically configure when added if the default configuration conflicts with other devices. Use Windows 98, Windows 2000, or Windows Me Device Manager to deselect the automatic settings for the board and choose a basic configuration that doesn't cause a resource conflict. You can also use Computer Setup to reconfigure or disable devices to resolve the resource conflict.
4. The cables for the new external device are loose or the power cables are unplugged. Check all cables, and check that pins in the cable or connector are not bent down.
5. The power switch for the new external device is not turned on. Turn off the computer, turn on the external device, and then turn the computer on to integrate the new device with the computer.
6. If the drive is a secondary drive that has just been installed on the same controller as the primary drive, verify that the jumpers for both drives are set correctly.

Insufficient power to the components.

Ensure both power supply cables are connected to the system board (some Workstations).

Installed third-party SCSI hard drive adapter not participating in the hard drive ordering sequence provided in F10 Setup and/or is always coming up as the boot device regardless of the predetermined sequence.

The third-party adapter is either not supporting BIOS Boot Specification or the Boot Vector option. A solution is not available.

DVD- and CD-ROM

Problem

Cannot read compact disc.

Possible Solution

1. CD is not properly seated in the drive. Eject the CD, correctly seat it in the drive, then reload.
2. CD has been loaded upside down. Eject the CD, turn it over, then reload.

System will not boot from CD-ROM or DVD drive.

1. The CD-ROM or DVD boot is not enabled through the Computer Setup utility. Run the Computer Setup utility and set the drive priorities.
2. Ensure that drive cabling and jumpers are set correctly. To boot a SCSI drive, the drive ID number must be set to 0.

Cannot eject compact disc (tray-load unit).

CD is not properly seated in the drive. Turn off the computer and insert a thin metal rod into the emergency eject hole and push firmly (a straightened paper clip can be used). Slowly pull the tray out from the drive until the tray is fully extended, then remove the CD.

Cannot eject compact disc (slot-load unit).

1. Remove the drive from the chassis.
2. Remove the front bezel from the drive.
3. Remove the top and bottom drive covers.
4. Release the clamping mechanism to retrieve the CD.

CD-ROM or DVD device is not detected; driver is not loaded.

CD-ROM or DVD drive is not connected properly or not properly terminated. Open the computer and check the drive cable.

Movie will not play in the DVD drive.

Movie may be regionalized for a different country. Refer to the documentation that came with the device.

Processor

Problem

Computer does not recognize the second processor.

Possible Solution

Hardware Abstract Layer (HAL) installed is for a single processor. Install the multi-processor HAL.

Memory

Problem

System won't boot or does not function properly after installing additional memory modules

Possible Solution

Memory module is not the correct type or speed grade for the system. Replace module with the correct industry-standard device for the computer.

Out of Memory error.

1. Memory configuration may not be set up correctly; check memory configuration using Device Manager.
2. The computer has run out of memory for the application. Check the application documentation to determine the memory requirements.

Memory count during POST is wrong.

Memory modules may not have been installed correctly or incorrect modules may have been used.

NOTE: On system boards having integrated Intel video that use 1 MB of memory for video it is normal for POST to have the memory count 1 MB short.

Insufficient memory error during operation.

1. Too many Terminate and Stay Resident programs (TSRs) are installed. Delete any unnecessary TSRs.
2. There is not enough memory for the application. Check the memory requirements for the application or add more memory.

Unit is on but there is no video and the power LED is blinking red.

Memory is not installed correctly and system is not booting. Reinstall memory modules.

Network

Some common causes and solutions for network problems are listed in the following table. These guidelines do not discuss the process of debugging network cabling.

