Maintenance & Service Guide

HP Pro 2110 Small Form Factor
HP Pro 3120 Minitower
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HP Pro 3130 Small Form Factor

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HP Pro 2110 Small Form Factor

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HP Pro 3125 Minitower

HP Pro 3130 Minitower

HP Pro 3130 Small Form Factor

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About This Book

⚠ **WARNING!** Text set off in this manner indicates that failure to follow directions 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 information.

NOTE: Text set off in this manner provides important supplemental information.

Table of contents

1 Installing and Customizing the Software

If your computer was not shipped with a Microsoft operating system, some portions of this documentation do not apply. Additional information is available in online help after you install the operating system.

NOTE: If the computer was shipped with Windows Vista or Windows 7 loaded, you will be prompted to register the computer with HP Total Care before installing the operating system. You will see a brief movie followed by an online registration form. Fill out the form, click the **Begin** button, and follow the instructions on the screen.

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

NOTE: Be sure there is a 10.2-cm (4-inch) clearance at the back of the unit and above the monitor to permit the required airflow.

Installing the Operating System

The first time you turn on the computer, the operating system is installed automatically. This process takes about 5 to 10 minutes, depending on which operating system is being installed. Carefully read and follow the instructions on the screen to complete the installation.

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

NOTE: If the computer shipped with more than one operating system language on the hard drive, the installation process could take up to 60 minutes.

If your computer was not shipped with a Microsoft operating system, some portions of this documentation do not apply. Additional information is available in online help after you install the operating system.

Downloading Microsoft Windows Updates

1. To set up your Internet connection, click **Start** > **Internet Explorer** and follow the instructions on the screen.
2. Once an Internet connection has been established, click the **Start** button.
3. Select the **All Programs** menu.
4. Click on the **Windows Update** link.

   In Windows Vista and Windows 7, the **Windows Update** screen appears. Click **view available updates** and make sure all critical updates are selected. Click the **Install** button and follow the instructions on the screen.

   In Windows XP, you will be directed to the **Microsoft Windows Update Web site**. If you see one or more pop-up windows that ask you to install a program from http://www.microsoft.com, click **Yes** to install the program. Follow the instructions on the Microsoft Web site to scan for updates and install critical updates and service packs.

   It is recommended that you install all of the critical updates and service packs.
5. After the updates have been installed, Windows will prompt you to reboot the machine. Be sure to save any files or documents that you may have open before rebooting. Then select **Yes** to reboot the machine.

Installing or Upgrading Device Drivers (Windows systems)

When installing optional hardware devices after the operating system installation is complete, you must also install the drivers for each of the devices.

If prompted for the i386 directory, replace the path specification with `C:\i386`, or use the **Browse** button in the dialog box to locate the i386 folder. This action points the operating system to the appropriate drivers.

Obtain the latest support software, including support software for the operating system from http://www.hp.com/support. Select your country and language, select **Download drivers and software (and firmware)**, enter the model number of the computer, and press Enter.

Accessing Disk Image (ISO) Files

There are disk image files (ISO files) included on your PC that contain the installation software for additional software. These CD image files are located in the folder C:\SWSetup\ISOs. Each .iso file can be burned to CD media to create an installation CD. It is recommended that these disks be created and the software installed in order to get the most from your PC. The software and image file names are:

- Corel WinDVD SD and BD – installation software for WinDVD – used to play DVD movies
- HP Insight Diagnostics OR Vision Diagnostics – software to perform diagnostic activities on your PC

Protecting the Software

To protect the software from loss or damage, keep a backup copy of all system software, applications, and related files stored on the hard drive. Refer to the operating system or backup utility documentation for instructions on making backup copies of your data files.

2 Computer Setup (F10) Utility

The computer setup utility differs for the different models.

HP Pro 2110 – Computer Setup (F10) Utilities

Use Computer Setup (F10) Utility to do the following:

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Modify the boot order of bootable devices such as hard drives, diskette drives, optical drives, or USB flash media devices.
- Restrict a device from booting the unit.
- Run hard drive self-tests.
- View CPU and system temperatures.
- Establish a supervisor password that controls access to Computer Setup (F10) Utility and the settings described in this section.
- Secure integrated I/O functionality, including the serial, USB, or parallel ports, audio, or embedded NIC, so that they cannot be used until they are unsecured.
- Enable or disable pre-boot messages.
- Enable or disable USB legacy support.

Using Computer Setup (F10) Utilities

Computer Setup can be accessed only by turning the computer on or restarting the system. To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer.
2. As soon as the computer is turned on, press F10 before the system boots to the operating system to enter Computer Setup. Press Enter to bypass the title screen, if necessary.

NOTE: If you do not press F10 at the appropriate time, you must restart the computer and again press F10 before the unit boots to the operating system to access the utility.

3. The Computer Setup Utility screen is divided into menu headings and actions.

   Six menu headings appear on the Computer Setup Utility screen:

   - Main
   - Advanced
   - Boot
   - Power
   - PC Health
   - Exit

   Use the arrow keys to select the appropriate heading, then press Enter. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the previous screen, press Esc.

4. To apply and save changes, press the F10 key.

   If you have made changes that you do not want applied, press the F5 key to return to the previous values.

   To load optimized default values, press the F7 key.

CAUTION: Do NOT turn the computer power OFF while the ROM is saving the Computer Setup (F10) changes because the CMOS could become corrupted. It is safe to turn off the computer only after exiting the F10 Setup screen.

Table 2-1 Computer Setup (F10) Utility Main Menu

Heading	Table
Main	Computer Setup—Main on page 6
Advanced	Computer Setup—Advanced on page 7
Boot	Computer Setup—Boot on page 8
Power	Computer Setup—Power on page 9
PC Health	Computer Setup—PC Health on page 10
Exit	Computer Setup—Exit on page 10

Computer Setup—Main

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-2 Computer Setup—Main

Option	Description
System Information	Allows you to view the following system information: • Processor Type (view only) • Processor Speed (view only) • CPUID/PatchID (view only) • Cache Size (view only) • Memory Size (view only) • Integrated MAC (view only) • System BIOS (view only)
System IDs	Allows you to view or change the following system identification information: • Product Name (press Enter to change) • Serial Number (press Enter to change) • UUID (press Enter to change) • SKU Number (press Enter to change) • Family Name (view only) • Asset Tag Number (press Enter to change) • Feature Byte (press Enter to change) • Build ID (press Enter to change)
Set Time and Date	Allows you to set system time and date.

