COMPAQ

Maintenance & Service Guide

Compaq Deskpro EN Series
of Personal Computers

Convertible Minitower Models

COMPAQ

Addendum #1 to Deskpro EN Maintenance & Service Guide

Compaq Deskpro EN Series of Personal Computers

Convertible Minitower

Part number 200803-002

Spare part number 201843-001

The complete MSG follows this addendum.

This addendum contains changes to the original document.

Spare Part Numbers

Description	Spare Part Number	Warranty Tier
Intel Celeron microprocessor		
566 MHz/66 MHz with heatsink and retainer clip	203967-001	B
Graphics Controller		
nVIDIA TNT2 PRO, 16-MB SGRAM	179997-001	B
System board without onboard graphics or audio (011032-101)	217055-001	B
10-GB Ultra ATA hard drive, 5400 RPM, Quiet Drive	203139-001	B
Audio cover	219817-001	D

System board 217055-001 does not support front-mounted audio. Computers with this board installed will not have a speaker mounted in the chassis but will have a piezo speaker mounted on the system board that supports diagnostic beeps.

Specifications – Graphics Controller

nVIDIA TNT2 Pro Graphics Controller			
Resolution	**Real-Time 3D Shading**	**Refresh Rate/Display**	
		Vertical	**Horizontal**
640 x 480	256, 65K, 16.7M	60 – 200 Hz	31 – 102 kHz
800 x 600	256, 65K, 16.7M	60 – 200 Hz	38 – 114 kHz
1024 x 768	256, 65K, 16.7M	60 – 140 Hz	48 –113 kHz
1152 x 864	256, 65K	60 – 120 Hz	54 – 110 kHz
1280 x 1024	256, 65K	60 – 100 Hz	64 – 107 kHz
1600 x 1200	256	60 – 90 Hz	75 – 113 kHz
1800 x 1440	65K	60 – 70 Hz	89 – 1 04 kHz
1920 x 1080	256	60 – 80 Hz	70 – 94 kHz
1920 x 1200	256/65K	60 – 76 Hz	75 – 95 kHz

Service Notes

WARNING: Removing the heatsink from the processor destroys the integrity of the thermal interface pad between the two parts. Whenever the heatsink is removed from the processor, the old thermal interface must be completely removed and a new one installed in its place.

Before installing a heatsink, prepare for its installation by doing one of the following:

- New heatsink: if the heatsink has a thermal interface attached to its bottom, peel off the protective paper before installing the heatsink.
- Reinstalled heatsink: Note where the thermal interface is located on the heatsink. Carefully remove the thermal interface pad and all residue from the heatsink surface. If any thermal interface remains on the die of the processor, scrape it off with your fingernail. A Q-Tip dipped in alcohol can be used to clean both surfaces. Add thermal interface pad to the bottom of the heatsink before reinstalling the original heatsink to insure an efficient thermal interface.

CAUTION: Thermal interface heat transmission is reduced if residue remains on the heatsink or the heatsink thermal interface surface is scratched. This could lead to the processor running at a higher than normal temperature, fan turning at a higher than normal speed, and possible loss of data if processor shuts down from overheating. Installing the heatsink assembly backwards will cause the processor to overheat, since the aluminum core will only make partial contact with the processor die.

COMPAQ

Maintenance & Service Guide

Compaq Deskpro EN Series
of Personal Computers

Convertible Minitower Models

Notice

The information in this guide is subject to change without notice.

COMPAQ COMPUTER CORPORATION SHALL NOT BE LIABLE FOR TECHNICAL OR EDITORIAL ERRORS OR OMISSIONS CONTAINED HEREIN; NOR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE FURNISHING, PERFORMANCE, OR USE OF THIS MATERIAL.

Printed in the U.S.A.

Maintenance & Service Guide

Compaq Deskpro EN Series of Personal Computers

Convertible Minitower Models

Second Edition (September 2000)
First Edition (June 2000)
Part Number 200803-002
Spare Part Number 201843-001

Compaq Computer Corporation

CONTENTS

chapter 4

Removal and Replacement Procedures

chapter 5

Connectors & Jumpers

chapter 6

Specifications

chapter 7

preface

ABOUT THIS GUIDE

This *Maintenance & Service Guide* is a troubleshooting and repair guide that can be used for reference when servicing the Compaq *Deskpro EN Series of Personal Computers*. Only authorized technicians trained by Compaq should attempt to repair this equipment.

Compaq Computer Corporation reserves the right to make changes to the these models without notice.

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, clarifying information, or specific instructions.

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 electric shock or damage to the equipment:

- Do not disable the power grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect the power from the computer by unplugging the power cord either from the electrical outlet or the computer.

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.

Locating Additional Information

The following documentation is available to support these products:

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

chapter 1

PRODUCT DESCRIPTION

This chapter describes the model features of the Compaq Deskpro EN Series Convertible Minitower model of Personal Computers.

1.1 Model Overview

Compaq Deskpro EN Series of Personal Computers ships as a minitower. It contains the unique, flexible Compaq ATX chassis, which allows you to easily reconfigure the unit as a desktop by (1) removing the drives from the computer, (2) setting the unit on its base, (3) rotating the drives and bezel blanks 90 degrees, then (4) reinserting the drives into the drive bays.

✎ The Compaq Deskpro EN Series models with the Intel 815e chipset will be referred to in this MSG as 815e.

1.2 System Design

- Desktop models of the Compaq Deskpro EN Series of Personal Computers use an innovative chassis to house the system board, expansion boards, power supply, and mass storage devices.
- Internal components are accessible when the access panel is removed.
- The front bezel is a multi-part assembly that attaches to the chassis with release latches. Attached to the back of the front bezel is a subpanel that holds the bezel blanks.
- The system board may be removed from the chassis after the access panel is removed. Details of the disassembly procedure are found in Chapter 4, “Removal and Replacement Procedures.”
- The drive bays are located in the front of the chassis; there are two 3.5-inch drive bays for internal hard drives and three 5.25-inch drive bays for accessible mass storage.
- The chassis design allows drive installation without the use of rails. Guide screws installed on each side of the drive ensure its proper alignment within the drive bay. Extra guide screws are provided in the front of the chassis.
- The minitower model of this computer may be converted to a desktop configuration, or the desktop to a minitower. See Chapter 4, “Removal and Replacement Procedures,” for additional information and instructions.

Detailed descriptions of the system components are presented in the sections that follow.

1.3 Preinstalled Software

This computer ships with Windows 95, Windows 98, Windows NT 4.0, or Windows 2000 Professional installed as the operating system, and also contains the following preloaded software:

- ROM-based Setup utilities
- Compaq Diagnostics for Windows
- Compaq support software and device drivers
- Online *Safety & Comfort Guide* (English only)
- Intelligent Manageability
- Power Management with Energy Saver features
- Security Management
- Remote Management Tools
- Microsoft Internet Explorer

1.3.1 Ordering Additional Software

If you plan to run any of the following operating systems on the computer, you must install the corresponding Compaq device drivers and utilities before attempting to use the computer:

- IBM OS/2
- NetWare
- Microsoft Windows NT Workstation 3.51 or 4.0
- A version of Microsoft Windows 95 that is different from the one included with the computer

To order copies of suitable device drivers and utilities:

- Order the *Support Software CD for Compaq Desktop Products.* This compact disc contains the latest device drivers, utilities, and flashable ROM images needed to run MS-DOS, Windows 3.1, Windows 95, Windows NT Workstation 3.51, IBM OS/2, and NetWare on the Compaq commercial desktop product.
- Download the software from the Compaq World Wide Web site (www.compaq.com).
- Purchase backup diskettes.

The *Support Software CD* can be purchased in either of two ways:

- A single CD-ROM that gives one-time access to the latest support software (North America only).
- A yearly subscription that delivers up to 12 monthly CD-ROMs.

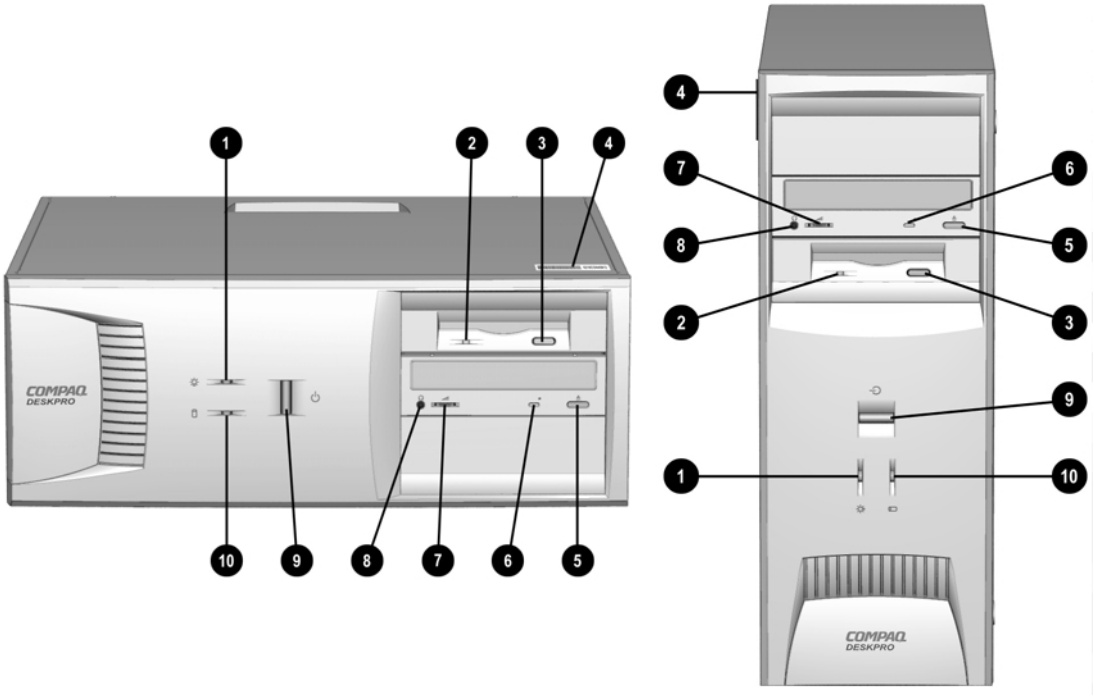
The annual subscription provides continuous access to the latest developments.

✎ When calling Compaq to place an order, be sure to have the serial number of the computer available. This number is necessary for all purchases.

1.4 Computer Features

Compaq Deskpro EN Series of Personal Computers ship with a mouse and keyboard. Some models are also equipped with a CD-ROM drive. A Compaq color monitor or other compatible monitor does not ship with the computer.

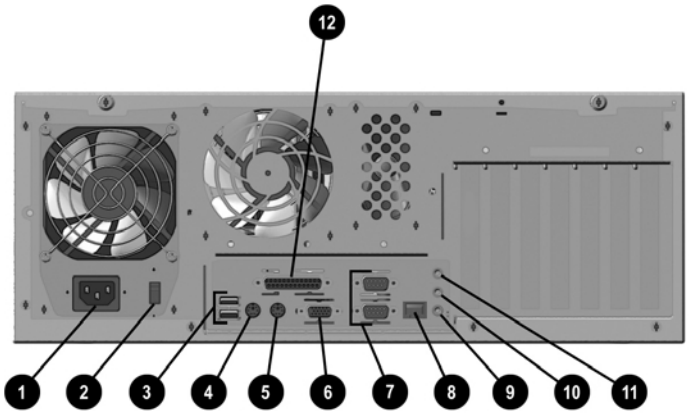
1.4.1 Front Panel Controls and LEDs



Ref.	Component/Function	Ref.	Component/Function
❶	Power-On Light	❻	CD-ROM Drive Busy Indicator*
❷	Diskette Drive Activity Light	❼	Headphone Volume Control
❸	Diskette Eject Button	❽	Stereo Headphone Jack
❹	Serial Number	❾	Dual-State Power Button
❺	CD-ROM Eject Button*	❿	Drive Activity Light**

*CD-ROM models only.
**Flashes when an ATAPI device, such as the hard drive, is active.

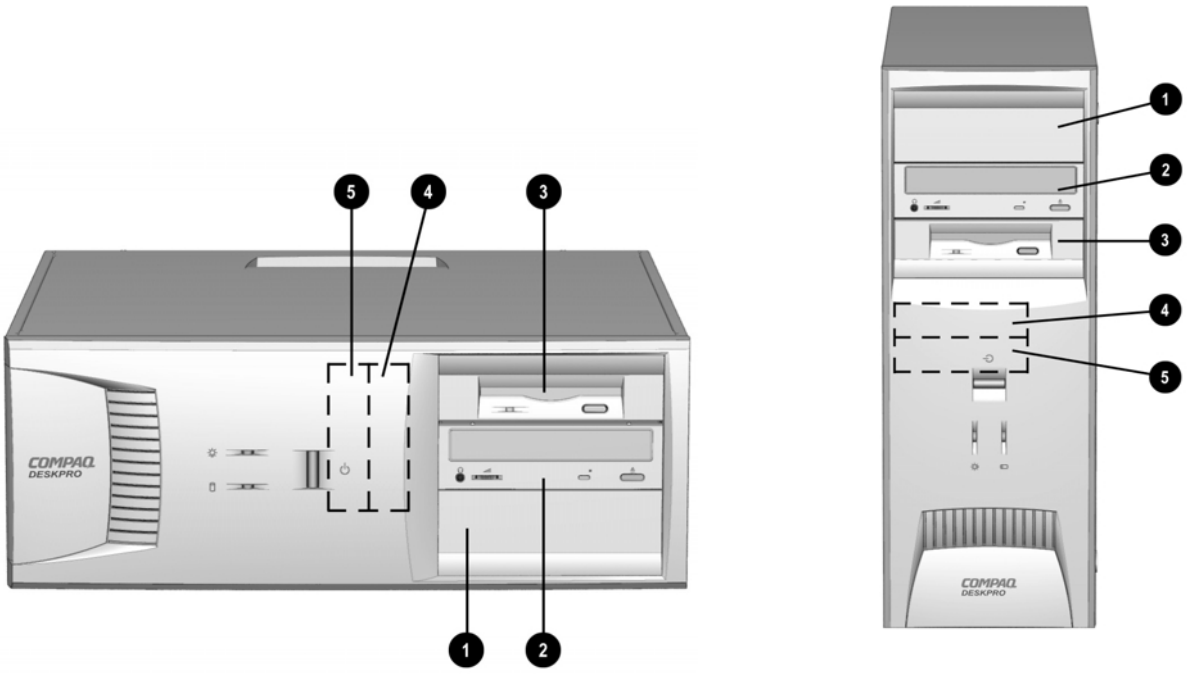
1.4.2 Rear Panel Connectors



Ref.	Component	Ref.	Component
❶	Power Cord Connector	❼	Serial Connectors
❷	Voltage Select Switch (switches voltage between 115V and 230V to match geographical requirements)	❽	RJ-45 Connector
❸	Universal Serial Bus (USB) Connectors (2) (connects the computer to any USB peripheral while the computer is operating; is a fully functional plug and play connector)	❾	Microphone Connector
❹	Keyboard Connector*	❿	Headphone/Line-Out Audio Connector
❺	Mouse Connector*	⓫	Line-In Audio Connector
❻	Monitor Connector	⓬	Parallel Port Connector

*Keyboard and mouse ports are interchangeable

1.4.3 Drive Positions



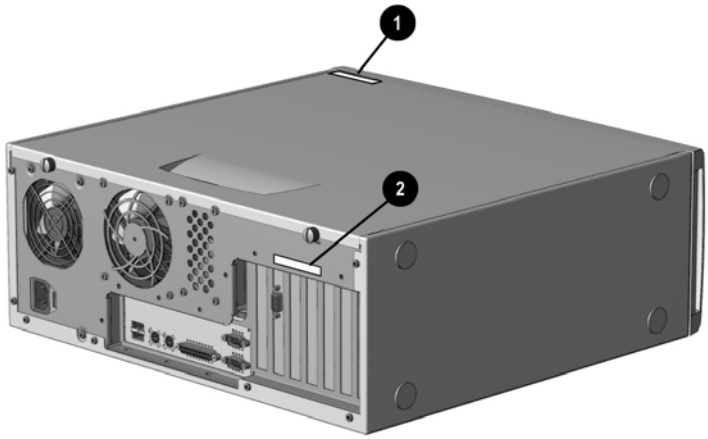
Reference	Drive Bay	Configuration
❶, ❷	1, 2	Two standard 5.25-inch, half-height bays for optional drives
❸	3	One standard 3.5-inch, 1.44-MB diskette drive mounted with a drive adapter into a 5.25-inch bay
❹, ❺	4, 5	Two standard 3.5-inch drive bays; Bay 4 contains the preinstalled hard drive; Bay 5 is available for an optional hard drive

✎ Drive bay numbers are stamped on the chassis.