Problem	Possible Solution
The Remote Wakeup feature is not functioning.	<ol style="list-style-type: none">1. The feature is not available when using an AUI network connection; use an RJ-45 network connection.2. Remote Wakeup is not enabled. Use the network control application to enable Remote Wakeup.
Network driver does not detect network controller.	Network controller is disabled. Run Computer Setup and enable network controller.
Network status link light does not turn on or flashes.	<ol style="list-style-type: none">1. No active network is detected. Check cabling and network equipment for proper connection.2. Network connection is not set up properly. Use the network control application to verify that the device is working properly.3. System is configured for AUI connection; link LED does not apply to AUI connections.4. Network driver is not properly loaded. Reinstall network drivers.5. System cannot autosense the network. Disable autosensing capabilities and force the system into the correct operating mode.
Diagnostics reports a failure.	Refer to www.compaq.com/support/files for the latest version of diagnostics. <ol style="list-style-type: none">1. The cable is not securely connected or is attached incorrectly. Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.2. There is a problem with the cable or a device at the other end of the cable. Ensure that the cable and device at the other end are operating correctly.3. The network controller is defective. Replace the controller or the system board.4. Network controller interrupt is shared with an expansion board. Under the Computer Setup Advanced menu, change the resource settings for the board.
Diagnostics passes, but the computer does not communicate with the network.	<ol style="list-style-type: none">1. Network drivers are not loaded, or driver parameters do not match current configuration. Make sure the network drivers are loaded and the driver parameters match the configuration of the network controller.2. The network controller is not configured for this computer. In Windows 98/Windows 2000/Windows Me/Windows NT, select the Network icon at the Control Panel.3. Network controller interrupt with an expansion board. Under the Computer Setup Advanced menu, change the resource settings for the board.

continued

Network Continued

Problem

Network controller stopped working when an expansion board was added to the computer.

Possible Solution

1. Network drivers are not loaded or driver parameters do not match the current configuration. Make sure that the drivers are loaded and that the driver parameters match the configuration of the network controller.
2. The cable is not securely connected or is attached incorrectly. Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
3. Network controller interrupt is shared with an expansion board. Under the Computer Setup Advanced menu, change the resource settings for the board.
4. Network drivers were accidentally deleted when the drivers for the new expansion board were installed, or the files containing the network drivers are corrupted. Reinstall the network drivers, using backup diskettes.

Network controller stopped working without apparent cause.

1. The files containing the network drivers are corrupted. Reinstall the network drivers, using backup diskettes or the *Compaq Restore CD*.
2. The cable is not securely connected or is attached incorrectly. Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
3. The network controller is defective. Replace the network controller or system board.

Cannot connect to the network server when attempting Remote System Installation.

The network controller is not configured properly. Run Computer Setup and modify the Embedded NIC Settings.

System Setup utility reports unprogrammed EPROM.

1. Boot the workstation without the network drivers using a system boot diskette and reconfigure the controller.
2. Replace the controller.
3. Replace the system board.

Resolving Audio Hardware Conflicts

Hardware conflicts occur when two or more peripheral devices contend for the same signal lines or channels. Conflicts between the audio interface and another peripheral device may be due to the settings of the base I/O addresses, interrupts, or DMA channels. The audio interface typically has the following settings:

Item	Setting
Base I/O address	220H
FM Synthesizer I/O address	388-38Bh
Interrupt	IRQ 5
8-bit DMA	Channel 1

To resolve hardware conflicts:

1. Change the hardware settings of your audio card or the peripheral card in your system if the peripheral card is using the audio interface setting. You can change settings for integrated audio using Computer Setup.
2. If you are unsure of the settings of the peripheral cards, you can isolate the source of the problem by temporarily removing all cards and other essential cards such as the disk controller. After that, add the cards back one at a time until the card that is causing the conflict is found.

Troubleshooting Using Compaq Intelligent Manageability Features

The Local Alert Pop-Up Dialog notifies you of an impending or actual hardware failure. If the computer is connected to a network and the Compaq Insight Management Agents are installed and configured, a Simple Network Management Protocol (SNMP) trap (message) is sent to the specified SNMP-compliant management application.

The Local Alert Pop-Up Dialog also tells you the steps you need to take prior to a hardware failure to avoid loss of data and damage to the computer. The system administrator can create a customized action message that might include contact telephone or pager numbers.

To close the Local Alert Pop-Up Dialog, click the Close button. To retrieve fault information after closing the dialog, run Compaq Insight Personal Edition.