SATA Port 1
SATA Port 2
SATA Port 3
SATA Port 4
	Allows or displays the following for each SATA Port:
	• Port Configuration — Disable/enable SATA Port
	• HDD Self-Test for selected channel:
	  ◦ SMART Status Check
	  ◦ HDD Short Self-Test
	  ◦ HDD Extended Self-Test
	• Vendor (view only)
	• Size (view only)
	• Firmware (view only)

Table 2-2 Computer Setup—Main (continued)

Option	Description
SATA Controller	Allows you to choose how the SATA controller and devices are accessed by the operating system. The following options are available: • Native Mode - 4 SATA port • Compatible Mode - 2 PATA devices and 2 SATA devices (ports)
Onboard FDC Controller	Disables/enables the floppy disk controller.
Drive A	(view only)
Halt On	Allows you to set POST error behavior to: • No Errors • All Errors • All But Keyboard
POST Delay	Allows you to set a POST delay to: • 0 seconds • 5 seconds • 10 seconds • 15 seconds • 30 seconds

Computer Setup—Advanced

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-3 Computer Setup—Advanced

Option	Description
Execute Disable Bit	Disables/enables hardware DEP function.
Intel (R) Virtualization Tech	Allows you to enable/disable the processor's Virtualization Technology feature.
Init Display First	Allows you to select the primary display device: • OnChip VGA • PCI Slot • PCIEx

Table 2-3 Computer Setup—Advanced (continued)

Option	Description
MAX DVMT Allocation	Allows you to specify the DVMT/system memory allocated for video memory: • 128MB • 256MB • Max
Onboard HD Audio	Allows you to disable/enable onboard HD audio.
OnChip USB Controller	Disables/enables the universal host controller interface for USB (Universal Serial Bus).
USB Legacy Support	Disables/enables USB legacy support function (USB keyboard, USB mouse, and USB flash media).
Onboard LAN	Disables/enables onboard LAN controller.
Onboard LAN Boot ROM	Disables/enables the boot ROM of the onboard LAN chip.
Onboard Serial Port 1	Allows you to select a setting for the onboard serial port: • Disabled • 3F8/IRQ4 • 2F8/IRQ3 • 3E8/IRQ4 • 2E8/IRQ3

Computer Setup—Boot

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-4 Computer Setup—Boot

Option	Description
ESC Boot Menu	Allows you to enable/disable the option to press the ESC key to access the Boot menu during computer startup.
F9 Diagnostics	Disables/enables F9 Boot Menu prompt message on the logo screen.
F10 Setup Prompt	Disables/enables the F10 Setup prompt message on the logo screen.
F11 Recovery	Disables/enables F11 Recovery and provides the option of showing the F11 Recovery prompt message on the logo screen. Choose from the following: • Disabled • Enabled no prompt • Enabled and prompt

Table 2-4 Computer Setup—Boot (continued)

Option	Description
F12 Boot from LAN Prompt	Disables/enables the F12 Boot from LAN prompt message on the logo screen.
Hard Disk Boot Seq.	Allows you to specify the order of attached hard drive devices (such as USB HDD storage or USB flash media). The first drive in the order has priority in the boot sequence and is recognized as drive C (if any devices are attached).
Optical Drive Boot Seq.	Allows you to specify the order in which attached optical drives (including USB ODD) are checked for a bootable operating system image.
Network Boot Seq.	Allows you to specify the order in which network devices (including UP NIC cards) are checked for a bootable operating system image.
First Boot Device **Second Boot Device** **Third Boot Device** **Fourth Boot Device**	Allows you to specify which devices will boot first, second, third, and fourth or to disable any of the four: • Removable • CDROM • Hard Disk • Network **NOTE:** MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started.
Set Supervisor Password	Allows you to establish a password to control access to Computer Setup.
BIOS Write Protection	Disables/enables BIOS upgrading.

Computer Setup—Power

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-5 Computer Setup—Power

Option	Description
After AC Power Loss	Allows you to select system power loss behavior: • Off • On • Last State
Wake on PCI Device from S5	Disables/enables waking up from S5 by PCI device.
RTC Alarm Resume	Disables/enables RTC (real-time clock) alarm.

Computer Setup—PC Health

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-6 Computer Setup—PC Health

Option	Description
Chassis Opened Warning	Allows you to disable/enable the chassis intrusion function and clear the intrusion warning.
System Fan Fail Check	Disables/enables detection of system fan during POST.
Smart Fan Function	Disables/enables Smart Fan functionality. Enabling optimizes fan control for best acoustic behavior.
Current CPU Temperature	(view only)
Current System Temperature	(view only)
Current CPU Fan Speed	(view only)
Current System Fan Speed	(view only)

Computer Setup—Exit

Table 2-7 Computer Setup—Exit

Option	Description
Save & Exit Setup	Allows you to save current settings and exit Computer Setup.
Exit Without Saving	Allows you to exit Computer Setup without saving changes.
Load Optimal Defaults	Allows you to reset Computer Setup to factory defaults.

HP Pro 3120 – Computer Setup (F10) Utilities

Use Computer Setup (F10) Utility to do the following:

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for graphics, audio, storage, communications, and input devices.
- View settings for processor and memory.
- Modify the boot order of bootable devices such as hard drives, optical drives, or USB flash media devices.
- Run hard drive self-tests.
- Establish a supervisor password that controls access to Computer Setup (F10) Utility and the settings described in this section.

Using Computer Setup (F10) Utilities

Computer Setup can be accessed only by turning the computer on or restarting the system. To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer.
2. As soon as the computer is turned on, press F10 before the computer boots to the operating system to enter Computer Setup.

   NOTE: If you do not press F10 at the appropriate time, you must restart the computer and again press F10 before the computer boots to the operating system to access the utility.

3. The Computer Setup Utility screen is divided into menu headings and actions.

   Five menu headings appear on the Computer Setup Utility screen:

   - Main
   - Advanced
   - Power
   - Boot
   - Exit

   Use the arrow keys to select the appropriate heading, then press Enter. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the previous screen, press Esc.

CAUTION: Do NOT turn the computer power OFF while the ROM is saving the Computer Setup (F10) changes because the CMOS could become corrupted. It is safe to turn off the computer only after exiting the F10 Setup screen.

Computer Setup—Main

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-8 Computer Setup—Main

Option	Description
System Time	Allows you to set system time.
System Date	Allows you to set system date.
System IDs	Allows you to view the following system identification information: • Product Name (view only) • Serial Number (view only) • UUID (view only) • SKU Number (view only) • Family Name (view only) • Feature Byte (view only) • Build ID (view only)
Language	Allows you to select language.
Floppy Diskette A	Allows you to set drive A to: • Disabled • 1.44 MB 3.5″ • Not Installed (default)

Table 2-8 Computer Setup—Main (continued)

1st Drive **2nd Drive** **3rd Drive** **4th Drive**	For each, allows you to adjust or view: • Capacity (Size - HDD only) - view only • Transfer Mode- view only • Smart Support - run HDD self-test for selected channel: ◦ SMART Status Check ◦ SMART Short Self-Test ◦ SMART Extended Self-Test
System Information	Allows you to view: • Installed Memory • Memory Bank 1 • Memory Bank 2 • Memory Bank 3 • Memory Bank 4 • BIOS Revision • Core Version

Computer Setup—Advanced

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

WARNING! Setting items on this menu to incorrect values may cause your system to malfunction.