To verify the type and size of the mass storage devices installed in the computer, run Compaq Computer Setup.

1.5 Serial Number Location

The serial number and model information label is located on the access panel of the unit ❶. A second barcode label is located on the rear of the unit ❷.



For the purpose of AssetControl, the serial number is embedded in CMOS and in the EEPROM on the system board and may be accessed through Diagnostics for Windows.

✎ If the system board is replaced with a spare part from Compaq, the invalid serial number condition will be recognized during POST. The original serial number must then be reentered through Computer Setup. Refer to the Software Reference Guide for more information.

△ **CAUTION:** A system board borrowed from another computer is recognized as a valid serial number and will create a mismatch between the serial number label and the electronic serial number.

The computer serial number should be provided to Compaq when requesting information or ordering spare parts.

1.6 Locating Additional Information

The following documentation is available to support these products:

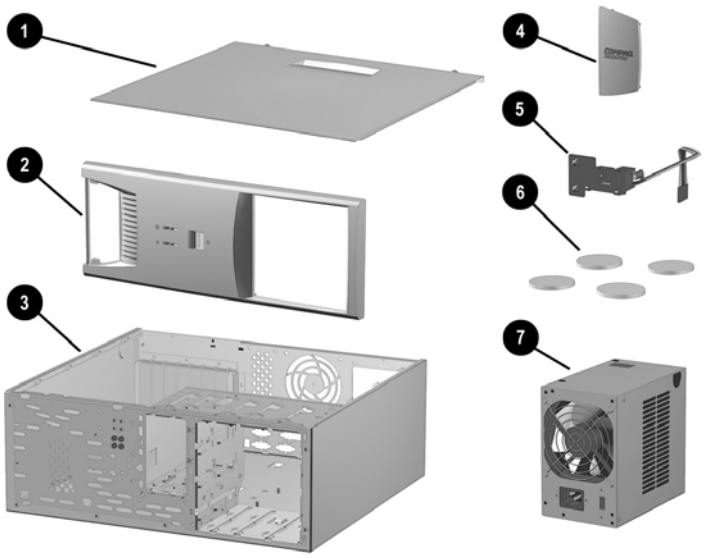
- User Documentation
- Technical Training Guides
- Compaq Service Advisories and Bulletins
- Compaq QuickFind
- *Technical Reference Guide*
- *Compaq Quick Reference Guide*
- *Compaq Service Reference Guide*
- *Compaq Quick Troubleshooting Guide*

chapter 2

SPARE PARTS

✎ The Compaq Deskpro EN Series, Intel 815e chipset models will be referred to in this MSG as 815e.

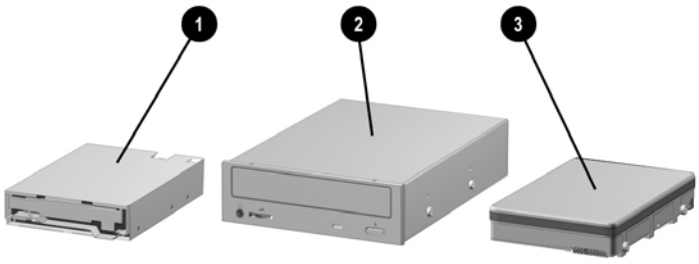
2.1 System Unit



System Unit Spare Parts

Description		Spare Part Number	Warranty Tier
1	Access panel	Not spared	
2	Front bezel	166868-001	B
3	Chassis/basepan	Not spared	
4	Logo Kit, Deskpro EN (1 ea., DT and MT)	210004-001	B
5	Power switch with cable, LED and switch holder	Not spared	
6	Feet	Misc Plastics Kit	B
7	Power supply, 200 Watt	103748-001	B

2.2 Mass Storage Devices



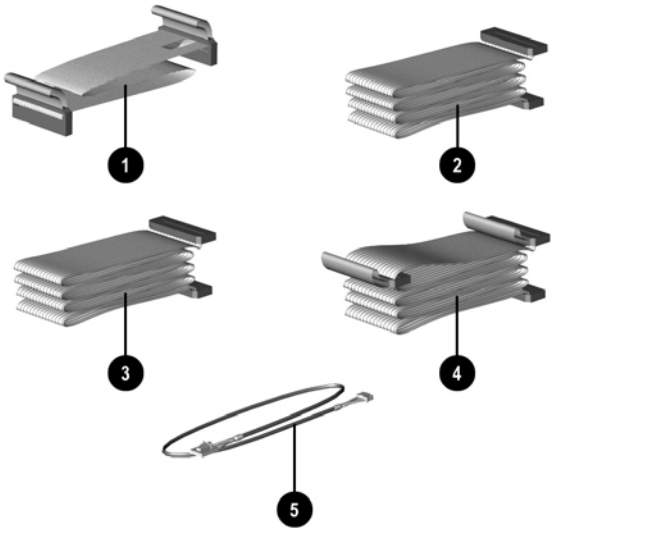
Mass Storage Devices

	Description	Spare Part Number	Warranty Tier
1	Diskette drive, 3.5-inch	158266-001	B
2	48X Max tray load IDE CD-ROM drive	187263-001	B
3	10.0-GB Ultra ATA hard drive (66/7200)	135364-001	B
*	15.0-GB Ultra ATA hard drive (66/7200)	192060-001	B
*	20.0-GB Ultra ATA hard drive (100/7200)	180475-001	B

*Not shown
(nn/nnnn) = hard drive transfer rate (MBytes/sec)/RPM

✎ Ultra ATA/100 hard drives are backwards compatible with Ultra ATA/66 devices; however, the data transfer rate is reduced to 66MB/sec.

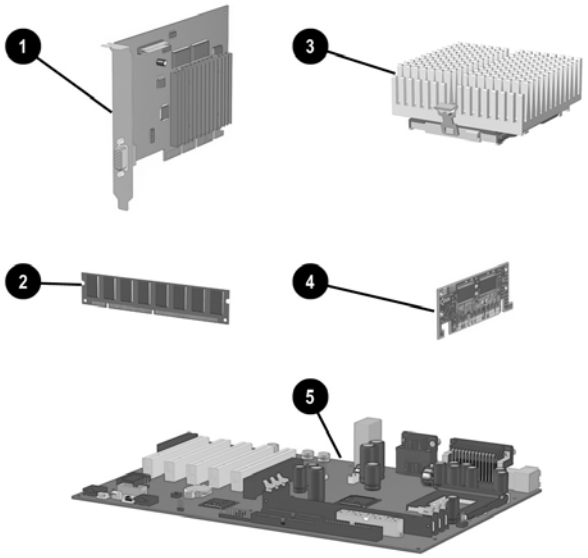
2.3 Cables



Cables			
	Description	**Spare Part Number**	**Warranty Tier**
	Cable Kit includes:	166879-002	B
1	Diskette drive cable *with* twist, 11″, with pull tab, center polarization (143218-001)		
2	40-position IDE data cable, 12.5″ (105876-001)		
4	IDE Ultra ATA dual device, hard drive/CD-ROM cable, 18″, with pull tab, center polarization, (108950-007)		
*	Dual-LED power cable (1 ea.), (387727-001)		
*	Switch mounting bracket (3 ea.), (166777-001)		
*	Diskette drive/tape cable, *with* twist, no key, 34″ (356107-001)		
*	Diskette drive cable *with* twist, 11″, without pull tab (387795-001)		
	Cable Kit includes:	192264-001	B
3	IDE Ultra ATA dual device, hard drive/CD-ROM cable, 18″ (108950-019)		
5	Audio cable, 21″, (288489-002)		
*	40-position IDE data cable (105876-001)		
*	Audio cable, Panther, 21″ (387527-001)		
*	IDE Ultra ATA dual device, hard drive/CD-ROM cable, 18″ (108950-021)		

*Not shown

2.4 Standard, Memory, and Expansion Boards



Standard, Memory, and Expansion Boards			
	Description	**Spare Part Number**	**Warranty Tier**
1	Nvidia 16MB SDRAM AGP Card	179997-001	B
	Memory Module (SDIMM, 133 MHz)		
2	64 MB	170080-001	B
*	128 MB	170081-001	B
*	256MB	192014-001	B
	Intel Celeron Processor with heatsink and clip		
*	600/66 MHz	192011-001	B
	Intel Pentium III Processor		
3	667/133 MHz with heatsink and clip	192007-001	B
3	733/133 MHz with heatsink and clip	192008-001	B
*	800/133 MHz with fansink (191845-002). Fansink includes fan, heatsink, and clip.	192009-001	B
*	866/133 MHz with fansink (191845-002). Fansink includes fan, heatsink, and clip.	192006-001	B
*	933/133 MHz with fansink (191845-002). Fansink includes fan, heatsink, and clip.	192010-001	B
4	AIMM (GPA) 4MB, 133MHz Graphics Card	192012-001	B
5	System Board, 815e chipset	187498-001	B

*Not shown.

2.5 Keyboards

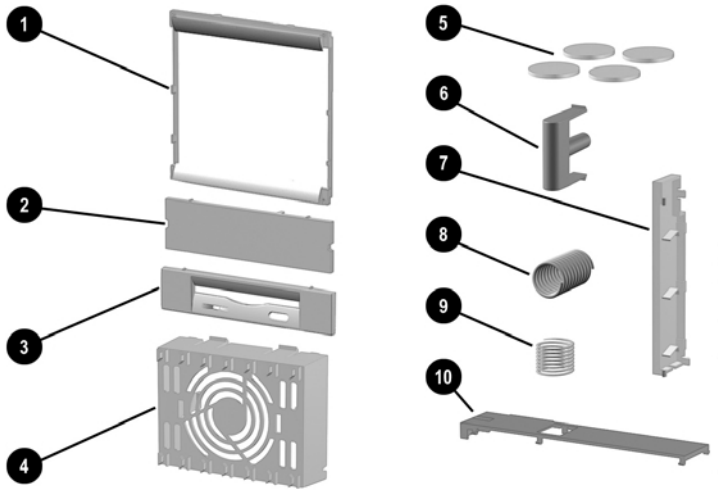
Keyboards (not illustrated)		
Description	**Spare Part Number**	**Warranty Tier**
Easy Access Keyboard-US	123130-xxx	D
USB Easy Access Keyboard-US	173304-xxx	D
Enhanced, Smart Card-US	125761-xxx	D
Basic, Smart Card-US	125790-xxx	D
Spacesaver, Opal	269513-xxx	D
Arabic	-171	
Belgian	-181	
Brazilian	-201	
BHCSY (Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia)	-B41	
Czech	-221	
Danish	-081	
Dutch/Netherlands	-B31	
Finnish	-351	
French	-051	
French Canadian	-121	
German	-041	
Greek	-151	
Hungarian	-211	
Italian	-061	
Japanese	-191	
Korean (Hanguel)	-AD1	
International	-B31	
Latin American Spanish	-161	
Norwegian	-091	
Polish	-B31	
Portuguese	-131	
Russian	-251	
Slovakian	-231	
Spanish	-071	
Swedish	-101	
Swiss	-111	
Taiwanese	-AB1	
Thai	-281	
Turkish	-141	
UK	-031	
US	-001	

2.6 Miscellaneous Screw Kit

Miscellaneous Screw Kit			
Description		**Spare Part Number**	**Warranty Tier**
Miscellaneous Screw Kit, includes:		179180-001	D
*	6-32 x 1/4 hi-top, thread-forming screw with serrations (4 ea.) (192308-001)		
*	6-19 x 5/16 panhead, plastite screw (5 ea.) (101346-068)		
*	6-19 x .5/16 hi-top, taptite screw with captive washer (4 ea.) (114399-069)		
*	6-32 x 3/16 hi-top, thread-forming screw with serrations (5 ea.) (192308-003)		
*	M3 x 5mm, hi-top, taptite screw with serrations (3 ea.) (247348-001)		
*	6-32 x 3/16 buttonhead tamper-resistant, taptite screw with serrations (4 ea.) (296769-002)		
*	6-32 x 5/16 hi-top, taptite screw (5 ea.) (109834-568)		
*	6-19 x 1/2 Panhead, plastite screw (4 ea.) (101346-071)		
*	Thumbscrew, molded cap (179333-002)		

*Not shown

2.7 Miscellaneous Plastics Kit

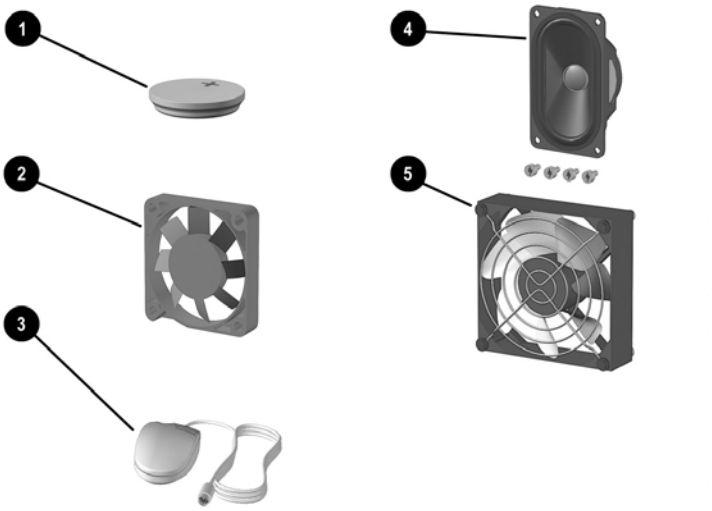


Miscellaneous Plastics Kit

Description	Spare Part Number	Warranty Tier
Miscellaneous Plastics Kit, includes:	166878-001	B
1 Panel, sub (166835-001)		
2 Bezel, blank (166775-001)		
3 Diskette bezel (166776-001)		
4 Card guide (166778-001)		
5 Foot, rubber (4 ea.) (166939-002)		
6 Button, power (166774-001)		
7 Drivelock, DT (166779-001)		
8 Spring, power button (166837-001)		
9 Springs, drivelock (2 ea.) (166837-002)		
10 Drivelock, MT (166780-001)		
* Retention mechanism (2 ea.) (350767-001)		

*Not shown

2.8 Miscellaneous Parts



Miscellaneous Parts

	Description	Spare Part Number	Warranty Tier
1	Battery	153099-001	D
2	Active fansink (for use with 800MHz+ processors)	191845-002	B
3	Mouse, scroll, opal	334689-002	D
4	Speaker with screws (40mm x 70mm, 12 inch)	192518-001	D
5	Fan assembly (for use on Pentium III units 933/133 and above)	207609-001	D
	Logo Kit EN/EX, includes:	210004-001	D
*	Logo plate, DT (166806-005)		
*	Logo plate, MT (166806-006)		

*Not shown

2.9 Shipping Boxes

Shipping Boxes (not illustrated)	
Description	**Spare Part Number**
Return Kit with buns (U.S.)	166990-001
Return Kit (international)	166990-002

2.10 Documentation and Software

Documentation and Software (not illustrated)	
Description	**Spare Part Number**
Maintenance & Service Guide (desktop & minitower)	201843-001
Illustrated Parts Map	203722-001
Service Reference Guide	152611-001
Quick Troubleshooting Guide	153837-001

chapter 3

REMOVAL & REPLACEMENT PRELIMINARIES

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 there is always voltage 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.

3.1 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.

3.1.1 Generating Static

The following table shows that:

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

	Relative Humidity		
Event	**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.

3.1.2 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.

3.1.3 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

3.1.4 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.

3.1.5 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

3.2 Routine Care

3.2.1 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.

3.2.2 Cleaning the Computer Case

Follow all safety precautions in Section 3.2.1 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.

3.2.3 Cleaning the Keyboard

Follow all safety precautions in Section 3.2.1 before cleaning the keyboard.

To clean the tops of the keys or the keyboard body, follow the procedures described in Section 3.2.2.