For more detailed information, refer to the online *Intelligent Manageability Guide*.

appendix **G**

SYSTEM BOARD AND RISER BOARD REFERENCE DESIGNATORS

Designator	Component
CR1	LED - 3.3V Aux
CR2	LED - Power button press
CR3	LED - PS_ON, 5.5V Aux
CR34	Power ON LED
CR35	Hard drive activity LED
E49	Clear Password header
E50	CMOS header
E51	Video pass through header
J6	BNC
J7	RJ-45 Jack
J8	IEEE 1394
J9	Stacked RJ45/Dual USB connector
J10 - 19	ISA slots
J20 -29	PCI slots
J30	Riser board socket
J31 - J35	Device bay connectors
J36	AC97 connector
J37	Primary SCSI connector
J38	Secondary SCSI connector
J39	Stacked parallel/SCSI connector
J40	AGP slot
J50	First parallel port
J51	Second parallel port
J52	Double-stacked parallel port Top Port B Bottom Port A
J53	Parallel port over single Serial Port
J54	Parallel port over Serial Port and Video Port
J66	Keyboard connector (Closest to monitor connector)
J67	Mouse connector

continued

Reference Designators Continued

Designator	Component
J68	Double-stacked mouse/keyboard connector Top Mouse Bottom Keyboard
J69	Video connector
J70	Single USB connector
J72	Microphone jack
J73	Line-in jack
J74	Line-out jack
J75	Headphone jack
J76	Volume control
J77	Double-stacked headphone/microphone connector Top Microphone Bottom Headphone
J78	Double-stacked line-in/line-out connector Top Line in Bottom Line out
J80	Stacked serial/audio connector
J81	Primary double stack USB Top Port 2 Bottom Port 1
J82	Secondary double stack USB Top Port 4 Bottom Port 3
J83	Triple stacked audio jack (line in, line out/headphone, microphone)
J113	Video cache connector
P1	P/S connector
P2	Second P/S connector (as required)
P3	Third P/S connector (as required)
P5	Main Power switch and HDD and power LED connector (pins 1-9) and SCSI LED connector (pins 10-11)
P6	Speaker connector
P7	Audio connector (from CD-ROM)
P8	Chassis fan connector
P9	WOL connector (NIC cable)
P10	Diskette drive connector
P11	Second Audio connector
P12	Alert on LAN NIC connector
P15	AUI connector
P20	Primary IDE connector
P21	Secondary IDE (MultiBay) connector
P22	Slimline CD-ROM connector