Table 2-9 Computer Setup—Advanced

Option	Description
CPU Type	(view only)
CPU Speed	(view only)
Cache RAM	(view only)
Cache RAM (L2)	(view only)
Cache RAM (L3)	(view only)
Primary Video Adapter	Allows you to select the boot display device when more than 2 video options are offered by the system: • PCI-E (default) • Onboard
USB Ports	Allows you to disable/enable individual USB ports.
SATA Controller	Allows you to disable/enable the SATA controller. Default is enabled.
SATA Controller Mode	If SATA Controller is enabled, allows you to set the mode to: • IDE (default) • AHCI • RAID
Onboard Audio	Allows you to set the onboard audio to: • Enabled • Disabled • Auto (default)
Onboard LAN	Allows you to disable/enable onboard LAN controller. Default is enabled.
Onboard LAN Boot ROM	Disables/enables the boot ROM of the onboard LAN chip. Default is enabled.
Change Supervisor Password	Allows you to establish, disable, or change the supervisor password.
Change User Password	Allows you to establish, disable, or change the user password. **NOTE:** Only displays if a Supervisor password is set.
Supervisor Password	Allows you to view whether the supervisor password is enabled or disabled.
User Password	Allows you to view whether the user password is enabled or disabled.

Computer Setup—Power

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-10 Computer Setup—Power

Option	Description
After AC Power Failure	Allows you to select system restart behavior after power loss: • Auto • Power On • Stay Off (default)
XD (Execute Disable) (if supported by hardware)	Allows you to disable/enable the processor's XD feature. Default is enabled.
Virtualization Technology	Allows you to enable/disable the processor's Virtualization Technology feature. Default is disabled.
WOL in S5	Disables/enables limited Wake on LAN from S5. Note that the computer can only wake from S5 during a normal shutdown event. Default is disabled.

Computer Setup—Boot

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-11 Computer Setup—Boot

Option	Description	
Boot-time Diagnostic Screen	Disables/enables POST diagnostic messages display during boot. Default is disabled.	
Boot Device Priority	Allows you to specify which device groups will boot first, second, third, and fourth or to disable any of the four. Also allows you to set the device boot priority within each group.	
	1st Boot Device **2nd Boot Device** **3rd Boot Device** **4th Boot Device**	Allows you to set the device group boot priority: • CD-ROM Group • Hard Drive Group • Floppy Group • Network Boot Group **NOTE:** MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started.
	Floppy Group Boot Priority	Specifies boot device priority within removable devices. **NOTE:** This computer does not support floppy drives.
	CD-ROM Group Boot Priority	Specifies boot device priority within CD/DVD drives.
	HDD Group Boot Priority	Specifies boot device priority within hard drives.
	Network Group Boot Priority	Specifies boot device priority within bootable network devices.

Computer Setup—Exit

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-12 Computer Setup—Exit

Option	Description
Exit Saving Changes	Press Enter to exit saving changes.
Exit Discarding Changes	Press Enter to exit discarding changes.
Load Setup Defaults	Press Enter to load setup defaults.
Discard Changes	Press Enter to discard changes.
Save Changes	Press Enter to save changes.

HP Pro 3125 – Computer Setup (F10) Utilities

Use Computer Setup (F10) Utility to do the following:

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for graphics, audio, storage, communications, and input devices.
- View settings for processor and memory.
- Modify the boot order of bootable devices such as hard drives, optical drives, or USB flash media devices.
- Run hard drive self-tests.
- Establish a supervisor password that controls access to Computer Setup (F10) Utility and the settings described in this section.

Using Computer Setup (F10) Utilities

Computer Setup can be accessed only by turning the computer on or restarting the system. To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer.
2. As soon as the computer is turned on, press F10 before the computer boots to the operating system to enter Computer Setup.

   NOTE: If you do not press F10 at the appropriate time, you must restart the computer and again press F10 before the computer boots to the operating system to access the utility.

3. The Computer Setup Utility screen is divided into menu headings and actions.

Five menu headings appear on the Computer Setup Utility screen:

- Main
- Advanced
- Power
- Boot
- Exit

Use the arrow keys to select the appropriate heading, then press Enter. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the previous screen, press Esc.

△ **CAUTION:** Do NOT turn the computer power OFF while the ROM is saving the Computer Setup (F10) changes because the CMOS could become corrupted. It is safe to turn off the computer only after exiting the F10 Setup screen.

Computer Setup—Main

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-13 Computer Setup—Main

Option	Description
System Time	Allows you to set system time.
System Date	Allows you to set system date.
System IDs	Allows you to view or change the following system identification information: • Product Name (press Enter to change) • Serial Number (press Enter to change) • UUID (press Enter to change) • SKU Number (press Enter to change) • Family Name (view only) • Feature Byte (press Enter to change) • Build ID (press Enter to change)
Language	Allows you to select language.
Floppy Diskette A	Allows you to set drive A to: • Disabled • 1.44 MB 3.5″ • Not Installed

Table 2-13 Computer Setup—Main (continued)

1st Drive **2nd Drive** **3rd Drive** **4th Drive**	For each, allows you to adjust or view: • Port Configuration - disable/enable the SATA port for the selected drive • Capacity (Size - HDD only) - view only • Transfer Mode- view only • Smart Support - run HDD self-test for selected channel: ◦ SMART Status Check ◦ SMART Short Self-Test ◦ SMART Extended Self-Test
System Information	Allows you to view: • Installed Memory • Memory Bank 1 • Memory Bank 2 • Memory Bank 3 • Memory Bank 4 • BIOS Revision • Core Version

Computer Setup—Advanced

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

WARNING! Setting items on this menu to incorrect values may cause your system to malfunction.

Table 2-14 Computer Setup—Advanced

Option	Description
CPU Type	(view only)
CPU Speed	(view only)
Cache RAM (L2)	(view only)
Cache RAM (L3)	(view only)
Primary Video Adapter	Allows you to select the boot display device when more than 2 video options are offered by the system: • Onboard • PCI-E
SATA1 Controller	Allows you to disable/enable the SATA controller.
SATA1 Controller Mode	If SATA Controller is enabled, allows you to set the mode to: • IDE • AHCI
USB Ports	Allows you to disable/enable individual USB ports.
Onboard LAN	Allows you to disable/enable onboard LAN controller.
Onboard LAN Boot ROM	Disables/enables the boot ROM of the onboard LAN chip.
Supervisor Password	Allows you to view whether the supervisor password is enabled or disabled.
User Password	Allows you to view whether the user password is enabled or disabled. **NOTE:** Only displays if a Supervisor password is set.
Change Supervisor Password	Allows you to establish, disable, or change the supervisor password.
Change User Password	Allows you to establish, disable, or change the user password. **NOTE:** Only displays if a Supervisor password is set.
Onboard Audio	Allows you to set the onboard audio to: • Disabled • Enabled • Auto

Computer Setup—Power

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-15 Computer Setup—Power

Option	Description
After AC Power Failure	Allows you to select system restart behavior after power loss: • Stay Off • Power On • Auto
S5 Maximum Power Savings	Disables/enables S5 Maximum Power Savings. Enabling this feature reduces the power of this system as much as possible in the S5 state. This feature must be disabled if you want to enable Wake on LAN from S5.
WOL in S5	Disables/enables limited Wake on LAN from S5. Note that the computer can only wake from S5 during a normal shutdown event. The S5 Maximum Power Savings feature must be disabled in order to enable limited Wake on LAN from S5.
NX (No Execute)	Allows you to disable/enable the processor's NX feature.
Virtualization Technology	Allows you to enable/disable the processor's Virtualization Technology feature.