When cleaning debris from under the keys, review all rules in Section 3.2.1 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.

3.2.4 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 3.2.2.

3.2.5 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 3.2.2.

3.3 Service Considerations

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

3.3.1 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 in all other instances (when the computer is either in the "On," "Standby," or "Suspend" mode).

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

3.3.2 Tools and Software Requirements

To service the computer, you need the following:

- Torx T-15 screwdriver (Compaq screwdriver with bits PN 161946-001)
- 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)

3.3.3 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

3.3.4 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.

3.3.5 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 3.1, "Electrostatic Discharge."
- 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.

3.3.6 Lithium Coin Cell Battery

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

See Chapter 4, "Removal and Replacement Procedures," for instructions on the replacement procedures.

WARNING: This computer contains a lithium-ion 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 140ºF (60ºC).

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

chapter 4

REMOVAL AND REPLACEMENT PROCEDURES

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.

4.1 Disassembly Sequence Chart

Use the chart below to determine the disassembly sequence for removing components from the computer.

- 4.3 Computer Feet
- 4.4 Logo Plate
- 4.5 Cable Lock
- 4.6 Access Panel
  - 4.7 Front Bezel
    - 4.8 Power Button
    - 4.9 Subpanel and Bezel Blanks
    - 4.10 Power Switch
    - 4.11.1 Removing an Internal 3.5-Inch Hard Drive ♦
    - 4.11.2 Removing an External 5.25-Inch Drive ♦
    - 4.11.3 Removing an External 3.5-Inch Drive ♦
      - 4.12 Removing the Drivelocks ♦
  - 4.13.2 Removing an Expansion Board
    - 4.14 Board Guide
      - 4.15 Internal Speaker
  - 4.16 System Memory
  - 4.17 Graphics Cards
  - 4.18 Processor
    - 4.19 System Board
  - 4.20 Lithium Battery
  - 4.21 Chassis Fan Assembly
  - 4.22 Power Supply
  - 4.23 Converting a Desktop to a Minitower
  - 4.24 Converting a Minitower to a Desktop

♦ Must remove all drives before removing drivelock.

4.2 Disassembly Preparation

Before adding any internal options or performing a removal/replacement:

1. Remove any diskette, compact disc, or tape from the computer.
2. Turn off the computer and any peripheral devices that are connected to it.

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.

CAUTION: Turn off the computer before disconnecting any cables.

3. Disconnect the power cord from the electrical outlet and then from the computer.
4. 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 components 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.

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

CAUTION: Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. For more information, refer to Chapter 3, “Removal and Replacement Preliminaries.”

The Compaq Deskpro EN Series, Intel 815e chipset models will be referred to in this MSG as 815e.

4.3 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.

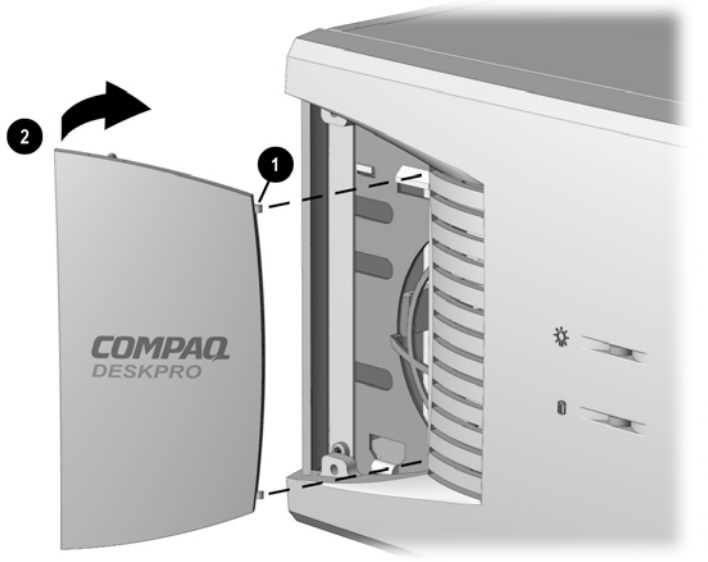
If necessary, remove the old feet and remove any adhesive residue from the chassis.

4.4 Logo Plate

Grasp the open side of the logo plate (left side if a desktop, bottom if a minitower) and pull outward ❷.

To install a new logo plate, align the guide pins in the slots ❶, then press into place.

✎ When replacing the logo plate, ensure that the alignment pins are properly placed in the front bezel before pressing the logo plate into position.

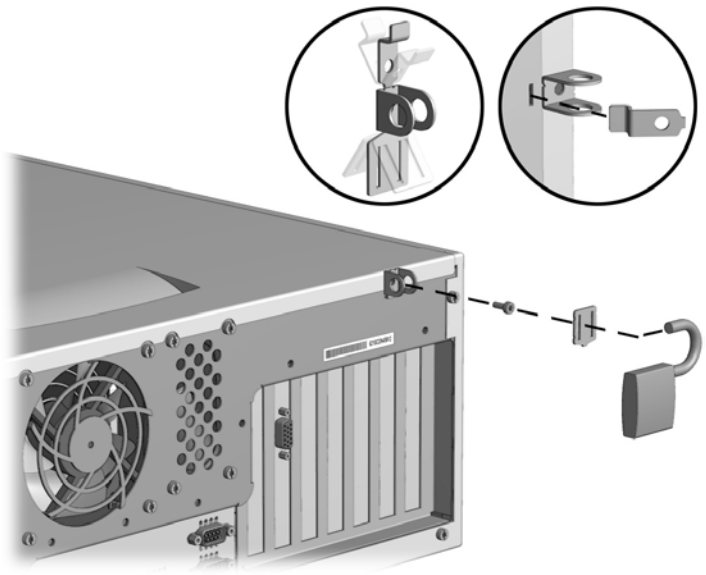


4.5 Cable Lock

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 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 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.
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.



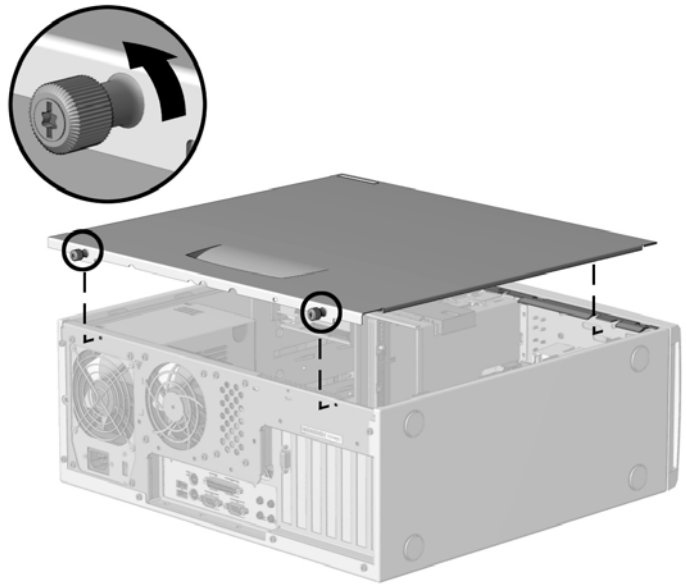
To remove the cable lock provision, reverse the above procedure.

4.6 Access Panel

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Loosen the two thumbscrews that secure the access panel to the back of the computer chassis.
4. Slide the access panel backward approximately 1-inch (2.5-cm); then lift it up and off the unit.



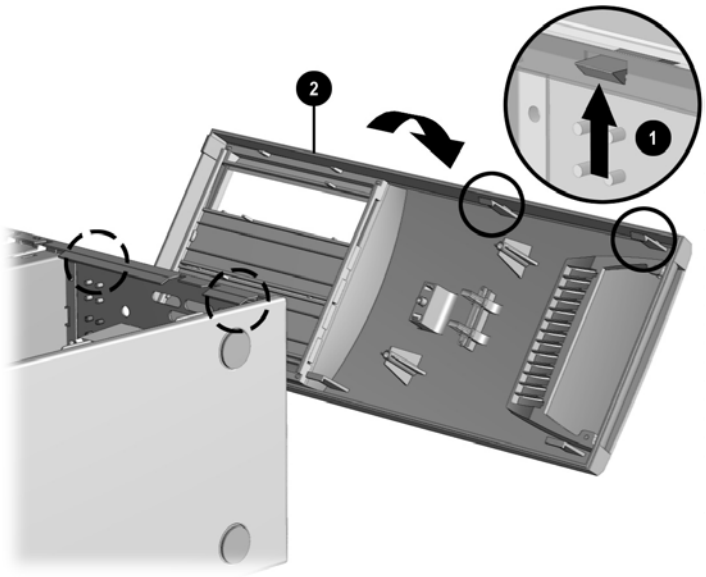
To replace the access panel, reverse the previous steps.

4.7 Front Bezel

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Press the two release tabs ❶ at the top of the front bezel.
5. Rotate the front bezel away from the chassis ❷ to remove it from the unit.



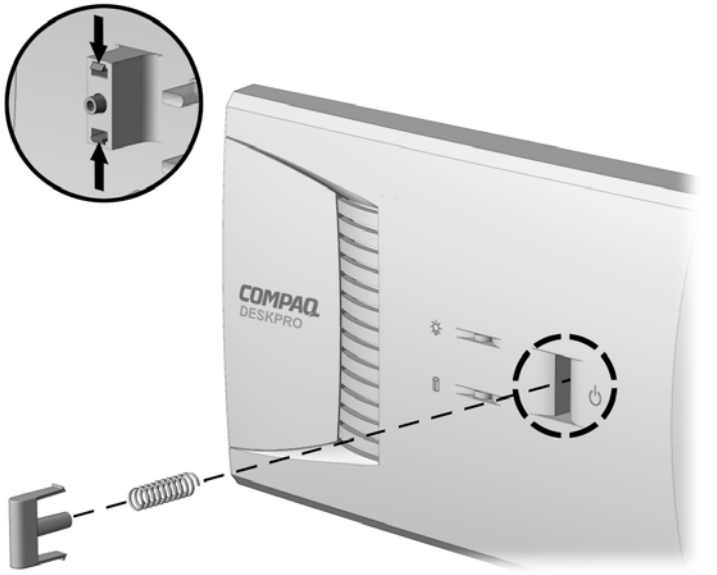
When replacing the front bezel, ensure that the bottom hinge points are properly placed in the chassis before rotating the front bezel back into its original position.

4.8 Power Button

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
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.



To replace the power button, reverse the above procedure.

4.9 Subpanel and Bezel Blanks

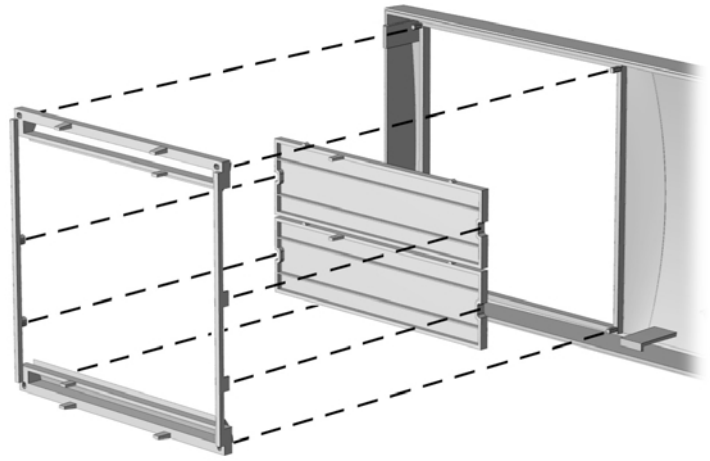
The subpanel and bezel blanks must be removed from the front bezel if you are installing a mass storage device for the first time, or if you are converting the unit from a desktop to a minitower configuration or from a minitower to a desktop configuration.

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.

1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
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.

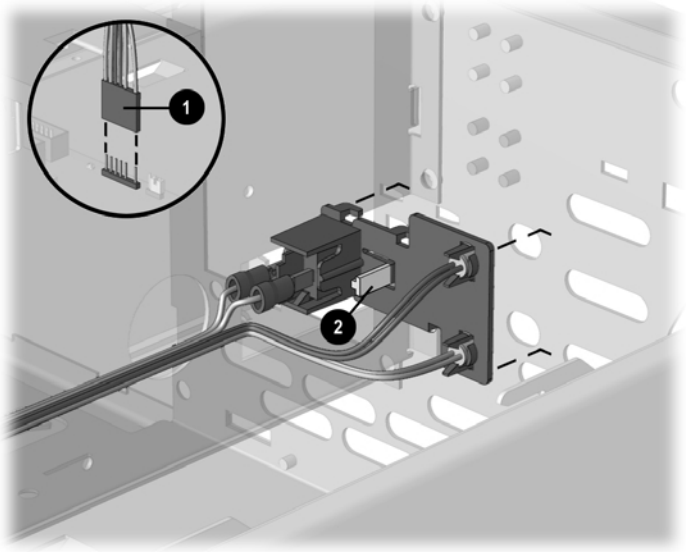
4.10 Power Switch

CAUTION: The power switch should not be removed from the switch holder. Doing so may damage the switch components.

1. Prepare the computer for disassembly (Section 4.2).

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.

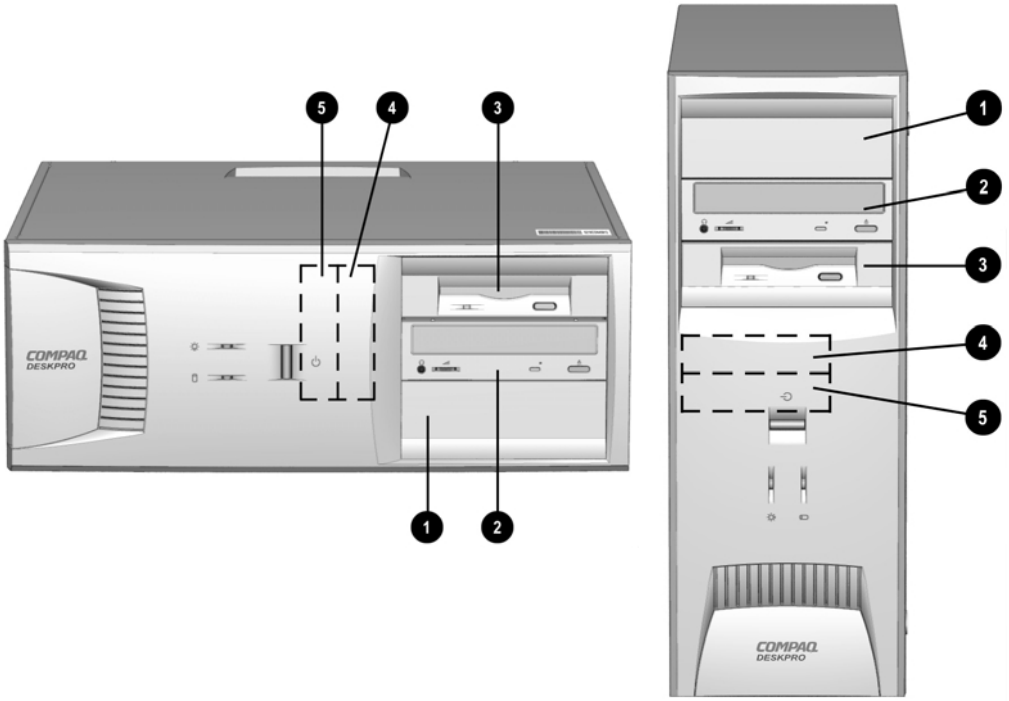
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
5. Disconnect the power/LED cable from the system board ❶.
6. Push the release tab ❷ toward the drive bays, then remove the power switch 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.

4.11 Mass Storage Devices

The Compaq Deskpro EN Series of Personal Computers support up to five drives in various configurations.



Drive Positions

Reference	Drive Bay	Configuration
❶❷	1, 2	Two standard 5.25-inch, half-height bays for optional drives.
❸	3	One standard 3.5-inch, 1.44-MB diskette drive mounted with a drive adapter into a 5.25-inch bay.
❹❺	4, 5	Two standard 3.5-inch drive bays; bay 4 contains the preinstalled hard drive, bay 5 is available for an optional hard drive.

✎ Drive bay numbers are stamped on the chassis.

To verify the type and size of the mass storage devices installed in the computer, run Computer Setup.