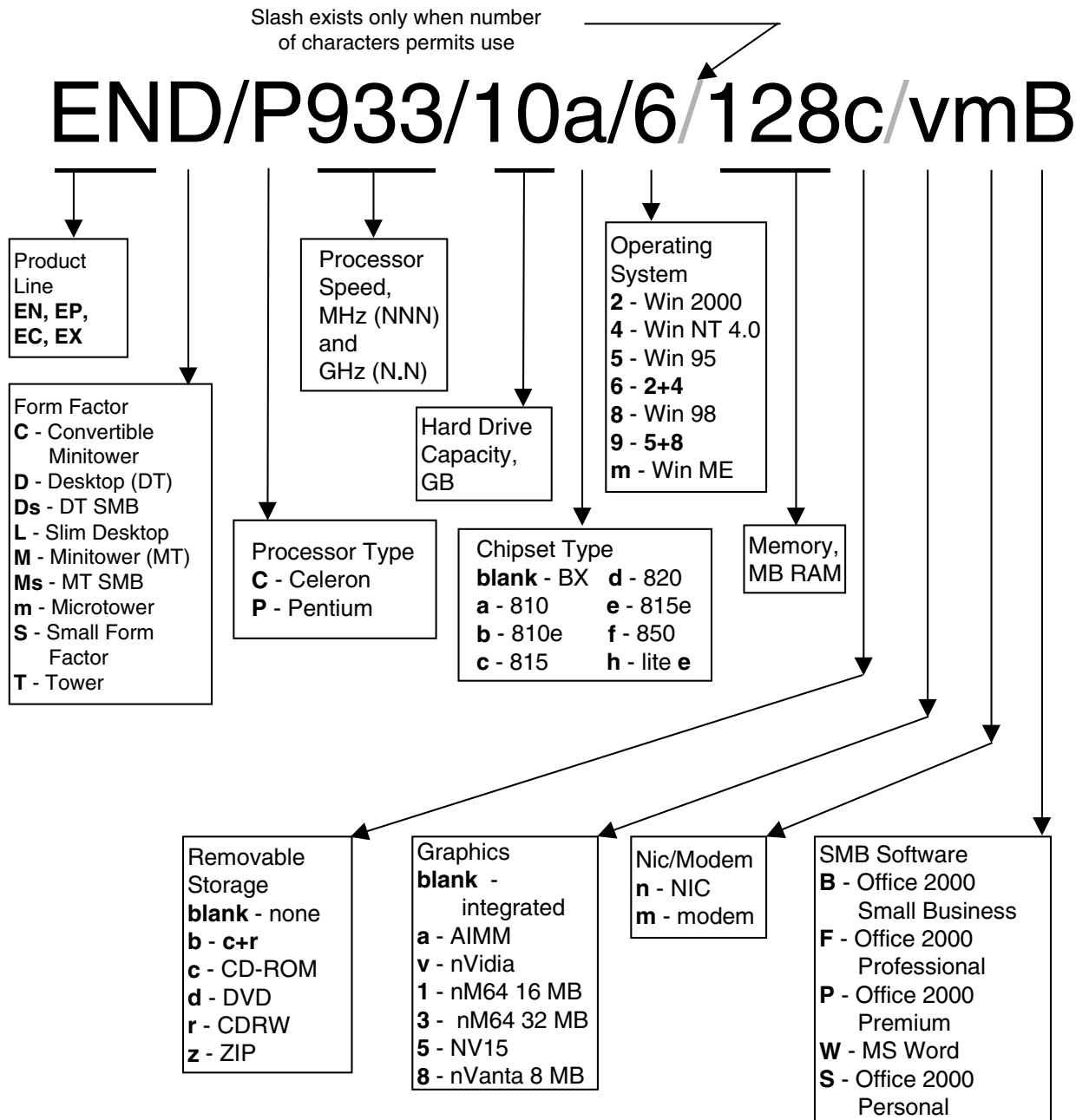
continued

Designator	Component
P25 - P26	Video memory upgrade connector
P29	SCSI LED connector
P53	First serial port
P54	Second serial port
P55	Double stack serial port Top Serial B Bottom Serial A
P58	Riser edge connector (male-mates with J30)
P70	Processor (CPU) fan header for fansink
P71	Secondary CPU fan header for fansink
P89	Floating serial port /COM port header
P100	ITP connector
P120	Secondary chassis fan header
P124	Hood lock header
P125	Hood sensor header
P216	White box chassis fan
SW1	Processor speed switch
SW2	Security hood switch
SW50	Clear CMOS switch
XBT1	Battery socket
XMM1	Memory slot. DIMM1 or RIMM1 populated and tested.
XMM2 - XMM5	Following memory slots
XU1	Primary processor socket
XU2	Secondary processor socket
XU15	ROM socket