Computer Setup—Boot

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-16 Computer Setup—Boot

Option	Description
Boot-time Diagnostic Screen	Disables/enables POST diagnostic messages display during boot.

Table 2-16 Computer Setup—Boot (continued)

Boot Device Priority	Allows you to specify which device groups will boot first, second, third, and fourth or to disable any of the four. Also allows you to set the device boot priority within each group.	
	1st Boot Device **2nd Boot Device** **3rd Boot Device** **4th Boot Device**	Allows you to set the device group boot priority: • CD-ROM Group • Hard Drive Group • Floppy Group • Network Boot Group **NOTE:** MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started.
	Floppy Group Boot Priority	Specifies boot device priority within removable devices. **NOTE:** This computer does not support floppy drives.
	CD-ROM Group Boot Priority	Specifies boot device priority within CD/DVD drives.
	HDD Group Boot Priority	Specifies boot device priority within hard drives.
	Network Group Boot Priority	Specifies boot device priority within bootable network devices.

Computer Setup—Exit

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-17 Computer Setup—Exit

Option	Description
Exit Saving Changes	Press Enter to exit saving changes.
Exit Discarding Changes	Press Enter to exit discarding changes.
Load Setup Defaults	Press Enter to load setup defaults.
Discard Changes	Press Enter to discard changes.
Save Changes	Press Enter to save changes.

HP Pro 3130 – Computer Setup (F10) Utilities

Use Computer Setup (F10) Utility to do the following:

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for graphics, audio, storage, communications, and input devices.
- View settings for processor and memory.
- Modify the boot order of bootable devices such as hard drives, optical drives, or USB flash media devices.
- Run hard drive self-tests.
- Establish a supervisor password that controls access to Computer Setup (F10) Utility and the settings described in this section.

Using Computer Setup (F10) Utilities

Computer Setup can be accessed only by turning the computer on or restarting the system. To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer.
2. As soon as the computer is turned on, press F10 before the computer boots to the operating system to enter Computer Setup.

   NOTE: If you do not press F10 at the appropriate time, you must restart the computer and again press F10 before the computer boots to the operating system to access the utility.

3. The Computer Setup Utility screen is divided into menu headings and actions.

   Five menu headings appear on the Computer Setup Utility screen:

   - Main
   - Advanced
   - Power
   - Boot
   - Exit

   Use the arrow keys to select the appropriate heading, then press Enter. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the previous screen, press Esc.

CAUTION: Do NOT turn the computer power OFF while the ROM is saving the Computer Setup (F10) changes because the CMOS could become corrupted. It is safe to turn off the computer only after exiting the F10 Setup screen.

Computer Setup—Main

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-18 Computer Setup—Main

Option	Description
System Time	Allows you to set system time.
System Date	Allows you to set system date.
System IDs	Allows you to view the following system identification information: • Product Name (view only) • Serial Number (view only) • UUID (view only) • SKU Number (view only) • Family Name (view only) • Feature Byte (view only) • Build ID (view only)
Language	Allows you to select language.
Floppy Diskette A	Allows you to set drive A to: • Disabled • 1.44 MB 3.5″ • Not Installed (default)

Table 2-18 Computer Setup—Main (continued)

1st Drive **2nd Drive** **3rd Drive** **4th Drive**	For each, allows you to adjust or view: • Capacity (Size - HDD only) - view only • Transfer Mode- view only • Smart Support - run HDD self-test for selected channel: ◦ SMART Status Check ◦ SMART Short Self-Test ◦ SMART Extended Self-Test
System Information	Allows you to view: • Installed Memory • Memory Bank 1 • Memory Bank 2 • Memory Bank 3 • Memory Bank 4 • BIOS Revision • Core Version

Computer Setup—Advanced

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

WARNING! Setting items on this menu to incorrect values may cause your system to malfunction.

Table 2-19 Computer Setup—Advanced

Option	Description
CPU Type	(view only)
CPU Speed	(view only)
Cache RAM	(view only)
Cache RAM (L2)	(view only)
Cache RAM (L3)	(view only)
Primary Video Adapter	Allows you to select the boot display device when more than 2 video options are offered by the system: • PCI-E • Onboard (default)
USB Ports	Allows you to disable/enable individual USB ports.
SATA Controller	Allows you to disable/enable the SATA controller. Default is enabled.
SATA Controller Mode	If SATA Controller is enabled, allows you to set the mode to: • IDE • AHCI (default) • RAID
Onboard Audio	Allows you to set the onboard audio to: • Enabled • Disabled • Auto (default)
Onboard LAN	Allows you to disable/enable onboard LAN controller. Default is enabled.
Onboard LAN Boot ROM	Disables/enables the boot ROM of the onboard LAN chip. Default is enabled.
Change Supervisor Password	Allows you to establish, disable, or change the supervisor password.
Change User Password	Allows you to establish, disable, or change the user password. **NOTE:** Only displays if a Supervisor password is set.

Table 2-19 Computer Setup—Advanced (continued)

Onboard Video Memory Size	Allows you to set onboard video memory size to: • Enabled, 32MB • Enabled, 64MB • Enabled, 128MB (default)
Onboard 1394	Allows you to enable/disable all 1394 ports. Default is enabled.
DVMT/FIXED Memory	Allows you to specify the DVMT/system memory allocated for video memory: • 128MB • 256MB (default) • Maximum DVMT

Computer Setup—Power

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-20 Computer Setup—Power

Option	Description
After AC Power Failure	Allows you to select system restart behavior after power loss: • Auto • Power On • Stay Off (default)
XD (Execute Disable) (if supported by hardware)	Allows you to disable/enable the processor's XD feature. Default is enabled.
Virtualization Technology	Allows you to enable/disable the processor's Virtualization Technology feature. Default is disabled.
WOL in S5	Disables/enables limited Wake on LAN from S5. Note that the computer can only wake from S5 during a normal shutdown event. Default is disabled.

Computer Setup—Boot

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-21 Computer Setup—Boot

Option	Description	
Boot-time Diagnostic Screen	Disables/enables POST diagnostic messages display during boot. Default is disabled.	
Boot Device Priority	Allows you to specify which device groups will boot first, second, third, and fourth or to disable any of the four. Also allows you to set the device boot priority within each group.	
	1st Boot Device **2nd Boot Device** **3rd Boot Device** **4th Boot Device**	Allows you to set the device group boot priority: • CD-ROM Group • Hard Drive Group • Floppy Group • Network Boot Group **NOTE:** MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started.
	Floppy Group Boot Priority	Specifies boot device priority within removable devices. **NOTE:** This computer does not support floppy drives.
	CD-ROM Group Boot Priority	Specifies boot device priority within CD/DVD drives.
	HDD Group Boot Priority	Specifies boot device priority within hard drives.
	Network Group Boot Priority	Specifies boot device priority within bootable network devices.
ESC: Boot Menu	Allows you to enable/disable the option to press the ESC key to access the Boot menu during computer startup. Default is enabled.	
F9: Diagnostics	Disables/enables the F9 Boot Menu prompt message on the logo screen. Default is enabled.	
F10: Setup	Disables/enables the F10 Setup prompt message on the logo screen. Default is enabled.	
F11: Recovery	Disables/enables the F11 Recovery prompt message on the logo screen. Default is enabled.	
F12: Boot from LAN	Disables/enables the F12 Boot from LAN prompt message on the logo screen. Default is enabled.	