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.
- You may install either a third-height or a half-height drive into a half-height bay.
- 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.

Using the Cable-Select Feature with Ultra ATA Devices

Optional drives are available from Compaq in kits that include a special drive cable. The configuration of the drives employs a cable-select feature that identifies the drives as device 0 (primary drive) or device 1 (secondary drive). The system board determines which drive is device 0 or device 1, based on the way the drives are connected to the special drive cable. The device 0 drive is the drive connected to the short segment of the drive cable (or that connector closest to the system board); the device 1 drive is the drive connected to the long segment of the drive cable.

Drive installation requires no jumper setting changes on the existing or optional drives. All Compaq drives have the jumpers preset for cable-select installation.

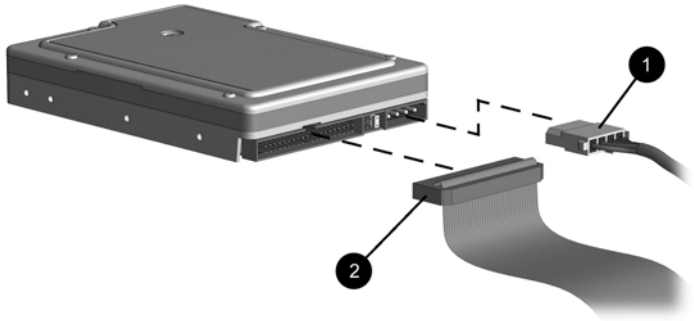
If installing a second device on the primary controller, you must use an 80-conductor Ultra ATA cable for optimal performance. This cable is available as a Compaq option.

4.11.1 Removing an Internal 3.5-Inch Hard Drive

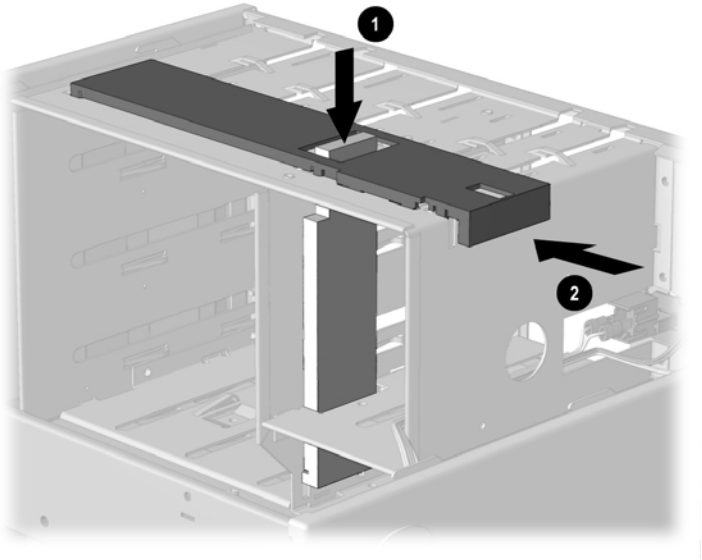
1. Prepare the computer for disassembly (Section 4.2).

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.

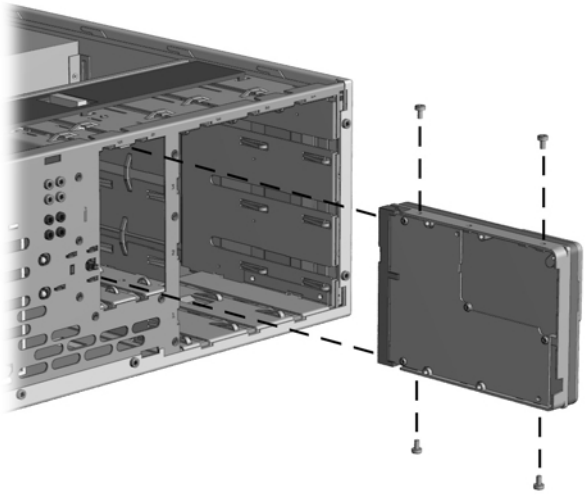
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
5. Disconnect the power ❶ and data ❷ cables from the back of the hard drive.



6. Press the drivelock mechanism to unlock the hard 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.



Removing an Internal 3.5-Inch Hard Drive

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 while U.S. screws have a silver finish.

Replace the 3.5-inch drive by reversing the above procedure.

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

✎ When installing a second ATA hard drive on the primary controller, you must use an 80-conductor ATA cable for optimal performance.

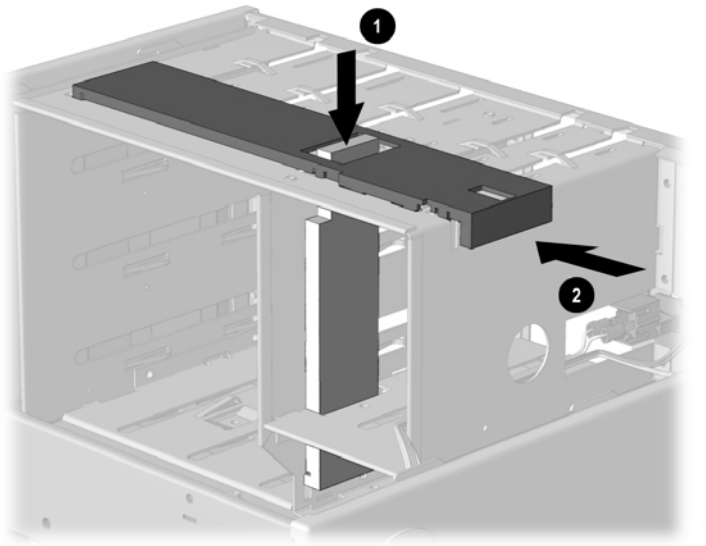
The system automatically recognizes hard drives sold by Compaq (or any other plug and play hard drive) and will automatically reconfigure the computer. If you installed a third-party hard drive, or one that is not a plug and play device, you must run Computer Setup to reconfigure the computer.

4.11.2 Removing an External 5.25-Inch Drive

1. Prepare the computer for disassembly (Section 4.2).

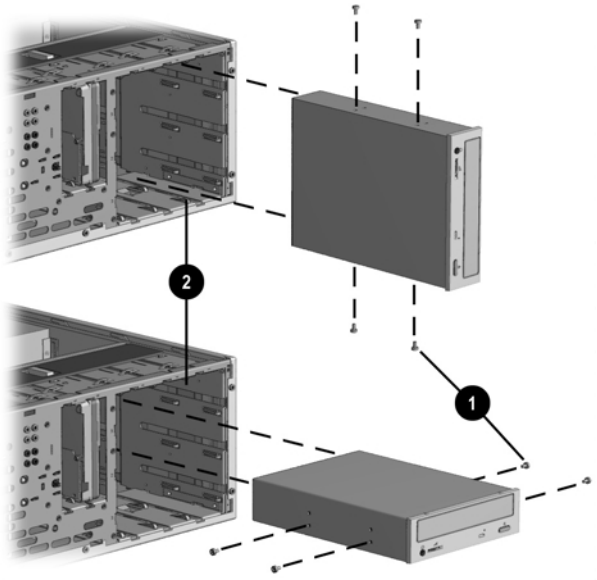
WARNING: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
5. If this is a desktop, push down on drivelock ❶ to release the drive; if a minitower, press drivelock ❷.



Releasing the Drives

6. While the drivelock is held in the unlatched position, remove the drive from the drive bay.
7. Remove the four guide screws from the drive ❶.



To install 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 (Section 4.9).
5. Reinstall the subpanel and the front bezel.

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.

4.11.3 Removing an External 3.5-Inch Drive

If you are installing a second 3.5-inch diskette drive into 5.25-inch bays #1 or 2 for the first time, you must use a special adapter bracket.

If you are installing a 3.5-inch diskette drive into 5.25-inch bay #3, you must use a special adapter bracket.

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

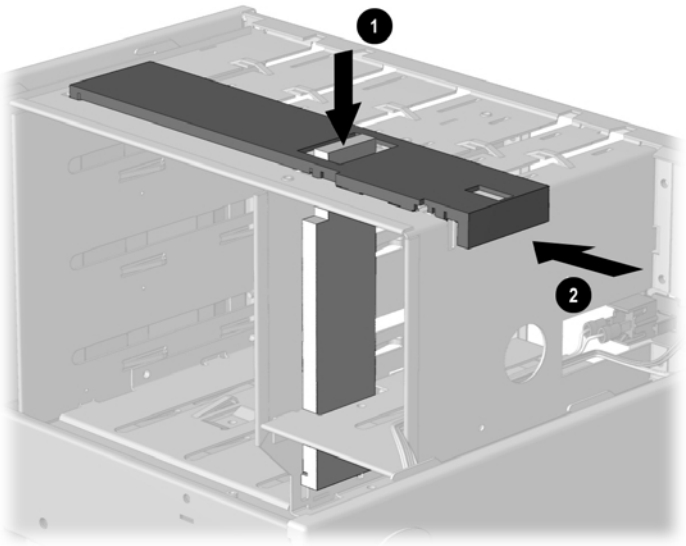
1. Prepare the computer for disassembly (Section 4.2).

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.

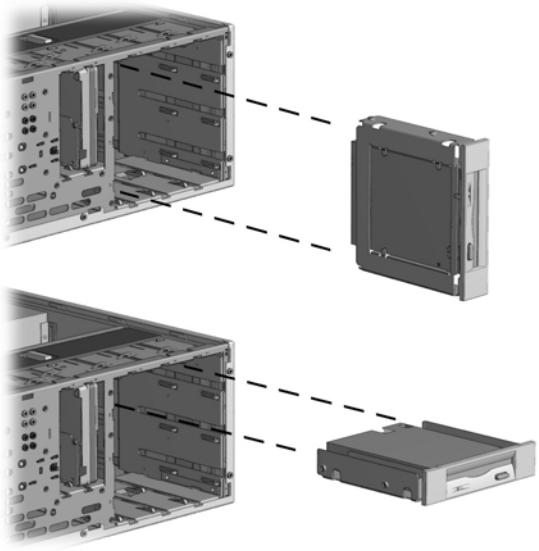
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).

✎ The primary diskette drive is always installed in drive bay 3.

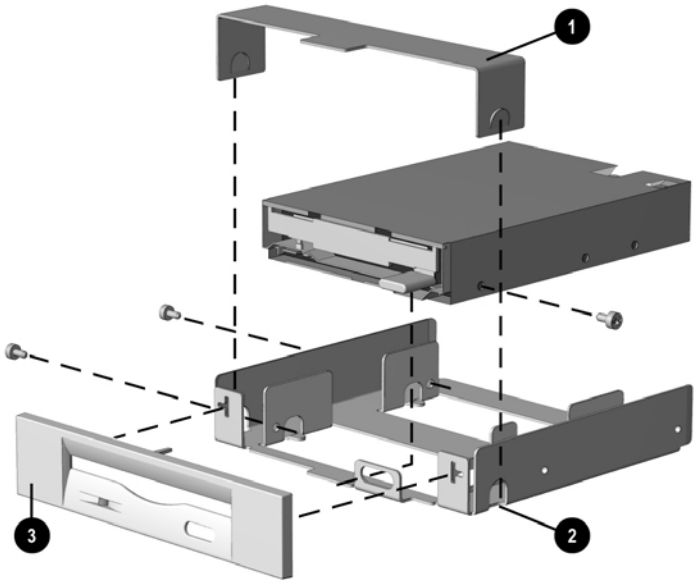
5. If this is a desktop, push down on drivelock ❶ to release the drives; if a minitower, press drivelock ❷.



6. While the drivelock is held in the unlatched position, remove the drive from the drive bay.



7. 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.
8. Remove the drive bezel ❸.
9. Remove the two screws that secure the drive to the left side of the drive adapter.
10. 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.
11. 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.

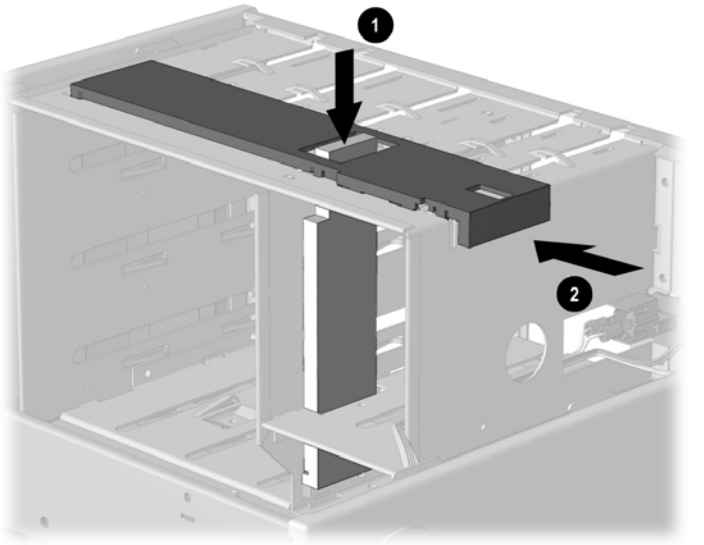
When replacing the drive, use the existing screws. Metric screws (M3) have a black finish while U.S. screws (#6) have a silver finish.

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

4.12 Removing the Drivelocks

The computer chassis contains two drivelock mechanisms. Drivelock ❶ secures the external drives in the desktop configuration, drivelock ❷ secures all drives in the minitower and the internal drives in the desktop configuration.



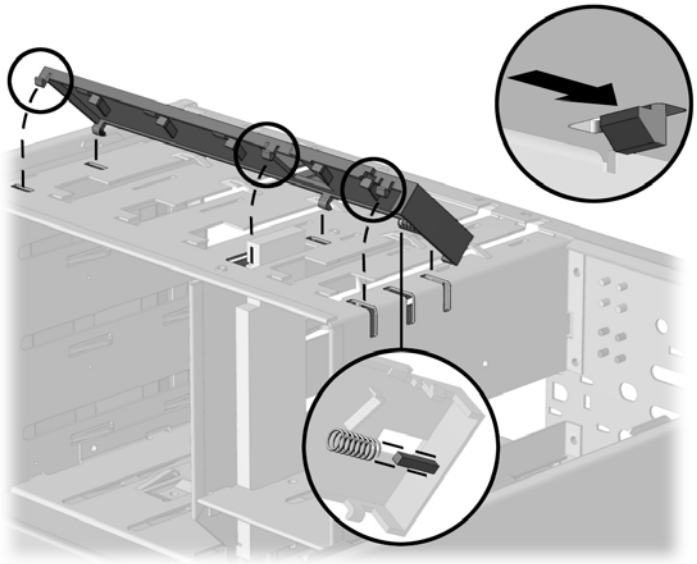
1. Prepare the computer for disassembly (Section 4.2).

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.

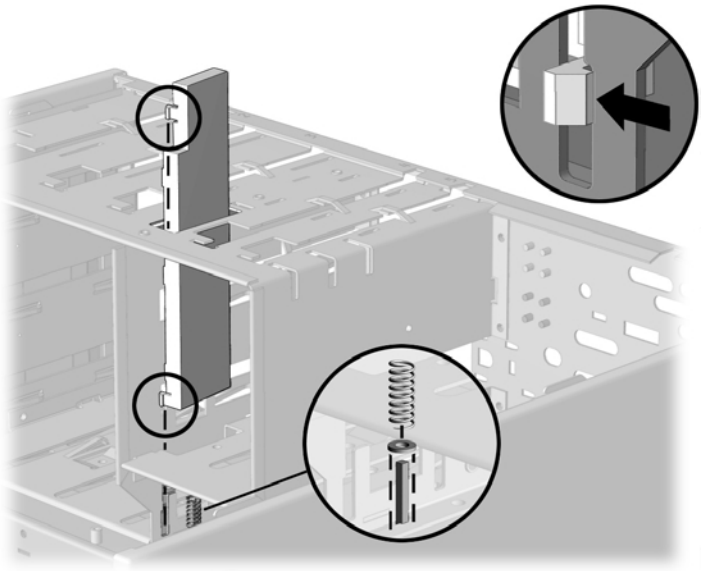
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
5. Remove all of the drives from the computer (Sections 4.11.1, 4.11.2, and 4.11.3).
6. While standing at the rear of the unit, push the top drivelock assembly toward the front of the drive cage.
7. Lift up on the side of the drivelock mechanism nearest you, snapping the tabs out of the holes in the drive cage.