appendix **H**

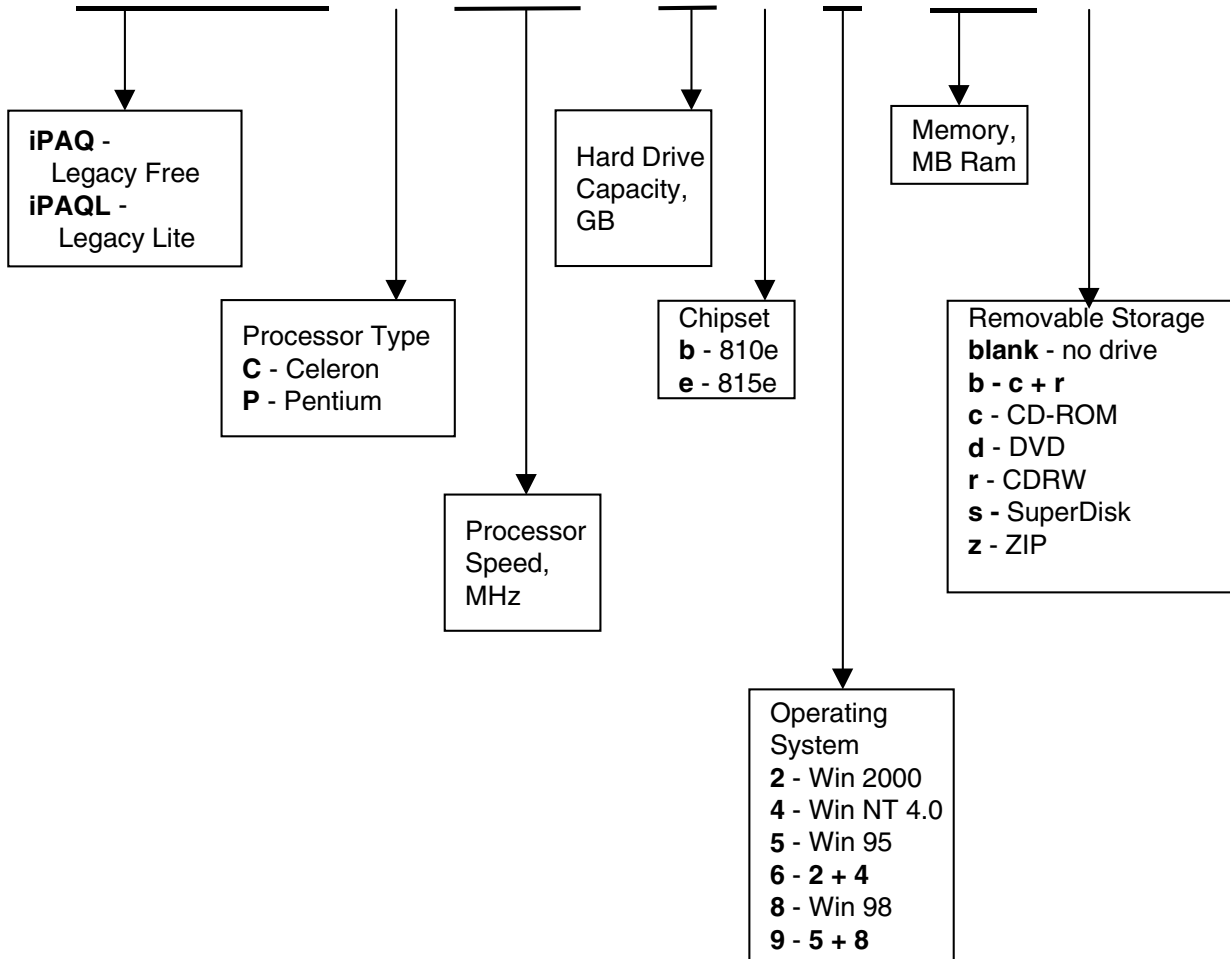
MODEL NUMBER NAMING FOR COMPAQ PRODUCTS

Compaq Deskpro Series of Personal Computers



Compaq iPAQ Desktop Personal Computers

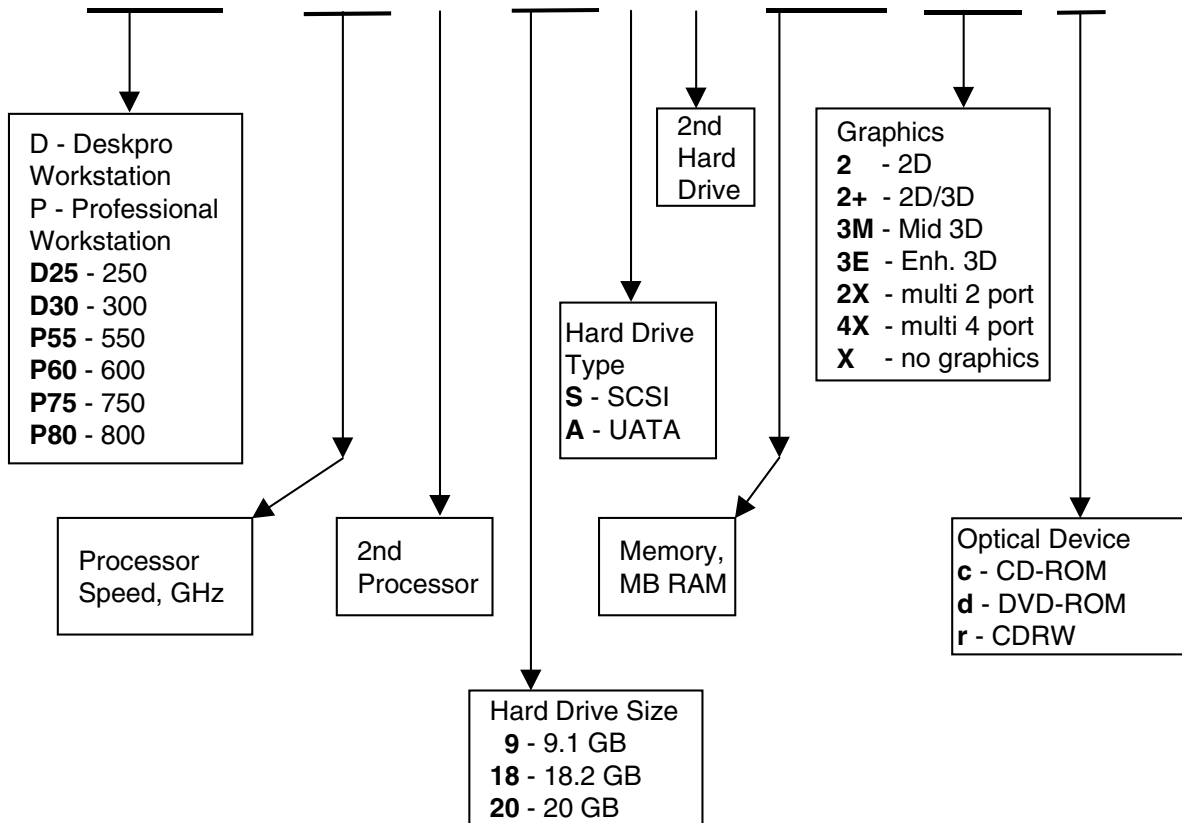
iPAQL/P733/10b/2/128c



Compaq Deskpro and Professional Workstations

Processors 1.0 GHz and Greater

P60/1.0+/40S+/256/2+d



Index

A

access panel, removal and replacement, 7-12
additional documentation, viii
AGP retention mechanism, 8-22
air baffle, removal and replacement, 9-8
air flow. *See* ventilation
Altiris eXpress, 3-2
AssetControl, 3-3

B

battery, 6-6
proper disposal, 9-2, 9-3
removal and replacement, 9-1
board guide, removal and replacement, 9-13
broken key icon, 3-6
Building Blocks and Partners, 3-19

C

cable
multi-mode SCSI, 5-2
SCSI adapter, 5-1
cable lock
Kensington, 7-7
provision, 3-10
removal and replacement, 7-7
cable lock bracket
Compaq, type 1, 7-4
Compaq, type 2, 7-5
cable select, 4-1
card guide, removal and replacement, 9-13
caution symbols, vii
CD-ROM drive, device sequence, 4-1
chain termination, SCSI, 5-2

chipset
440BX, 8-12
810/810e, 8-12
815e, 8-13
820, 8-14
850, 8-15
cleaning
computer, 6-4
keyboard, 6-4
monitor, 6-4
mouse, 6-5
Compaq
cable lock bracket, type 1, 7-4
cable lock bracket, type 2, 7-5
software, 1-4
Computer Checkup (TEST), 2-10
computer cleaning, 6-4
computer cover, removal and replacement, 7-13
Computer Setup
menu, 2-4
replicating, 3-17
utilities, using, 2-2
configuration, RIMM guidelines, 8-14, 8-15
conventions and symbols, vii
Convertible Minitower
desktop to minitower conversion, 10-15
drive removal and replacement, 8-2
drivelock removal, 10-12
converting to NTFS, 1-3
CRIMM, 8-14, 8-15
removal and replacement, 8-17