Computer Setup—Exit

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-22 Computer Setup—Exit

Option	Description
Exit Saving Changes	Press Enter to exit saving changes.
Exit Discarding Changes	Press Enter to exit discarding changes.
Load Setup Defaults	Press Enter to load setup defaults.
Discard Changes	Press Enter to discard changes.
Save Changes	Press Enter to save changes.

3 Serial ATA (SATA) Drive Guidelines and Features

NOTE: HP only supports the use of SATA hard drives on these models of computer. No Parallel ATA (PATA) drives are supported.

SATA Hard Drives

Serial ATA Hard Drive Characteristics	
Number of pins/conductors in data cable	7/7
Number of pins in power cable	15
Maximum data cable length	39.37 in (100 cm)
Data interface voltage differential	400-700 mV
Drive voltages	3.3 V, 5 V, 12 V
Jumpers for configuring drive	N/A
Data transfer rate	3.0 Gb/s

SATA Hard Drive Cables

SATA Data Cable

Always use an HP approved SATA 3.0 Gb/s cable as it is fully backwards compatible with the SATA 1.5 Gb/s drives.

Current HP desktop products ship with SATA 3.0 Gb/s hard drives.

SATA data cables are susceptible to damage if overflexed. Never crease a SATA data cable and never bend it tighter than a 30 mm (1.18 in) radius.

The SATA data cable is a thin, 7-pin cable designed to transmit data for only a single drive.

SMART ATA Drives

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

Hard Drive Capacities

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

Because of the differences in the way that drive sizes are calculated, the size reported by the operating system may differ from that marked on the hard drive or listed in the computer specification. Drive size calculations by drive manufacturers are bytes to the base 10 while calculations by Microsoft are bytes to the base 2.

Drive/Partition Capacity Limits				
			Maximum Size	
File System	**Controller Type**	**Operating System**	**Partition**	**Drive**
FAT 32	ATA	Windows XP/Windows Vista/Windows 7	32 GB	2 TB
NTFS	ATA	Windows XP/Windows Vista/Windows 7	2 TB	2 TB

4 Identifying the Chassis, Routine Care, and Disassembly Preparation

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

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

Chassis Designation

Minitower and small form factor chassis are available.

Minitower

Figure 4-1 Bezel without reset button (left) and with reset button (right)

Figure 4-2 Bezel without reset button (left) and with reset button (right) for China only

Small Form Factor

Figure 4-3 Small form factor

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 appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded 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.

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

*These are then multi-packaged inside plastic tubes, trays, or Styrofoam.

NOTE: 700 volts can degrade a product.

Preventing Electrostatic Damage to Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following 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.

Personal Grounding Methods and Equipment

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

- **Wrist straps** are flexible straps with a maximum 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 maximum 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

Grounding the Work Area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface 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 work areas.
- 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.

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

Operating Guidelines

To prevent overheating and to help prolong the life of the computer:

- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold.
- Operate the computer on a sturdy, level surface. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow.
- Never restrict the airflow into the computer by blocking any vents or air intakes. Do not place the keyboard, with the keyboard feet down, directly against the front of the desktop unit as this also restricts airflow.
- Occasionally clean the air vents on all vented sides of the computer. Lint, dust, and other foreign matter can block the vents and limit the airflow. Be sure to unplug the computer before cleaning the air vents.
- Never operate the computer with the cover or side panel removed.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.

- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.
- Install or enable power management functions of the operating system or other software, including sleep states.

Routine Care

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 unplug the computer when cleaning with liquids or damp cloths.
4. Always unplug 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.

Cleaning the Computer Case

Follow all safety precautions in General Cleaning Safety Precautions on page 38 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.

Cleaning the Keyboard

Follow all safety precautions in General Cleaning Safety Precautions on page 38 before cleaning the keyboard.

To clean the tops of the keys or the keyboard body, follow the procedures described in Cleaning the Computer Case on page 38.

When cleaning debris from under the keys, review all rules in General Cleaning Safety Precautions on page 38 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.

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 Cleaning the Computer Case on page 38.

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 Cleaning the Computer Case on page 38.

Service Considerations

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

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

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

Tools and Software Requirements

To service the computer, you need the following:

- Torx T-15 screwdriver (HP screwdriver with bits, PN 161946-001)
- Torx T-15 screwdriver with small diameter shank (for certain front bezel removal)
- Flat-bladed screwdriver (may sometimes be used in place of the Torx screwdriver)
- Phillips #2 screwdriver
- Diagnostics software
- HP tamper-resistant T-15 wrench (Smart Cover FailSafe Key, PN 166527-001) or HP tamper-resistant bits (Smart Cover FailSafe Key, PN 166527-002)

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. HP strongly recommends that all screws removed during disassembly be kept with the part that was removed, then returned to their proper locations.

△ **CAUTION:** Metric screws have a black finish. U.S. screws have a silver finish and are used on hard drives only.

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

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.

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 Electrostatic Discharge Information on page 35
- 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.

Lithium Coin Cell Battery

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

See the appropriate removal and replacement chapter for the chassis you are working on in this guide for instructions on the replacement procedures.

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

NOTE: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, their authorized partners, or their agents.

5 Removal and Replacement Procedures Minitower (MT) Chassis

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.

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

Preparation for Disassembly

1. Close any open software applications.
2. Exit the operating system.
3. Remove any diskette or compact disc from the computer.
4. Turn off the computer and any peripheral devices that are connected to it.

CAUTION: Turn off the computer before disconnecting any cables.

CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. In some systems the cooling fan is on even when the computer is in the “Standby,” or “Suspend” modes. The power cord should always be disconnected before servicing a unit.

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

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

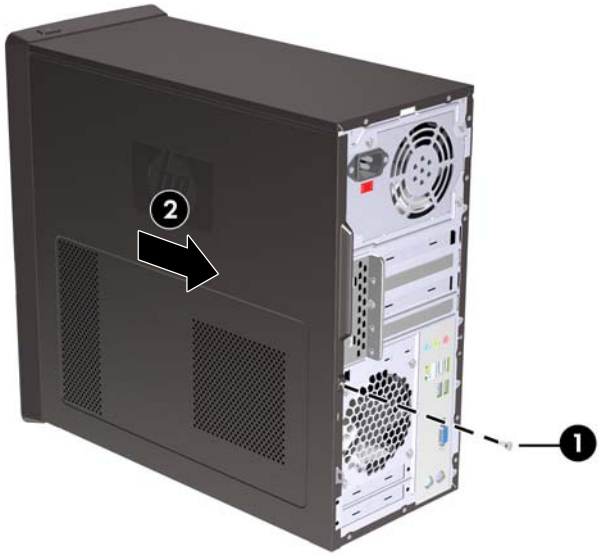
CAUTION: The screws used in the computer are of different thread sizes and lengths; using the wrong screw in an application may damage the unit.