CAUTION: The spring contained under the drivelock mechanism may pop out unexpectedly.

8. Remove the drivelock from the drive cage.
9. Remove the spring from the drivelock (see inset).



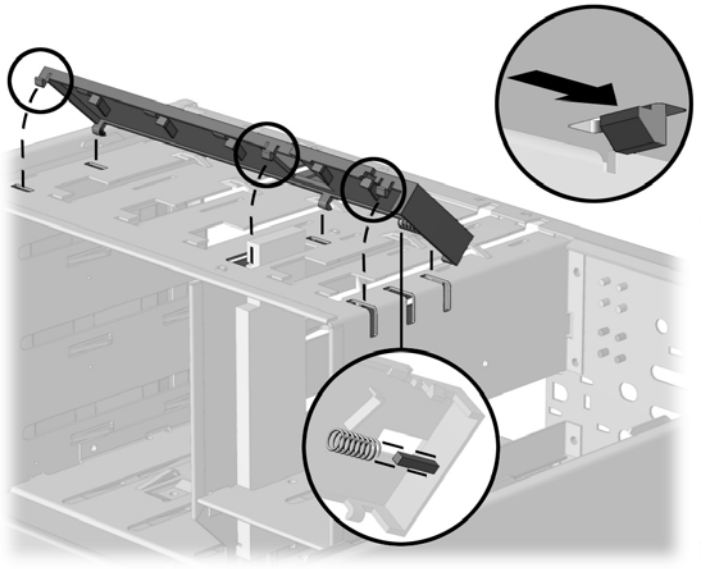
10. Press in on the tabs to release the vertical drivelock from the chassis, then lift it up and out of the system while at the same time rotating the drivelock slightly to clear the travel slots at the bottom of the drivelock.
11. Remove the spring from the post (see inset).



To reinstall the vertical drivelock, reverse the previous procedure.

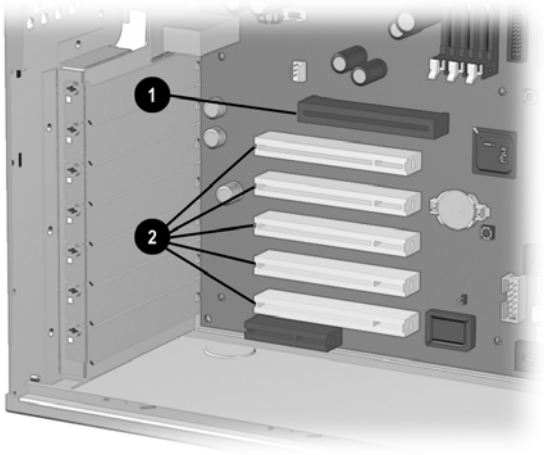
To reinstall the horizontal drivelock:

1. Insert the left side of the drivelock (with the rounded tabs) into the slots on the drive cage.
2. Place the washer on the middle tab on the underside of the drivelock.
3. Compress the spring, then lower the drivelock onto the drive cage until it snaps into place.



4.13 Expansion Boards

4.13.1 Expansion Board Slots



❶ AGP graphics slot

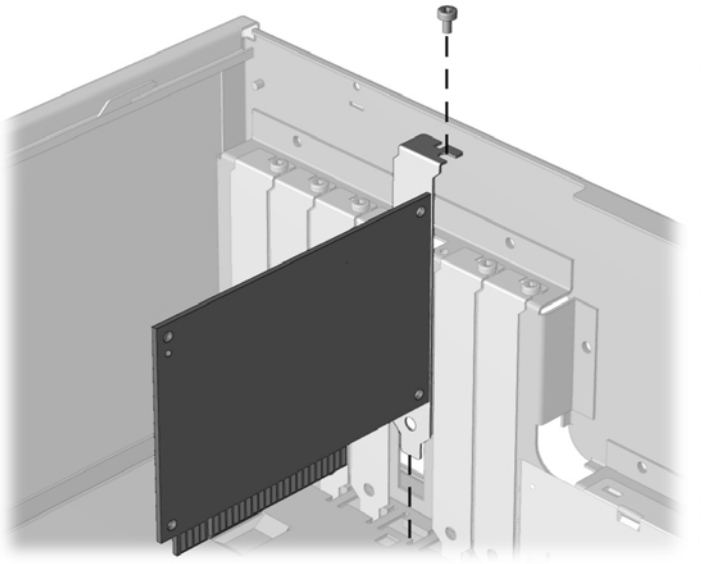
❷ PCI expansion slots

4.13.2 Removing a PCI Expansion Board

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Disconnect any cables from the expansion board, noting their location for reinstallation.
5. Remove the expansion board retaining screw.
6. Hold the board at each end and carefully rock it back and forth while pulling upward, until the connectors pull free from the slot.

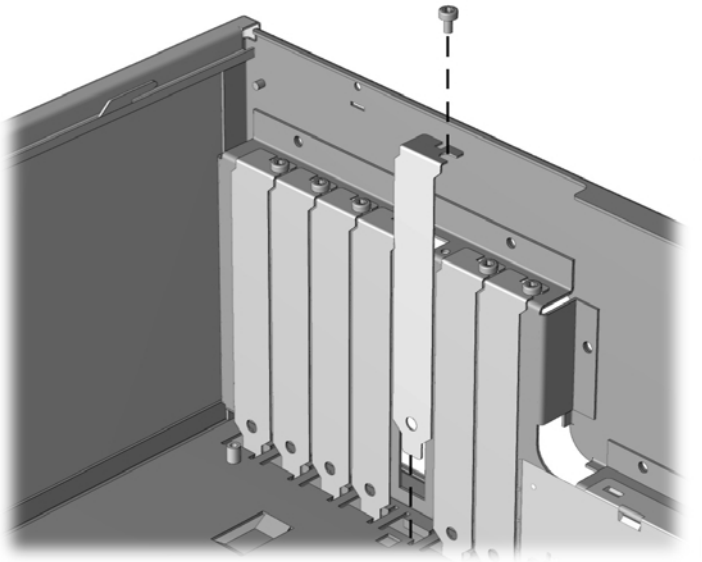


4.13.3 Installing a PCI Expansion Board

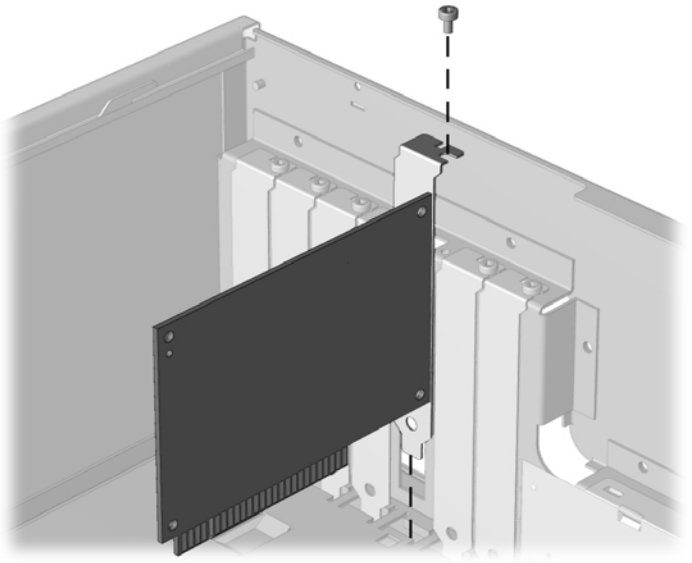
1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. If you are installing an expansion board for the first time, remove the expansion slot cover.



5. Hold the board at each end and carefully rock it back and forth while pushing downward, until the connectors fit completely and firmly into the expansion slot.



6. Secure the board to the chassis with the retaining screw.
7. Attach any cables that came with the board.

✎ If installing a NIC board, attach the WOL power cable to connector P9 on the system board.

8. Reassemble the computer.

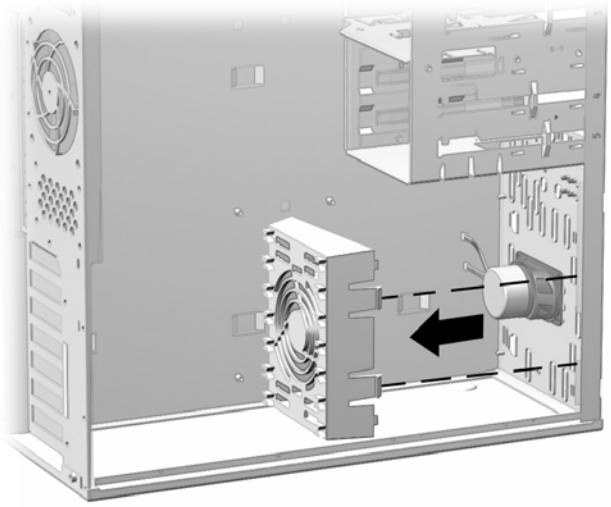
The computer should automatically recognize the added plug and play board.

4.14 Board Guide

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove any full-length expansion boards (Section 4.13.2).
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.



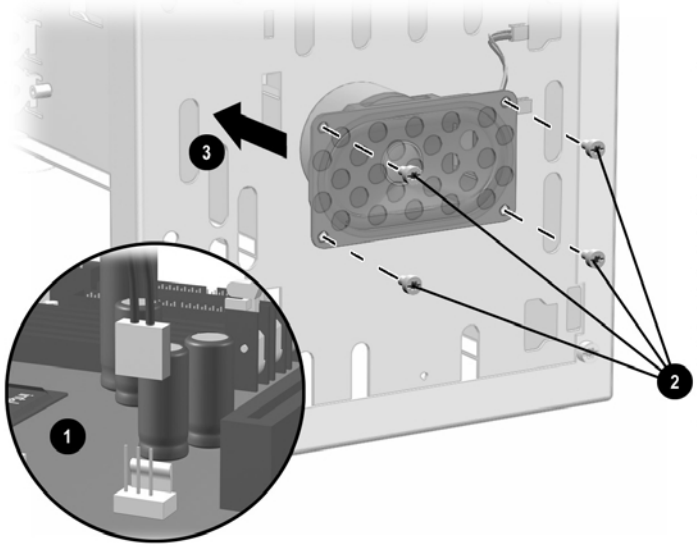
To replace the board guide, reverse the above procedures.

4.15 Internal Speaker

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the board guide (Section 4.14).
5. Disconnect the speaker cable from the system board ❶.
6. Remove the four screws ❷ that secure the speaker to the front of the chassis.
7. Lift the speaker out of the unit ❸



To install the new speaker, reverse the preceding steps.

4.16 System Memory

The computer comes with synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

4.16.1 DIMMs

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 100Mhz speed. Some configurations of PC133 SDRAMs may run at 100Mhz, instead of 133Mhz.

4.16.2 Memory Module Installation

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.

CAUTION: Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. Refer to Appendix F, "Electrostatic Discharge," for more information.

CAUTION: When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

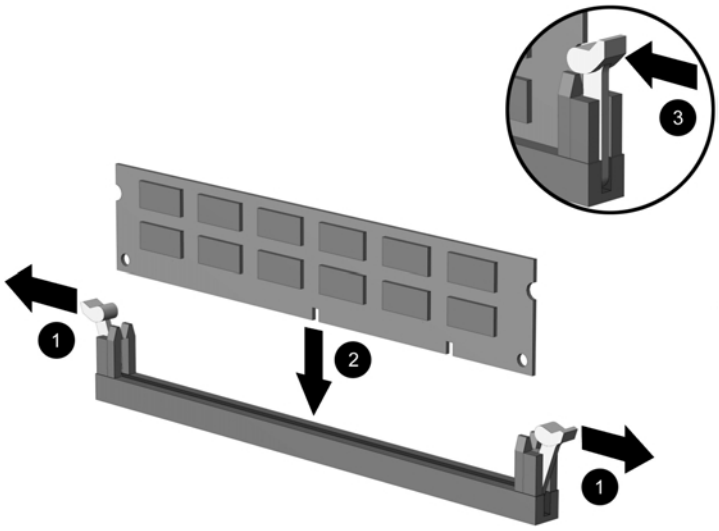
1. If you have locked the Smart Cover Lock, use Computer Setup to unlock the lock and disable the Smart Cover Sensor.
2. Shut down the operating system properly, then turn off the computer and any external devices, then disconnect the power cord from the power outlet.
3. Remove the access panel and locate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



4.17 Graphics Cards

The AGP expansion slot 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 slot.

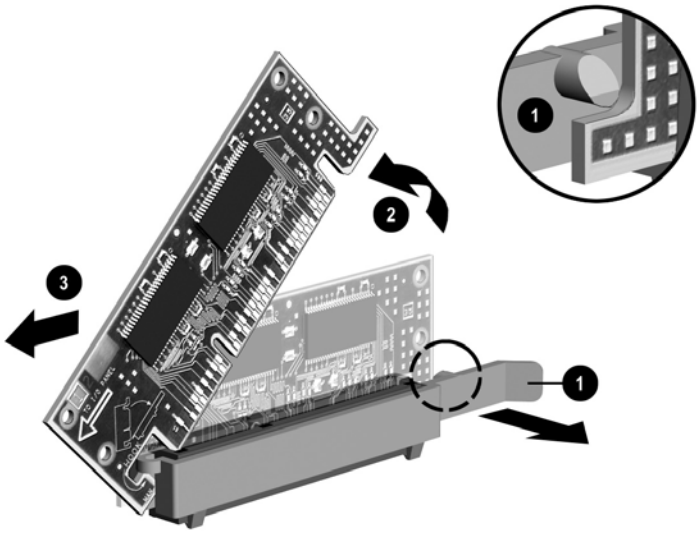
4.17.1 Graphics Performance Accelerator (GPA)/AGP Inline Memory Module (AIMM) Card with a Type I Retention Mechanism

Removing a GPA/AIMM Card

1. Prepare the computer for disassembly (Section 4.2).

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.

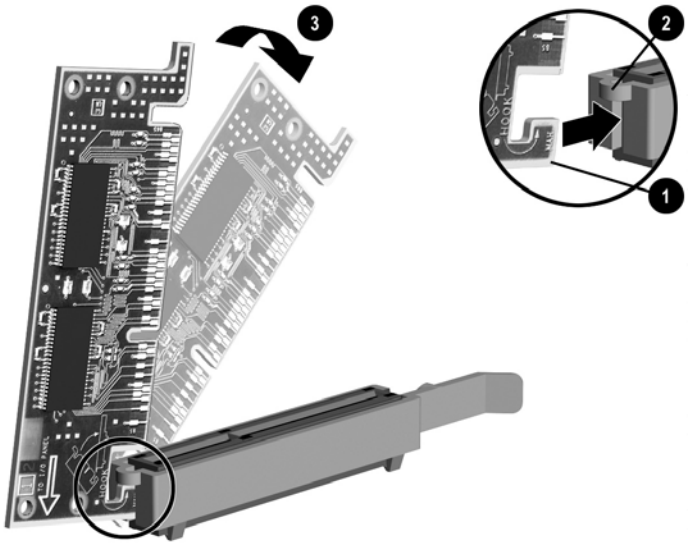
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Pull the arm on the right side of the retention mechanism ❶.
5. At the same time, rotate the front of the GPA/AIMM card up until it is at a 45 degree angle ❷.
6. Remove the card from the expansion slot ❸.



Installing a GPA/AIMM Card

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.

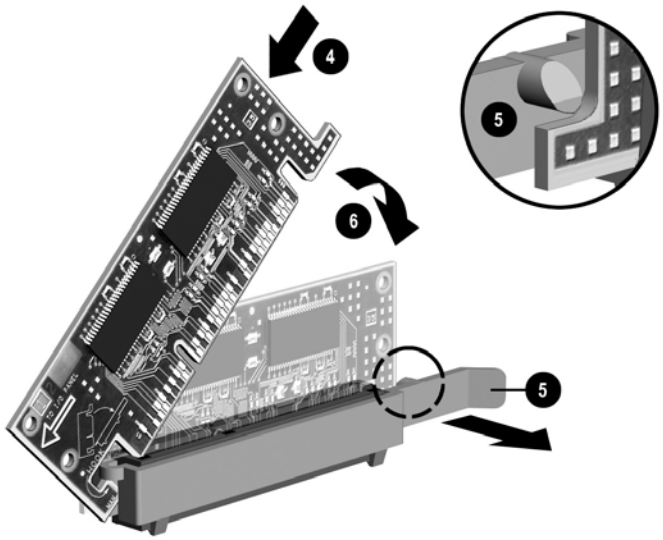
1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Insert the hook ❶ on the left side of the GPA/AIMM card under the loop ❷ on the left side of the retention mechanism.
5. Rotate the right side of the card down until it is at a 45 degree angle ❸.