D

deployment, remote, 3-3
desk attachment, iPAQ, 7-10
device drivers, install or upgrade, 1-1, 1-2
device sequence, all drives, 4-1
diagnostic
diskette, 2-10
tests, 2-13
DIMM, removal and replacement, 8-16
disassembly preparation, 7-1
diskette
diagnostics, 2-10
emergency repair, 1-2
drive
capacities, 4-3
device designation, 4-1
partition size, 4-3
removal and replacement, 8-1
drive adapter, removal and replacement, 8-4
drivelock, removal and replacement, 10-12
DVD-ROM drive, device sequence, 4-1

E

electrostatic discharge (ESD), 6-1
emergency repair diskette, 1-2
error checking and correcting (ECC)
fault prediction, 3-12
prefailure warranty, 3-12
ESD. *See* electrostatic discharge
expansion card cage, removal and replacement, 8-19
expansion card, removal and replacement, 8-21

F

FailSafe
 Boot Block ROM, 3-14
 key, 3-8
fan
 power supply, 6-5
 removal and replacement,
 9-6
fault prediction, 3-11
feet, removal and replacement,
 7-11
front bezel removal and
 replacement, 7-16
front trim removal and
 replacement, 7-23

G

graphics card, removal and
 replacement, 8-22
graphics memory cache
 replacement, 8-28
grounding methods, 6-2

H

hard drive, proper handling,
 6-6
Hardware Application Layer
 (HAL), 10-8
heatsink
 dual clip removal, 10-10
 removal and replacement,
 10-8
 round, removal, 10-11
 single clip removal, 10-9
hood sensor, removal and
 replacement, 7-9

I

icon, broken key, 3-6
ID numbers, SCSI, 5-1
Insight Manager LC, 3-3, 3-4,
 3-11, 3-12
INSPECT, 2-11
install or upgrade device
 drivers, 1-1, 1-2
Intelligent Manageability
 defined, 3-1
interior access panel, iPAQ,
 7-15
iPAQ

desk attachment, 7-10

exterior access panel, 7-14
front bezel removal, 7-18
graphics memory cache
 replacement, 8-28
hard drive replacement, 8-11
interior access panel, 7-15
legacy module replacement,
 8-29
MultiBay board replacement,
 8-30
security bar, 7-3
speaker grill replacement,
 7-20
system board replacement,
 10-5
top bezel replacement, 7-19

J

jumper positions
 CD-ROM drive, 5-5
 DVD-ROM drive, 5-5
 SCSI hard drive, 5-4
 Zip drive, 5-5

K

Kensington cable lock, 7-7
keyboard
 delimiter characters, 3-7
 light combinations, 3-15
keyboard, cleaning, 6-4

L

legacy module removal and
 replacement, 8-29
LS-120 drive, device
 sequence, 4-1

M

memory
 CRIMM installation, 8-17
 DIMM installation, 8-16
 expansion, 8-12
 installation guidelines, 8-14,
 8-15
 RIMM installation, 8-17
monitor, cleaning, 6-4
mouse, cleaning, 6-5
MultiBay board

iPAQ, removal and
 replacement, 8-30

N

network service boot, 3-2
NIC Alert, 3-16
NTFS, converting to, 1-3

P

password
 delete, 3-6
 establish, 3-5
 power-on, 3-5
PC Transplant, 3-3
POST, 2-3
power button
 dual state, 3-17
 removal and replacement
 (CMT), 7-22
power supply
 fan, 6-5
 removal and replacement,
 10-7
power switch, removal and
 replacement, 9-10
Power-On Self-Test (POST),
 2-3
preailure warranty, 3-11
preinstalled software, 3-2
processor, removal and
 replacement, 10-8
protecting software, 2-14

R

recognizing second processor,
 10-8
recovering software, 2-14
remote
 Management Setup Utilities,
 3-4
 Security Management, 3-16
 system installation, 3-2
 Wakeup and Shutdown, 3-16
Remote Management Setup
 Utilities, 3-12
removal and replacement
 access panel, 7-12
 air baffle, 9-8
 battery, 9-1
 board guide, 9-13
 cable lock, 7-7