Access Panel

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Loosen the screw **(1)** that secures the access panel to the computer chassis.
3. Slide the access panel back **(2)** about 1.3 cm (1/2 inch), then lift it off the unit.

NOTE: You may want to lay the computer on its side to install internal parts. Be sure the side with the access panel is facing up.

Figure 5-1 Removing the Computer Access Panel

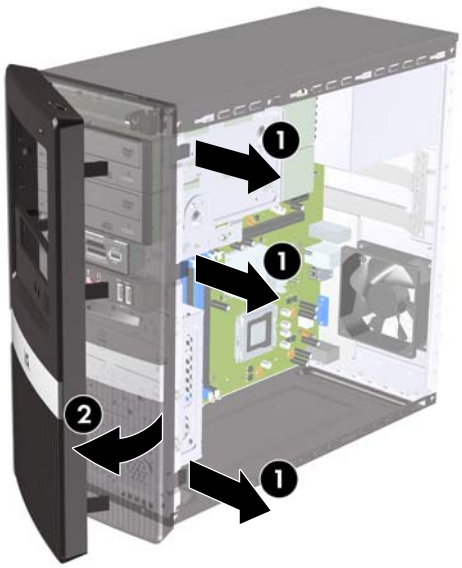


To replace the access panel, reverse the removal steps.

Front Bezel

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Press outward on the three latches on the right side of the bezel **(1)**, then rotate the right side of the bezel off the chassis **(2)** followed by the left side.

Figure 5-2 Removing the Front Bezel



NOTE: The appearance of the front bezel may vary.

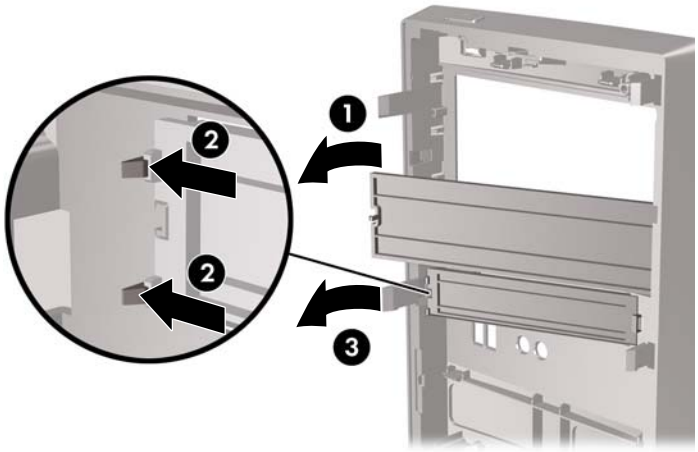
To reinstall the front bezel, reverse the removal procedure.

Bezel Blanks

On some models, there are bezel blanks covering the 3.5-inch and 5.25-inch external drive bays that need to be removed before installing a drive. To remove a bezel blank:

1. Remove the front bezel (Front Bezel on page 44).
2. To remove the lower 5.25-inch bezel blank, gently twist and pull on the bezel blank until it breaks free from the front bezel **(1)**, then discard the bezel blank. If the blank needs to be replaced at a later date, you can order a replacement blank from HP.
3. To remove the 3.5-inch bezel blank, press the two retaining tabs towards the outer left edge of the bezel **(2)** and pull the bezel blank inwards to free it from the front bezel **(3)**.

Figure 5-3 Removing a Bezel Blank



4. Replace the front bezel.

Memory

The computer comes with double data rate 3 synchronous dynamic random access memory (DDR3-SDRAM) dual inline memory modules (DIMMs).

DDR3-SDRAM DIMMs

The memory sockets on the system board can be populated with up to four industry-standard DIMMs. These memory sockets are populated with at least one preinstalled DIMM. To achieve the maximum memory support, you can populate the system board with up to either 8 GB or 16 GB of memory configured in a high-performing dual channel mode, depending on model.

Model Number	Maximum Memory
HP Pro 3120	8 GB
HP Pro 3125	16 GB
HP Pro 3130	16 GB

For proper system operation, the DDR3-SDRAM DIMMs must be:

- industry-standard 240-pin
- unbuffered non-ECC PC3-10600 DDR3-1333 MHz-compliant
- 1.5 volt DDR3-SDRAM DIMMs

The DDR3-SDRAM DIMMs must also:

- support CAS latency 9 DDR3 1333 MHz (9-9-9 timing)
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

- 512-Mbit, 1-Gbit, and 2-Gbit non-ECC memory technologies
- single-sided and double-sided DIMMs
- DIMMs constructed with x8 and x16 DDR devices; DIMMs constructed with x4 SDRAM are not supported

NOTE: The system will not operate properly if you install unsupported DIMMs.

The system will automatically operate in single channel mode, dual channel mode, or flex mode, depending on how the DIMMs are installed.

- The system will operate in single channel mode if the DIMM sockets are populated in one channel only.
- The system will operate in a higher-performing dual channel mode if the total memory capacity of the DIMMs in Channel A is equal to the total memory capacity of the DIMMs in Channel B. The technology and device width can vary between the channels. For example, if Channel A is populated with two 1-GB DIMMs and Channel B is populated with one 2-GB DIMM, the system will operate in dual channel mode.
- The system will operate in flex mode if the total memory capacity of the DIMMs in Channel A is not equal to the total memory capacity of the DIMMs in Channel B. In flex mode, the channel populated with the least amount of memory describes the total amount of memory assigned to dual channel and the remainder is assigned to single channel. For optimal speed, the channels should be balanced so that the largest amount of memory is spread between the two channels. If one channel will have more memory than the other, the larger amount should be assigned to Channel A. For example, if you are populating the sockets with one 2-GB DIMM, and three 1-GB DIMMs, Channel A should be populated with the 2-GB DIMM and one 1-GB DIMM, and Channel B should be populated with the two 1-GB DIMMs. With this configuration, 4 GB will run as dual channel and 1 GB will run as single channel.
- In any mode, the maximum operational speed is determined by the slowest DIMM in the system.

Populating DIMM Sockets

There are four DIMM sockets on the system board, with two sockets per channel.

DIMM Socket Locations – HP Pro 3120

When installing memory modules:

- If installing only one memory module, install it in DIMM1.
- If installing 2 memory modules:
  - 2 matching memory modules - install in DIMM1 and DIMM3.
  - 2 non-matching memory modules - install in DIMM1 and DIMM3. Install the larger (GB) module in DIMM1 and smaller (MB) module in DIMM3.