6. With the GPA/AIMM card at a 45 degree angle, slide the card toward the back of the expansion slot ❹ until the fingers on the bottom of the card line up properly with the connectors in the expansion slot.

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.

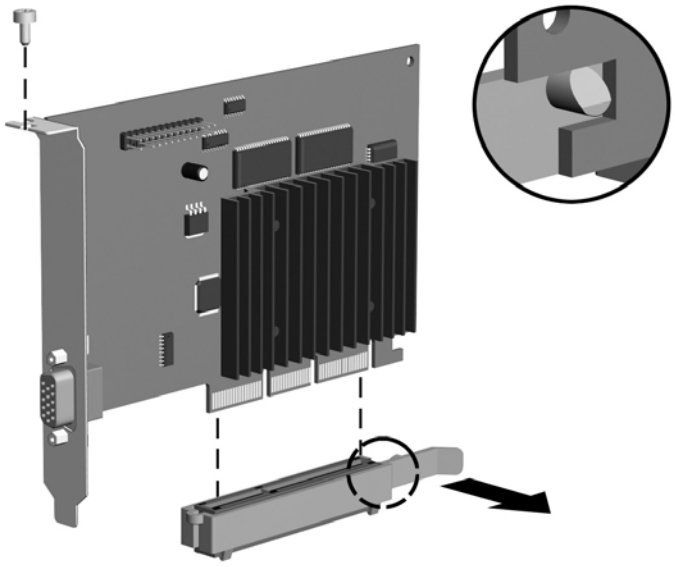
7. While pulling the arm on the right side of the retention mechanism ❺, rotate the card down into the expansion slot until seated ❻.



4.17.2 AGP Card with a Type I Retention Mechanism

Removing an AGP Card

1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the screw at the top of the expansion slot.
5. Pull the arm on the right side of the retention mechanism.
6. Pull the card straight up to remove it from the expansion slot.

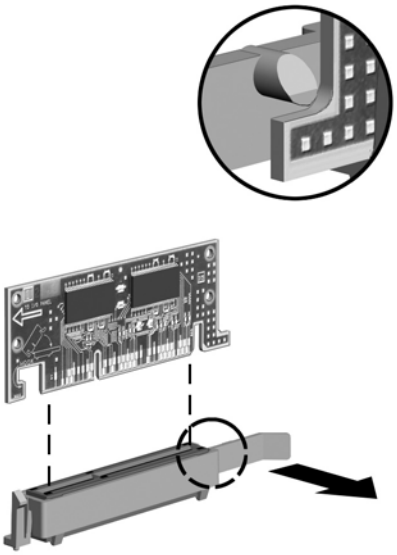


To install the graphics card, reverse the above procedures.

4.17.3 GPA/AIMM Card with a Type 2 Retention Mechanism

Removing a GPA/AIMM Card

1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Pull the arm on the right side of the retention mechanism.
5. Pull the card straight up to remove it from the expansion slot.

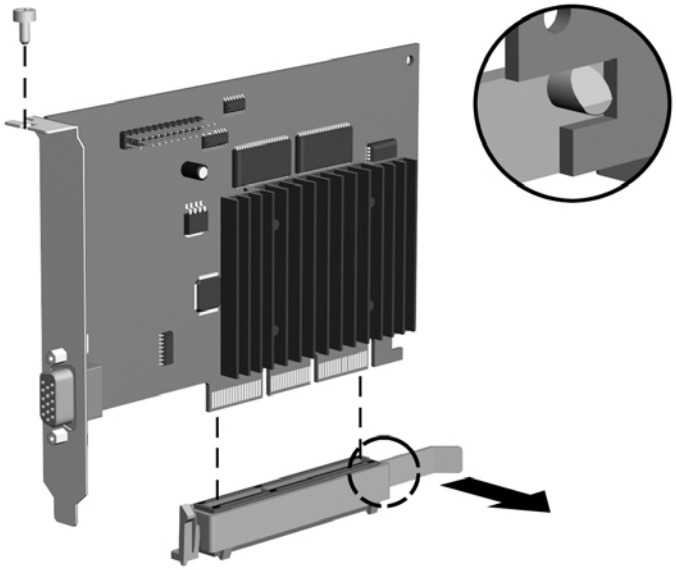


To install the graphics card, reverse the above procedures.

4.17.4 AGP Card with a Type 2 Retention Mechanism

Removing an AGP Card

1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the screw at the top of the expansion slot.
5. Pull the arm on the right side of the retention mechanism.
6. Pull the card straight up to remove it from the expansion slot.

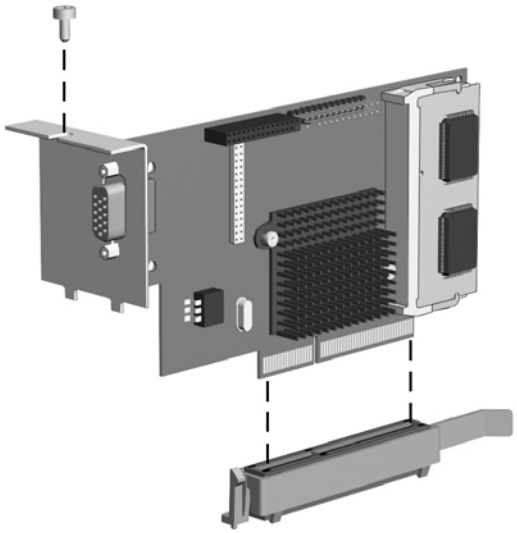


To install the graphics card, reverse the above procedures.

4.17.5 Standard AGP Expansion Card

Removing an AGP Card

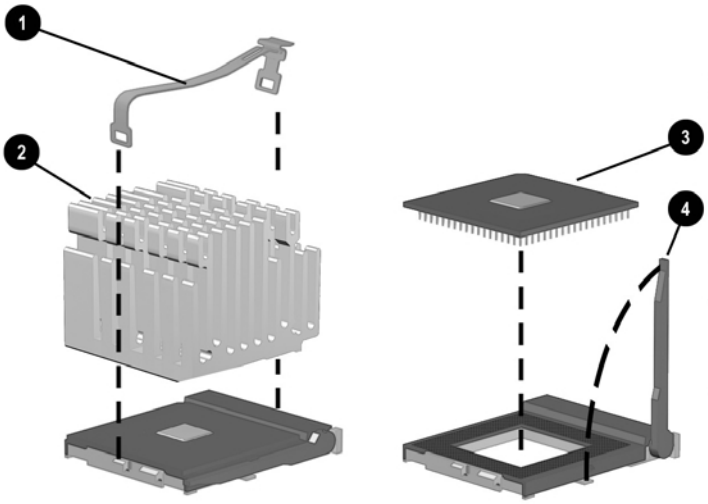
1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the screw at the top of the expansion slot.
5. Remove the AGP graphics board as you would any PCI expansion board (Section 4.13.2).



4.18 Processor

Before installing a processor, make sure the release latches are in the locked position. This will cause the processor to make an audible sound when it is properly seated in the retaining clip.

1. Prepare the computer for disassembly (Section 4.2).
2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the heatsink retaining clip ❶ by pressing down on the clip's extended tab until it releases from the safety catch.
5. Lift the heatsink ❷ off the processor.
6. Release the original processor ❸ from the socket by pulling the handle on the ZIF socket out and upward ❹.
7. Lift the processor out of the socket.



To install a new processor, reverse this procedure.

✎ If the heatsink has a thermal interface attached to its bottom, peel off the protective paper before installing the heatsink.

✎ All units with 800 MHz and faster processors require an active fansink. When installing the fan, make sure it is positioned so it blows down on the processor.

✎ All units with 933 MHz and faster processors require the chassis fan assembly (Section 4.21). When properly installed, this fan blows air away from the computer.

△ **CAUTION:** Carefully remove the interface and all residue from the heatsink surface. Thermal interface heat transmission is reduced if residue remains on the heatsink or the heatsink surface is scratched.

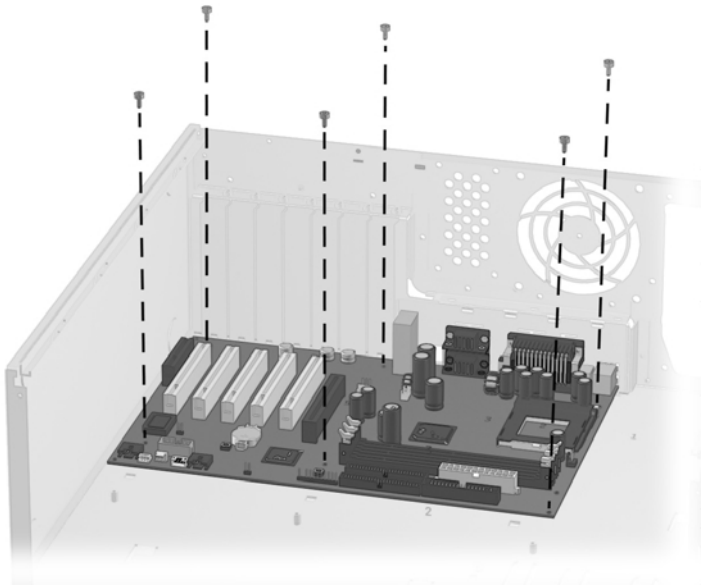
4.19 System Board

More information on the system board, including troubleshooting criteria, can be found in the Compaq Quick Troubleshooting Guide (part number 153837-001) and the Compaq Service Reference Guide (part number 152611-001).

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove all PCI expansion boards (Section 4.13.2).
5. Disconnect any cables that are attached to the system board, noting their location for reinstallation.
6. Remove the DIMMs (optional) (Section 4.16).
7. Remove the graphics card (Section 4.17).
8. Remove the processor (Section 4.18).
9. Remove the six retaining screws that secure the system board to the chassis.
10. Slide the board about ½ inch toward the front of the chassis to disengage the I/O panel, then lift it up and out of the chassis.



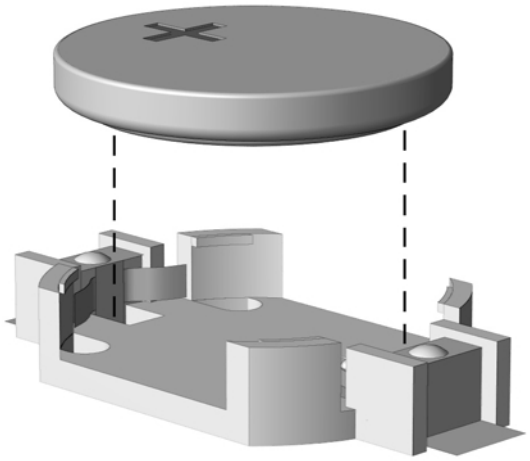
To install a new system board, reverse the above procedures.

4.20 Battery

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Locate the battery on the system board. If you have expansion boards installed, you may need to remove them to gain access to the battery (Section 4.13.2).
5. Lift the battery out of 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. If you removed expansion boards, reinstall them now.
8. Replace the computer access panel.
9. Reassemble the computer.
10. Reconnect the AC power cord and turn on the computer.
11. Reset the date and time, your 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 60ºC (140ºF).

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.

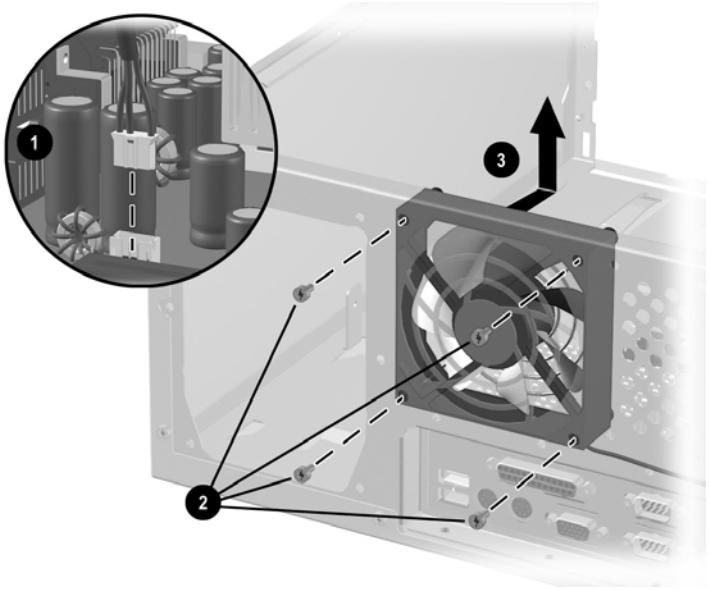
4.21 Chassis Fan Assembly

The Configurable Minitower (CMT) can have up to three fans in it. Every CMT has at least one fan that is integrated in the power supply. If the unit has a 800 MHz or higher processor, it will have a fan attached to the processor heatsink. If the CMT has a 933Mhz or higher processor, it will also have an external chassis fan.

1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Disconnect the fan power cable from the system board. ❶
5. Remove the four screws that secure the fan to the chassis ❷.
6. Remove the fan from the chassis ❸.
7. Pull on the two push-pins that secure the fan grill to remove it from the fan.



To install the fan assembly, reverse the above procedure.

This fan is used on units with 933 MHz and faster processors.

4.22 Power Supply

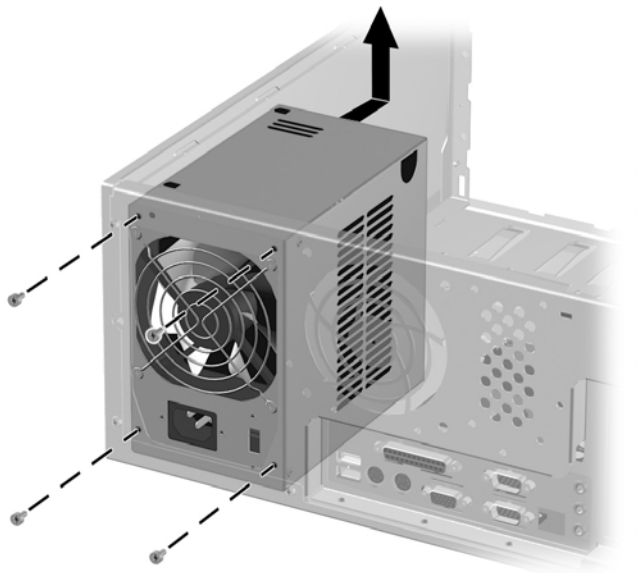
1. Prepare the computer for disassembly (Section 4.2).

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. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Disconnect all power cables from the mass storage devices and the system board.

Power connectors are keyed for correct installation. Note the orientation of each cable connector and the routing of the cables to facilitate reassembly.

5. Remove the four screws that secure the power supply to the back of the chassis.
6. Slide the power supply toward the front of the computer, then lift up to remove it from the chassis.



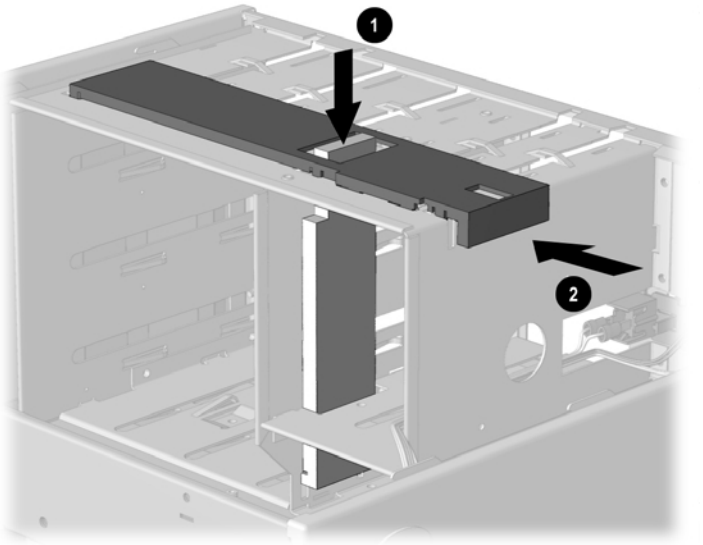
To replace the power supply, reverse the above procedure.