- card guide, 9-13
- computer cover, 7-13
- Convertible Minitower
 - drives, 8-2
- CRIMM, 8-17
- DIMM, 8-16
- drive adapter, 8-4
- drivelock, 10-12
- drives, 8-1
- expansion card, 8-21
- expansion card cage, 8-19
- fan, 9-6
- feet, 7-11
- front bezel, 7-16
- front bezel, iPAQ, 7-18
- front trim, 7-23
- graphics card, 8-22
- graphics memory cache,
 - iPAQ, 8-28
- heatsink, 10-8
- hood sensor, 7-9
- iPAQ exterior access panel,
 - 7-14
- iPAQ hard drive, 8-11
- legacy module, iPAQ, 8-29
- MultiBay board, iPAQ, 8-30
- power button(CMT), 7-22
- power supply, 10-7
- power switch, 9-10
- processor, 10-8
- RIMM, 8-17
- riser board, 8-20
- side-mounted hard drive, 8-8
- Slim Desktop diskette drive,
 - 8-6
- Slim Desktop drives, 8-5
- Slim Desktop hard drive, 8-7
- Small Form Factor drives,
 - 8-5
- speaker, 9-4
- speaker grill, iPAQ, 7-20
- speaker, iPAQ, 9-5
- standard desktop diskette
 - drive, 8-10
- standard desktop external
 - drive, 8-9
- standard desktop hard drive,
 - 8-8
- subpanel and bezel blanks,
 - 7-21
- system board, 10-1
- top bezel, iPAQ, 7-19
- required tools and software,
 - 6-5

- Restore CD, 2-14
- retention mechanism, AGP,
 - 8-22
- RIMM
 - configuration guidelines, 8-14, 8-15
 - dual memory channel
 - system, 8-17
 - removal and replacement, 8-17
 - single memory channel
 - system, 8-17
- riser board, removal and
 - replacement, 8-20

S

- screws, correct size, 6-5
- SCSI
 - cable adapter, 5-1
 - chain termination, 5-2
 - ID numbers, 5-1
 - multi-mode cable, 5-2
- SCSI*Select* utility, 5-3
- second processor recognition,
 - 10-8
- security bar, iPAQ, 7-3
- security devices, 7-3
- service considerations, 6-5
- side-mounted hard drive
 - removal and replacement, 8-8
- Slim Desktop
 - diskette drive, removal and
 - replacement, 8-6
 - drive removal and
 - replacement, 8-5
 - hard drive, removal and
 - replacement, 8-7
- Small Form Factor
 - drive removal and
 - replacement, 8-5
 - system board replacement,
 - 10-3
- Smart Cover
 - FailSafe key
 - spare part number, 7-2
 - FailSafe key, 3-8
 - lock, 3-8
 - lock, unlocking, 7-2
 - sensor protection level, 3-7
- SMART drive, 4-3, 5-3
- software
 - Compaq, 1-4

- image, 3-2
 - protecting, 2-14
 - recovery, 2-14
 - required, 6-5
 - updating, 3-12
- spare part number
 - Smart Cover FailSafe key,
 - 7-2
- speaker
 - grill removal and
 - replacement, iPAQ, 7-20
 - removal and replacement,
 - 9-4
 - removal and replacement,
 - iPAQ, 9-5
- standard desktop
 - diskette drive, removal and
 - replacement, 8-10
 - drive removal and
 - replacement, 8-8
 - external drive, removal and
 - replacement, 8-9
- static electricity, 6-1
- subpanel and bezel blanks,
 - removal and replacement,
 - 7-21
- symbols and conventions, vii
- symbols, warning, vii
- system board
 - removal and replacement,
 - 10-1
 - removal and replacement,
 - iPAQ, 10-5
- system installation
 - remote, 3-2
- System Software Manager,
 - 3-12

T

- tape drive, device sequence,
 - 4-1
- technician notes, viii
- TEST. *See* Computer Checkup
- text conventions, vii
- thermal sensor, 3-12
- tools ,required, 6-5
- top bezel, removal and
 - replacement, iPAQ, 7-19

U

Ultra ATA integrity
monitoring, 3-11
unlocking Smart Cover lock,
7-2

V

ventilation, computer, viii
View System Information
(INSPECT), 2-11

W

warning symbols, vii
warnings
electrical shock, vii
network interface connection,
vii
on equipment, vii
wrench, tamper-resistant, 6-5,
7-3

Z

Zip drive, device sequence,
4-1

225698-001



225302-001