- If installing 3 memory modules:
  - 3 matching memory modules - install in DIMM1, DIMM3, and DIMM2.
  - 2 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 2x2GB and 1x1GB) - install the matching pair in DIMM1 and DIMM2 and smaller (MB) module in DIMM2.
- If installing 4 memory modules:
  - 4 matching memory modules - install in DIMM1, DIMM3, DIMM2, and DIMM4.
  - 3 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 3x2GB & 1x1GB) -install the matching pair in DIMM2, DIMM4, and DIMM1 and smaller (MB) module in DIMM3.

Figure 5-4 DIMM Socket Locations – HP Pro 3120

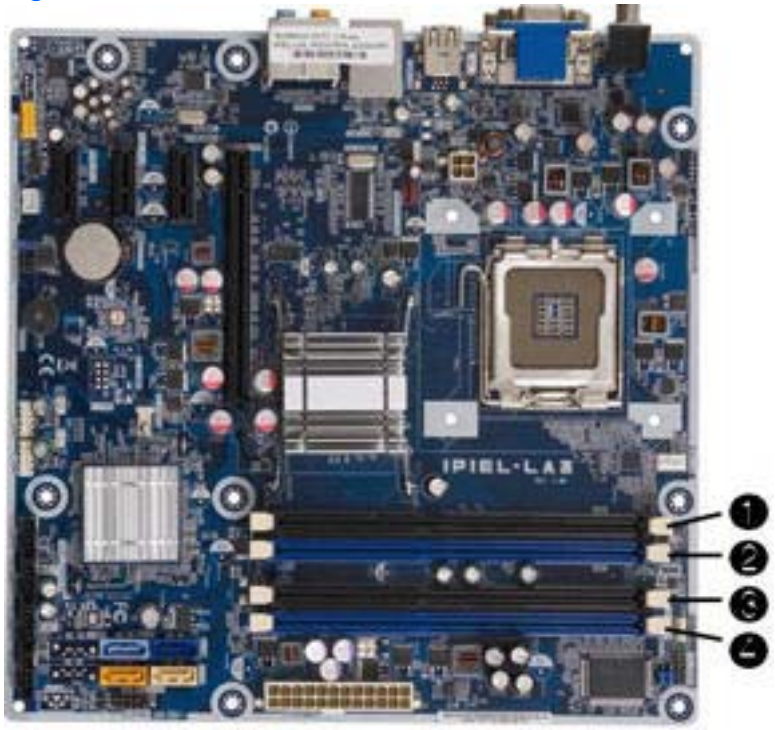


Table 5-1 DIMM Socket Locations – HP Pro 3120

Item	Description	Socket Color	Insertion Order
1	XMM1 socket, Channel A (populate first)	Black	1
2	XMM2 socket, Channel B	Blue	3
3	XMM3 socket, Channel A	Black	2
4	XMM4 socket, Channel B	Blue	4

NOTE: A DIMM must occupy the XMM1 socket.

DIMM Socket Locations – HP Pro 3125

When installing memory modules:

- If installing only one memory module, install it in DIMM3.
- If installing 2 memory modules:
  - 2 matching memory modules - install in DIMM3 and DIMM4.
  - 2 non-matching memory modules - install in DIMM3 and DIMM4. Install the larger (GB) module in DIMM3 and smaller (MB) module in DIMM4.
- If installing 3 memory modules:
  - 3 matching memory modules - install in DIMM3, DIMM4, and DIMM1.
  - 2 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 2x2GB and 1x1GB) - install the matching pair in DIMM3 and DIMM4 and smaller (MB) module in DIMM1.
- If installing 4 memory modules:
  - 4 matching memory modules - install in DIMM3, DIMM4, DIMM1, and DIMM2.
  - 3 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 3x2GB & 1x1GB) -install the matching pair in DIMM3, DIMM4, and DIMM1 and smaller (MB) module in DIMM2.

Figure 5-5 DIMM Socket Locations – HP Pro 3125

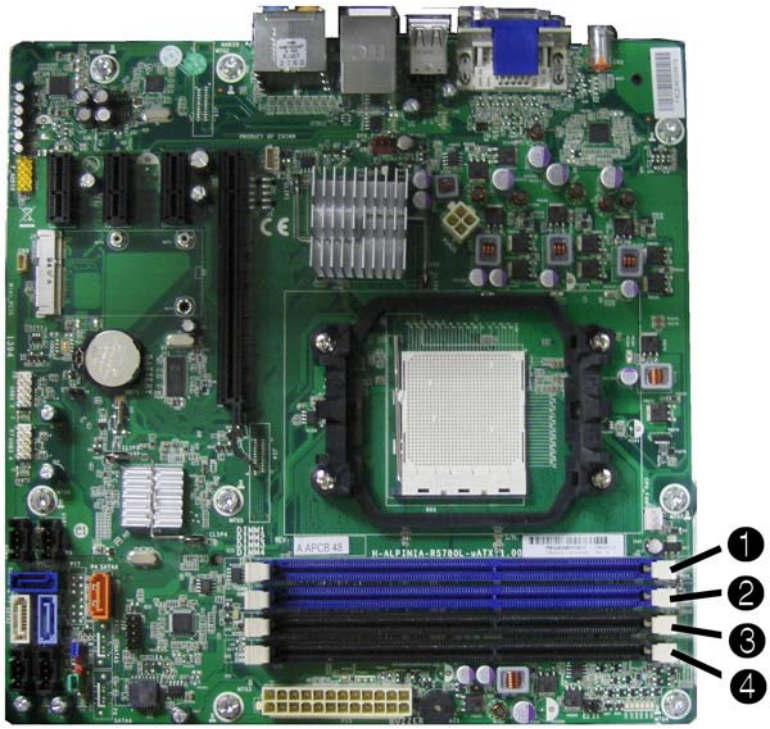


Table 5-2 DIMM Socket Locations – HP Pro 3125

Item	Description	Socket Color	Insertion Order
1	XMM1 socket, Channel B	Blue	3
2	XMM2 socket, Channel B	Blue	4
3	XMM3 socket, Channel A (populate first)	Black	1
4	XMM4 socket, Channel A	Black	2

NOTE: A DIMM must occupy the XMM3 socket.

DIMM Socket Locations – HP Pro 3130

When installing memory modules:

- If installing only one memory module, install it in DIMM2.
- If installing 2 memory modules:
  - 2 matching memory modules - install in DIMM2 and DIMM4.
  - 2 non-matching memory modules - install in DIMM2 and DIMM4. Install the larger (GB) module in DIMM2 and smaller (MB) module in DIMM4.
- If installing 3 memory modules:
  - 3 matching memory modules - install in DIMM2, DIMM4, and DIMM1.
  - 2 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 2x2GB and 1x1GB) - install the matching pair in DIMM2 and DIMM4 and smaller (MB) module in DIMM1.
- If installing 4 memory modules:
  - 4 matching memory modules - install in DIMM2, DIMM4, DIMM1, and DIMM3.
  - 3 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 3x2GB & 1x1GB) -install the matching pair in DIMM2, DIMM4, and DIMM1 and smaller (MB) module in DIMM3.