4.23 Converting a Desktop to a Minitower

1. Prepare the computer for disassembly (Section 4.2).

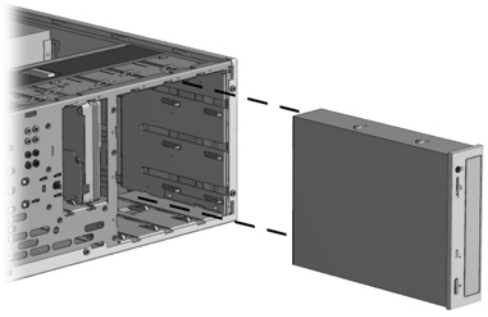
WARNING: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
5. Remove the drives from the 5.25-inch drive bays by pressing drivelock ❶ (Sections 4.11.2 and 4.11.3).



6. Rotate the drives 90 degrees, then reinstall them into the drive bays.

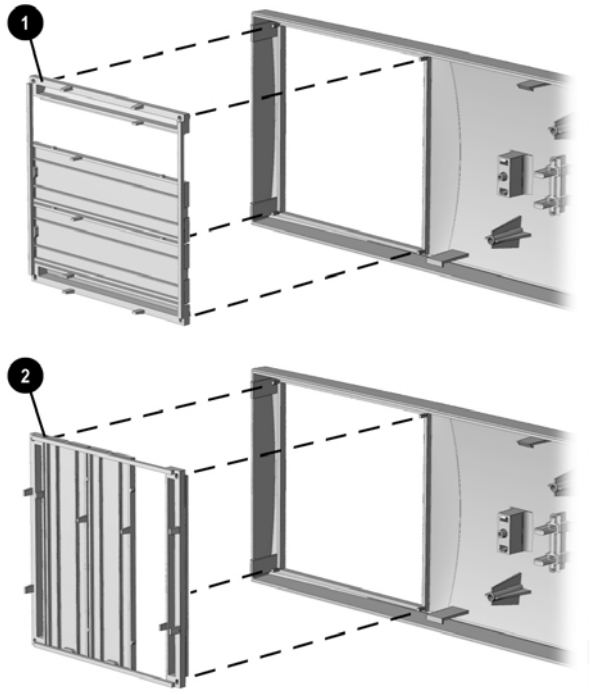
✎ The diskette drive should always be placed in bay number 3, the bay nearest the internal 3.5-inch drives, for proper placement within the chassis.



CAUTION: The use of unnecessary force may result in damage to the drives.

7. Reconnect the power, signal, and audio cables to the drives.
8. Remove the subpanel and rotate the bezel blanks 90 degrees (Section 4.9).

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



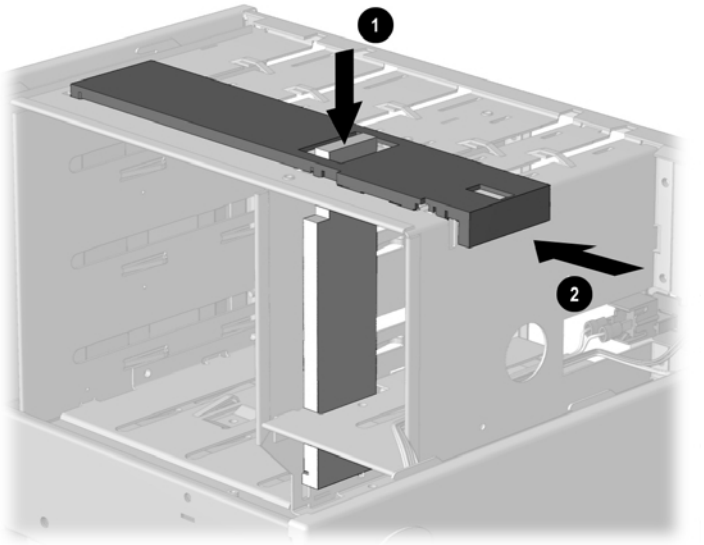
9. Replace the subpanel, front bezel, and the computer access panel.
10. Reassemble the computer.

4.24 Converting a Minitower to a Desktop

1. Prepare the computer for disassembly (Section 4.2).

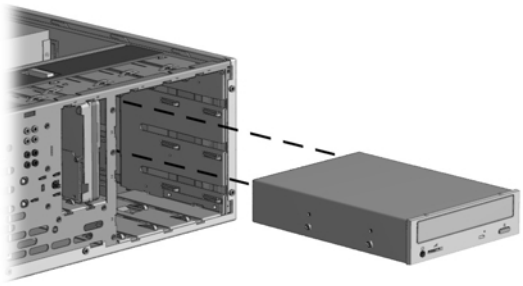
WARNING: Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

2. Lay the computer down on its large base (side with feet) for greater stability.
3. Remove the access panel (Section 4.6).
4. Remove the front bezel (Section 4.7).
5. Disconnect all power and data cables from the drives in the 5.25-inch drive bays.
6. Remove the drives from the 5.25-inch drive bays by pressing drivelock ❷ (Sections 4.11.2 and 4.11.3).



7. Rotate the drives 90 degrees, then reinstall them into the drive bays.

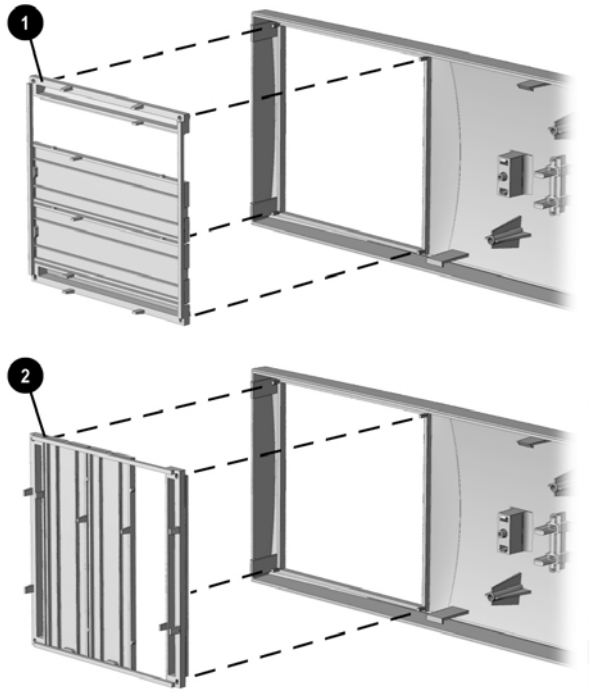
✎ The diskette drive should always be placed in the bay nearest the top of the chassis in the desktop configuration for proper drive clearance and access.



CAUTION: The use of unnecessary force may result in damage to the drives.

8. Reconnect the power, signal, and audio cables to the drives.
9. Remove the subpanel and rotate the bezel blanks 90 degrees (Section 4.9).

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



10. Replace the subpanel, front bezel, and the computer access panel.

    Reassemble the computer.

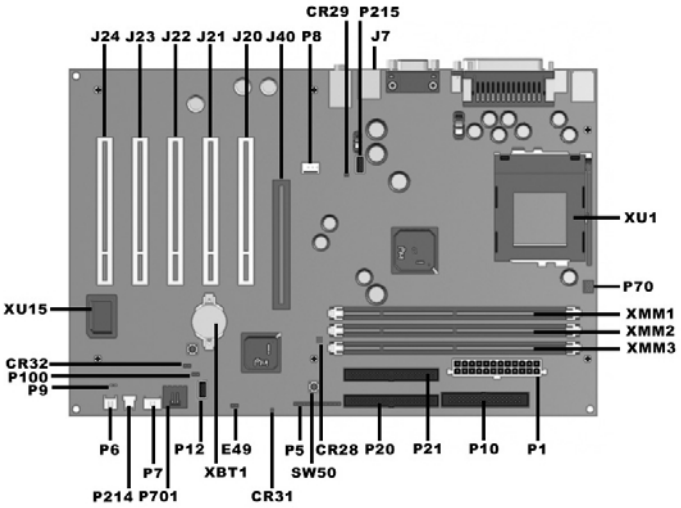
chapter 5

CONNECTORS AND JUMPERS

This chapter provides connect or, jumper, and switch information for system board jumpers, system I/O board connectors, and hard drives for the Convertible Minitower model.

5.1 System Board

5.1.1 Connectors and Jumpers



CR28	3.3V Aux LED	P12	SOS Connector
CR29	3.3V Main LED (NI)	P214	Hood Intrusion Sensor
CR31	Power Button LED (ON when pushed)	P215	Hood Lock Solenoid Connector
CR32	5V Aux (ON)/PS_ON_LED (OFF)	P10	Diskette Drive Connector
E49	Clear Password Header (Installed = Enabled, Removed = Cleared)	P20	Primary IDE Connector
SW50	Clear CMOS	P21	Secondary IDE Connector
P1	Power Supply Connector	P70	CPU Fan
P5(pins 1-9)	Power Button, Pwr LED and HD LED Connector	P100	ITP Connector
P5(pins 10-11)	SCSI LED Connector	J20-24	PCI Slots
P6	Speaker Connector	J40	AGP/AIMM Connector
P7	CD-ROM Audio	XBT1	External Battery
P701	CD-ROM Audio	XMM1-3	DIMM Memory Slots
P8	Chassis Fan Connector	XU1	Primary Processor Socket

5.1.2 Clearing CMOS

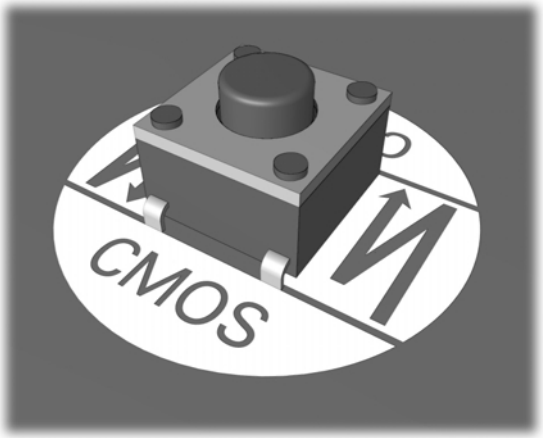
The computer's configuration (CMOS) may occasionally be corrupted. If it does, it is necessary to clear the CMOS memory using jumper SW50.

To clear and reset the configuration, perform the following procedure:

1. Prepare the computer for disassembly (Section 4.2).

CAUTION: The power cord must be disconnected from the power source before pushing the Clear CMOS Button (NOTE: All LEDs on the board should be OFF). Failure to do so may damage the system board.

2. Remove the access panel (Section 4.6).
3. Press the CMOS button located on the system board and keep it depressed for 5 seconds.



4. Replace the access panel.
5. Turn the computer on.
6. Run F10 Computer Setup (delete-utility) to reconfigure the system.

5.1.3 Disabling or Clearing the Power-On and Setup Passwords

1. Turn off the computer and any external devices, and disconnect the power cord from the power outlet.
2. Disconnect the keyboard, monitor, and any other external devices connected to the computer.
3. Remove the access panel.
4. Locate the header and jumper labeled E49.
5. Remove the jumper from pins 1 and 2. Place the jumper over pin 2 only, in order to avoid losing it.
6. Replace the access panel.
7. Reconnect the external equipment.
8. Plug in the computer and turn on power. Allow the operating system to start. This clears the current passwords and disables the password features.
9. To re-enable the password features, repeat steps 1-4, then replace the jumper on pins 1 and 2.
10. Repeat steps 6-8, then establish new passwords.

    Refer to the Computer Setup (F10 Setup) instructions to establish new passwords.

5.1.4 CMOS Archive and Restore (Power Switch Override)

Each time the system starts, the system ROM saves a copy of NVRAM (including CMOS, passwords, and other system variables) in the flash ROM. Should the system become unstable, the last known good copy of NVRAM can be restored using a feature called "power button override." To restore NVRAM, do the following:

1. With the unit powered down, press and release the power button.
2. Immediately after pressing the power button (during POST), press and hold the power button until the unit powers down (about 4 seconds).

At the next startup, the ROM detects this "power button override" event and the backup copy of NVRAM is restored.

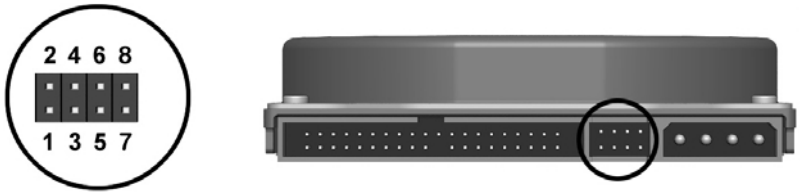
Because of this feature, users cannot power off the computer immediately after powering up. The video display must be active before the computer can be powered off.

CAUTION: Unplugging the power cord during POST can corrupt the splash screen. Flashing the ROM is required to restore the splash screen, although the computer will continue to function.

5.2 Hard Drive Jumper Settings

5.2.1 Seagate, Quantum, and Western Digital

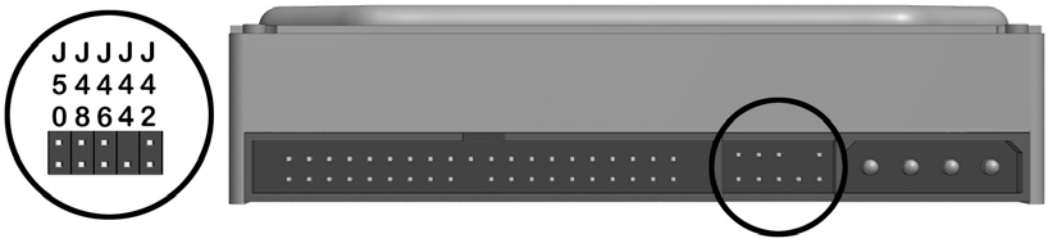
The drawings and tables below apply to a number of different size drives in the following paragraphs.



Seagate, Quantum, and Western Digital
Ultra ATA Hard Drive Jumper Settings

Definition	Seagate	Quantum	Western Digital
Single	7 - 8	1 - 2 and 3 - 5	3 - 5
Primary	5 - 6 and 7 - 8	1 - 2 and 3 - 5	5 - 6
Secondary	No connection	3 - 5	3 - 4
Cable Select	5 - 6	2 - 4 and 3 - 5	1 - 2

5.2.2 Maxtor



Maxtor Ultra ATA Hard Drive Jumper Settings

Definition	J50	J48	J46	J44	J42
Single	J				
Primary (in a dual-drive system)	J				
Secondary	O				
Cable Select					
Disabled*		O			
Enabled		J			
4092 Cylinder Limitation					
Disabled*			O		
Enabled			J		
Factory Reserved				O	
Factory Reserved					O

* = Default setting
J = Jumper
O = No jumper

chapter 6

SPECIFICATIONS

6.1 Specifications

6.1.1 System

Dimensions		
Height	17.65 in	44.83 cm
Width	6.60 in	16.76 cm
Depth	16.80 in	42.67 cm
Weight (approximate, depending on configuration)	26 lb	11.8 kg
Power Supply, 200 Watt		
Operating Voltage Range	200 VAC	
Rated Voltage Range	Switched 115/230 V	
Rated Line Frequency	50-60 Hz	
Rated Input Current	2A/4A (115V/230V)	
Maximum Rated Power	200W	
Environmental Requirements:		
Temperature		
Operating	50 to 95°F	10 to 35°C
Shipping	-4° to 140°F	-20° to 60°C
Humidity (noncondensing)		
Operating	20% to 80%	20% to 80%
Nonoperating	10% to 90%	10% to 90%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m

6.1.2 System Interrupts

Hardware IRQ	System Function
0	Timer Interrupt
1	Keyboard
2	Interrupt Controller Cascade
3	Serial Port (COM B)
4	Serial Port (COM A)
5	Audio
6	Diskette Drive
7	Parallel Port (LPT 1)
8	Real-Time Clock
9	Available for PCI
10	Available for PCI
11	Available for PCI
12	Mouse
13	Coprocessor
14	Primary IDE Controller
15	Secondary IDE Controller

6.1.3 System DMA

Hardware DMA	System Function
0	Unused
1	Unused
2	Diskette Drive
3	ECP Parallel Port LPT1 (Default; Alternate = DMA 0)
4	DMA Controller Cascading
5	Unused
6	Unused
7	Unused

6.1.4 ICH Fixed I/O Registers

Port	Register Name
00h, 02h, 04h, 06h	Channel 0, 1, 2, 3 DMA Base & Current Address Regsiter
C0h, C4h, C8h, CCh	Channel 4, 5, 6, 7 DMA Base & Current Address Register
01h, 03h, 05h, 07h	Channel 0, 1, 2, 3 DMA Base & Current Count Register
C2h, C6h, Cah, CEh	Channel 4, 5, 6, 7 DMA Base & Current Count Register
10h-1Fh	**Aliased at 00h-0Fh**
20h	Master PIC ICW1 Init. Cmd Word 1 Register Master PIC OCW2 Op Ctrl Word 2 Register Master PIC OCW3 Op Ctrl Word 3 Register
21h	Master PIC ICW2 Init. Cmd Word 1 Register Master PIC ICW3 Init. Cmd Word 1 Register Master PIC ICW4 Init. Cmd Word 1 Register Master PIC OCW1 Op Ctrl Word 3 Register
24h-25h, 28-29h, 2Ch-2Dh, 30h-31h, 34h-35h, 38h-39h, 3Ch-3Dh	**Aliased at 20h-21h**
40h	Counter 0 Interval Time Status Byte Format Counter 0 Counter Access Port Register
41h	Counter 1 Interval Time Status Byte Format Counter 1 Counter Access Port Register
42h	Counter 2 Interval Time Status Byte Format Counter 2 Counter Access Port Register
43h	Timer Control Word Register Timer Control Word Register Read Back Counter Latch Command
50h-53h	**Aliased at 40h-43h**
61h	NMI Status and Control Register
70h	NMI Enable Register Real-Time Clock (Standard RAM) Index Register
71h	Real-Time Clock (Standard RAM) Target Register
72h	Extended RAM Index Register
73h	Extended RAM Target Register
74h-75h	**Aliased at 70h-71h**
76h-77h	**Aliased at 72h-73h or 70h-71h**
81h, 82h, 83h	Channel 2, 3, 1 DMA Memory Low Page Register
84h-86h, 88h	Reserved Page Registers
89h, 8Ah, 8Bh	Channel 6, 7, 5 DMA Memory Low Page Register
8CH-8Eh	Reserved Page Registers
8Fh	Refresh Low Page Register
91h-9Fh (except 92h)	**Aliased at 81h-8Fh**
92h	Fast A20 and INIT Register

continued

ICH Fixed I/O Registers cont

Port	Register Name
CF9h	Reset Control Register
A0h	Slave PIC ICW1 Init. Cmd Word 1 Register
	Slave PIC OCW2 Op Ctrl Word 2 Register
	Slave PIC OCW3 Op Ctrl Word 3 Register
A1	Slave PIC ICW2 Init. Cmd Word 2 Register
	Slave PIC ICW3 Init. Cmd Word 3 Register
	Slave PIC ICW4 Init. Cmd Word 4 Register
	Slave PIC OCW1 Op Ctrl Word 1 Register
A4h-A5h, A8h-A8h, ACh-ADh, B0h-B1h, B4h-B5h, B8h-B9h, BCh-BDh	**Aliased at A0h-A1h**
B2h	Advanced Power Management Control Port Register
B3h	Advanced Power Management Status Port Register
C0h, C4h, C8h, CCh	Channel 4, 5, 6, 7 DMA Base and Current Address Register
C1h	**Aliased at C0h**
C5h	**Aliased at C4h**
C9h	**Aliased at C8h**
CDh	**Aliased at CCh**
C2h, C6h, CAh, CEh	Channel 4, 5, 6, 7 DMA Base and Current Count Register
C3h	**Aliased at C2h**
C7h	**Aliased at C6h**
CBh	**Aliased at CAh**
CFh	**Aliased at Ceh**
D0h	Channel 4-7 DMA Command Register
	Channel 4-7 DMA Status Register
D1h	**Aliased at D0h**
D4h	Channel 4-7 DMA Write Single Mask Register
D5h	**Aliased at D4h**
D6h	Channel 4-7 DMA Channel Mode Register
D7h	**Aliased at D6h**
D8h	Channel 4-7 DMA Clear Byte Pointer Register
D9h	**Aliased at D8h**
DAh	Channel 4-7 DMA Master Clear Register
DBh	**Aliased at DAh**
DCh	Channel 4-7 DMA Clear Mask Register
DEh	**Aliased at DCh**
DEh	Channel 4-7 DMA Write All Mask Register
DFh	**Aliased at DEh**
F0h	Coprocessor Error Register
170h-177h	PIO Mode Command Block Offset for Secondary Drive

continued

ICH Fixed I/O Registers cont

Port	Register Name
1F0h-1F7h	PIO Mode Command Block Offset for Primary Drive
376h	PIO Mode Control Block Offset for Secondary Drive
3F6h	PIO Mode Control Block Offset for Primary Drive
4D0h	Master PIC Edge/Level Triggered Register
3F6h	PIO Mode Control Block Offset for Primary Drive
4D0h	Master PIC Edge/Level Triggered Register
4D1h	Slave PIC Edge/Level Triggered Register
400-47F	Super I/O
F800-F87F	Reserved (power management)
FA00-FA3F	Reserved (GPIO management)
FC00-FC0F	Reserved (SMBUS controller)

NOTE: When the POS_DEC_EN bit is set, additional I/O ports get positively decoded by the ICH.

6.1.5 System Memory Map

Size	Memory Address	System Function
512 KB	FFFFFFFFh to FFF80000	System ROM
3839 MB	FFFBFFFFh to 10000000h	PCI Memory Expansion
511 MB	0FFFFFFFh to 00100000h	HOST or PCI Memory Expansion
128KB	000FFFFFh to 000E0000h	System ROM
96 KB	000DFFFFh to 000C8000h	PCI Option ROMs
32 KB	000C7FFFh to 000C0000h	Video ROM
128 KB	000BFFFFh to 000A0000h	Video RAM
640 KB	0009FFFFh to 00000000h	Base Memory

6.2 Drives

6.2.1 1.44-MB Diskette Drive

Size and Capacity	
Size (in)	3.5
High Density (MB)	1.44
Low Density (KB)	720
Compaq Spare Part Number	191714-001
Light	Green
Drive Rotation (rpm)	300
Height	One-third (1 inch)
Bytes per Sector	512
Sectors per Track (high/low density)	18/9
Tracks per Side (high/low density)	80/80
Read/Write Heads	2
Cylinders (high/low density)	80/80
Average Seek Time (ms)	
Track-to-Track (high/low)	3/6
Average (high/low)	94/173
Settling Seek Time	15
Latency Average (ms)	100

6.2.2 Ultra ATA Hard Drives

	10.0 GB	15.0 GB	20.0 GB
Formatted Capacity			
Physical (MB)	10005	15020	20020
Logical (MB)	Not available	8455	8455
Compaq Spare Part Number	135364-001	192060-001	180475-001
Total Logical Sectors	19541088	29336832	39102336
Logical Geometry			
Cylinders	16383	16383	16383
Heads	16	16	16
Sectors	63	63	63
Physical Geometry			
Cylinders	15011	24453	19955
Heads	8	3	4
Sectors	214-312	312-494 (20 zones)	380-585 (10 zones)
Data Bytes/Sector	512	512	512
Sector Interleave	1:1	1:1	1:1
ECC Bytes	34	18 bytes ON-THE-FLY 33 bytes FIRMWARE	18
Recording Method–EPR4	PRML	48/51 PRML	16/17 EPRML
Spin-Up Time (maximum)	TYP / MAX 18 sec / 31 sec	9 seconds	7.92 seconds
Spin-Down Time (maximum)	Not available	10 seconds	6.96 seconds
Seek Times, Logical (Busy to Seek Complete)	TYP / MAX	MAX / TYP	MAX / TYP
Track-to-Track	1.7ms / 2.4ms	5.0ms / 2.0ms	0.5ms / 0.4ms
Average (Read)	8.5 ms / 9.5ms	15.0ms / 9.5ms	8.0m s / 7.5ms
Full Stroke	15ms / 18ms	25.0ms / 21.0ms	16.4ms / 15.7ms
Average Latency	5.56ms	4.17ms	4.16ms
Data Transfer Rate			
@Disk to Buffer	139.61 – 224.31 MB/s	189.0 - 304.3 Mbits/s	364Mbits/s Max
@Interface w/o IORDY		12.5 MB/s	16.6 MB/s
PIO	16.6 MB/s	up to 16.6 MB/s	16.6 MB/s
DMA	16.6 MB/s	up to 33.3 MB/s	66.6 MB/s
UDMA	66.6 MB/s	up to 66.6 MB/s	
RPM	7200+/-0.1%	7200+/-0.1%	7200+/- 0.2%

6.2.3 CD-ROM Drives

	48X Max
Compaq Spare Part Number	187263-001
Data Buffer (ms)	16.6
Data Transfer Rate	150 KB/s Min (audio) CD: 3000-7200 KB/s
Access Time (ms)	
Random	<100
Full-Stroke Seek	<150
Cache Buffer	128 KB
Interface	ATAPI
Disk Formats Read	Photo-CD/Multisession CD-ROM Multi Read CD TEXT Audio CD CD-I CD-RW CD-R CD EXTRA CD-ROM XA
Disk	
Capacity	CD: 650 MB
Block Size	Mode 1 – 2048 bytes Mode 2 – 2340, 2336 bytes CD-DA – 2353 bytes CD-XA – 2328 bytes
Diameter	12 cm;8 cm
Thickness	1.2 mm
Track Pitch	1.6 um
Audio Output Level	
Line Out	0.7 V @ 47 K ohm
Headphone	0.6 V @ 32 ohm
Startup Time	<7 sec (typical); <30 sec with multisession
Operating Conditions	
Temperature	5 – 45 C
Humidity	10-80% relative humidity
Dimensions (mm) (HxWxD)	42.9x150.1x208
Weight (grams)	1200
MPEG Playback Graphics Solution Support	None

6.3 Compaq Keyboards

	Compaq Easy Access	Compaq Enhanced	Compaq Smart Card
Dimensions			
Height	1.4 in	1.4 in	1.4 in
Width	18.3 in	18.3 in	18.3 in
Depth	6.3 in	6.3 in	6.3 in

6.4 2-Button Mouse

Dimensions		
Height	1.34 in	3.4 cm
Length	4.45 in	11.3 cm
Width	2.36 in	6.0 cm
Weight	4.59 oz	130 g
Base Resolution	400 dpi	400 dpi
Tracking Speed (maximum)	10 in/sec	25 cm/sec
Temperature		
Operating	50°F to 104°F	10°C to 50°C
Non-operating	-22°F to 140°F	-30°C to 60°C
Lifetime		
Mechanical	300 miles	483 km
Switch	1 million operations	1 million operations
Relative Humidity		
Operating	10% to 90%, noncondensing	10% to 90%, noncondensing
Non-operating	20% to 80%, noncondensing	20% to 80%, noncondensing
ESD	CE level 4, 15kV air discharge	

6.5 Supported Graphics Resolutions

6.5.1 Intel 3D Graphics

Colors	256	65K	16.7M
640 x 480	85 Hz	85 Hz	85 Hz
800 x 600	85 Hz	85 Hz	85 Hz
1024 x 768	85 Hz	85 Hz	85 Hz
1152 x 864	85 Hz	85 Hz	85 Hz
1280 x 1024	85 Hz	85 Hz	85 Hz
1600 x 1200	85 Hz	85 Hz	85 Hz

6.5.2 nVIDIA TNT 3D AGP

Colors	256	65K	16.7M
640 x 480	120 Hz	120 Hz	120 Hz
800 x 600	120 Hz	120 Hz	120 Hz
1024 x 768	120 Hz	120 Hz	120 Hz
1280 x 1024	120 Hz	120 Hz	120 Hz
1600 x 1200	85 Hz	85 Hz	85 Hz
1800 x 1440	72 Hz		

chapter 7

SERVICE NOTES

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

1. The new Intel 815e chipset in these models is a high-performance, flexible technology that also provides stability for future models. This chipset supports PIII processors with 100- or 133-MHz front-side bus, as well as non-ECC PC100 or PC133 SDRAM.
2. Although some of these models ship with Ultra ATA/66 hard drives, the chipset also supports Ultra ATA/100 technology. The chipset also provides for integrated 3D graphics, USB capability, and 10/100 media access controller integration.
3. The processor die is mounted upside down on a board. The heatsink mounts directly to the back of the die. The die is centered in the processor package, but the processor is offset in the system board socket because of the hinge for the lever arm. The heatsink and the clip must be properly aligned to ensure that the clip pushes the heatsink flat against the processor die.

   If the heatsink is mounted improperly, the processor will run at a higher than normal temperature, making the fans to run faster to cool it down. The processor is protected from thermal damage in two ways: First, a hardware circuit monitors the temperature of the processor and causes it to throttle back (run much slower) if it exceeds a much higher than normal operating temperature. Second, the processor will shut down when it reaches 135 degrees C to prevent damage. If Compaq's DMI software is installed, the user receives a warning about any elevated temperature in the processor.
4. Unplug the power cord before installing or removing any PCI boards, since the PCI slots are hot with auxiliary power. If the power cord is not unplugged, damage to the boards can occur.
5. The following setup is required for system memory to run at 133 MHz:
   - a 133-MHz front-side bus processor must be installed
   - all installed DIMMs must be PC133
   - no more than four loads (four sides of SDRAM) on the data lines

   In all other cases, the system BIOS downshifts the memory to 100 MHz.
6. The 10-GB Ultra ATA hard drive in the new Deskpro EN Series configurations features a "quiet seek" mode that reduces the noise level of the hard drive by 7 decibels during search operations. This feature, however, must be enabled from F10 Setup and may affect hard drive performance by about 10 percent in some cases.

   There are unique spare part numbers for Ultra ATA hard drives with and without the quiet seek feature.

7. Each time the system boots, the system ROM saves a copy of NVRAM (including CMOS, passwords, and other system variables) in the flash ROM. Should the system become unstable, the last known good copy of NVRAM can be restored using a feature called "power button override." To restore NVRAM, do the following:
   1. With the unit powered down, press and release the power button.
   2. Immediately after pressing the power button (during POST), press and hold the power button until the unit powers down (approximately 4 seconds).

   At the next boot, the ROM detects this "power button override" event and the backup copy of NVRAM is restored.

   Because of this feature, users cannot power off the computer immediately after powering up. The video display must be active before the computer can be powered off.

8. The major core BIOS for the Deskpro EN is significantly changed from previous versions. Some of the key changes include:
   - detailed F10 Setup help text via the F1 key
   - enhanced storage support from F10 Setup, including:
     - detailed device viewing information
     - choice of booting to IDE or SCSI hard drives
     - execution of IDE DPS self test
     - support for LS-120 and ZIP drive booting (without a 1.44-MB diskette drive
     - increased maximum drive capacity from 64 GB to 2 terabytes
     - SCSI SMART failure support
     - adjustment of configurable device parameters, including:
       - translation mode options: bit shift (default), LBA assisted, user (must specify desired geometry), and none (hard disk defaults used). Two "industry standard" translations inhibits "connect-and-go" access to hard disk data
       - Emulation type option, which allows users to force the BIOS to treat the device as the specified device type

         For an LS-120 and ATAPI ZIP drive, emulation modes include
         1. diskette (ZIP drive only; to boot as A:/ drive)
         2. hard disk
         3. none

         The device's native type is always "none". For the Zip drive, none means "other" device type: for the LS-120 drive, none means "diskette" device type.
   - new F10 Setup device information
   - service password that allows for back-door, power-on capability in the event a password is forgotten
   - advanced interrupt controller (APIC) that provides more interrupt requests (IRQs) for PCI IRQ mapping (this feature can be disabled in F10 Setup)
   - 10-second POST time (may vary with slower storage devices or removable media)
   - master boot record (MBR) security, which provides recovery from malicious or accidental damage to the boot disk's MBR
   - notifies user during POST if the boot disk or its MBR has changed
   - changes to either the boot disk or the MBR require:
     - saving a new MBR image
     - disabling MBR security
     - restoring the backup MBR to the disk (unless the boot disk has changed)
   - some administrative utilities (like fdisk) cause changes to the MBR that are detected in the next reboot

Index

T

U

201843-001

200803-002