Figure 5-6 DIMM Socket Locations – HP Pro 3130

Table 5-3 DIMM Socket Locations – HP Pro 3130

Item	Description	Socket Color	Insertion Order
1	XMM1 socket, Channel B	Black	3
2	XMM2 socket, Channel B (populate first)	Blue	1
3	XMM3 socket, Channel A	Black	4
4	XMM4 socket, Channel A	Blue	2

NOTE: A DIMM must occupy the XMM2 socket.

Installing Memory Modules

△ **CAUTION:** You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

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

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.

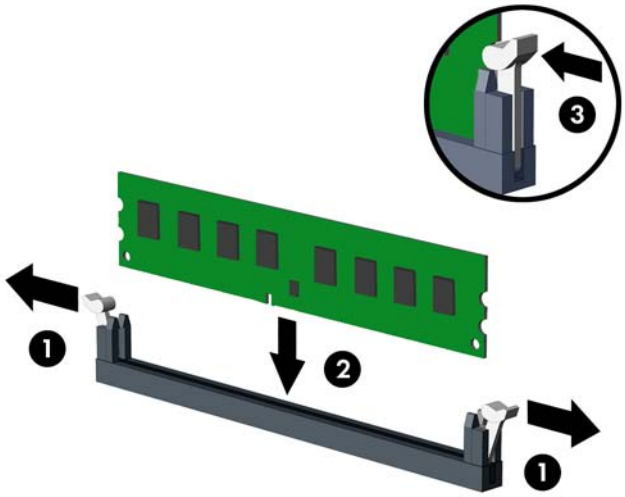
When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Locate the memory module sockets on the system board.

⚠ **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 **(1)**, and insert the memory module into the socket **(2)**.

Figure 5-7 Installing a DIMM



NOTE: A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

A DIMM must occupy the DIMM1 socket. Always populate the blue sockets before the black sockets in each channel.

To create a dual-channel memory configuration, the memory capacity of Channel A must equal the memory capacity of Channel B. Refer to Populating DIMM Sockets on page 47 for more information.

5. Push the DIMM module down firmly into the socket, ensuring that the module is fully inserted and properly seated. The DIMM must be pushed all the way down into the socket and sit evenly in the socket to avoid memory corruption. Make sure the latches are in the closed position **(3)**.
6. Repeat steps 4 and 5 to install any additional modules.
7. Replace the computer access panel.
8. Reconnect the power cord and any external devices, then turn on the computer. The computer should automatically recognize the additional memory when you turn on the computer.
9. Lock any security devices that were disengaged when the access panel was removed.

Expansion Cards

The HP Pro 3120, HP Pro 3125, and HP Pro 3130 all have three PCI Express x1 expansion slots and one PCI Express x16 expansion slot. The expansion slots accommodate full-height or half-height expansion cards.

Expansion Slot Locations

Figure 5-8 Expansion Slot Locations – HP Pro 3120

Figure 5-9 Expansion Slot Locations – HP Pro 3125

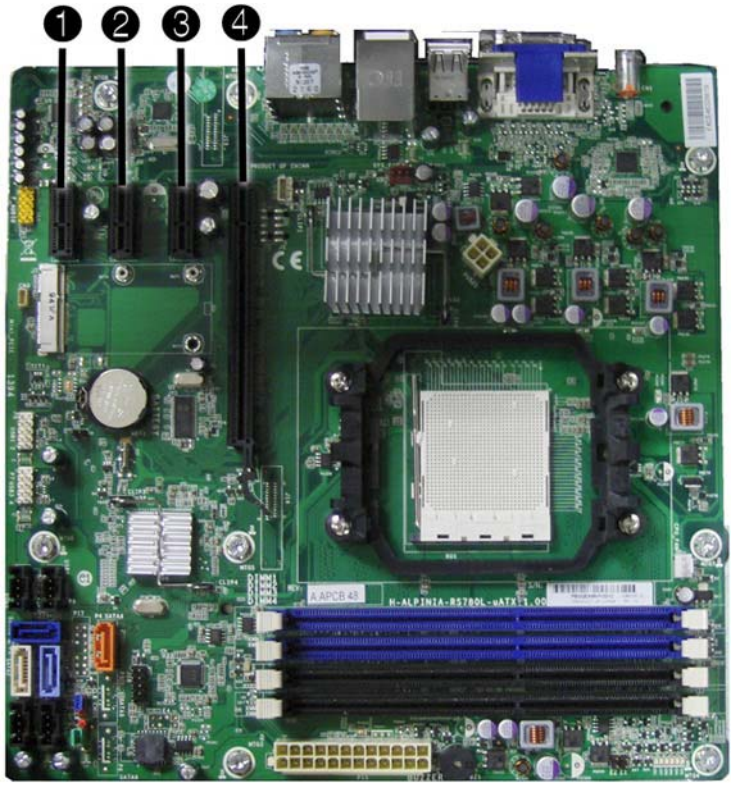


Figure 5-10 Expansion Slot Locations – HP Pro 3130

Table 5-4 Expansion Slot Locations

Item	Description
1	PCI Express x1 expansion slot
2	PCI Express x1 expansion slot
3	PCI Express x1 expansion slot
4	PCI Express x16 expansion slot

NOTE: You can install a PCI Express x1, x4, x8, or x16 expansion card in the PCI Express x16 expansion slot.

To remove, replace, or add an expansion card:

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Locate the correct vacant expansion socket on the system board and the corresponding expansion slot on the back of the computer chassis.
4. On the rear of the computer, a slot cover lock secures the expansion card brackets in place. Remove the screw from the slot cover lock then slide the slot cover lock up to remove it from the chassis.

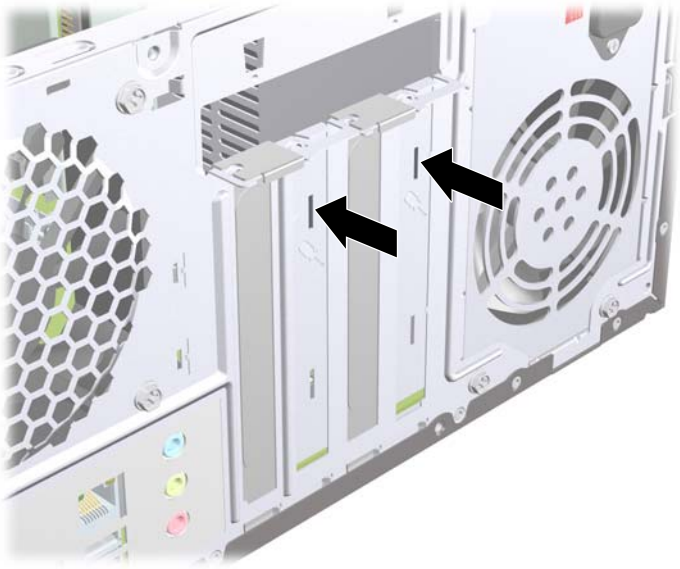
Figure 5-11 Opening the Slot Cover Lock

5. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.

NOTE: Before removing an installed expansion card, disconnect any cables that may be attached to the expansion card.

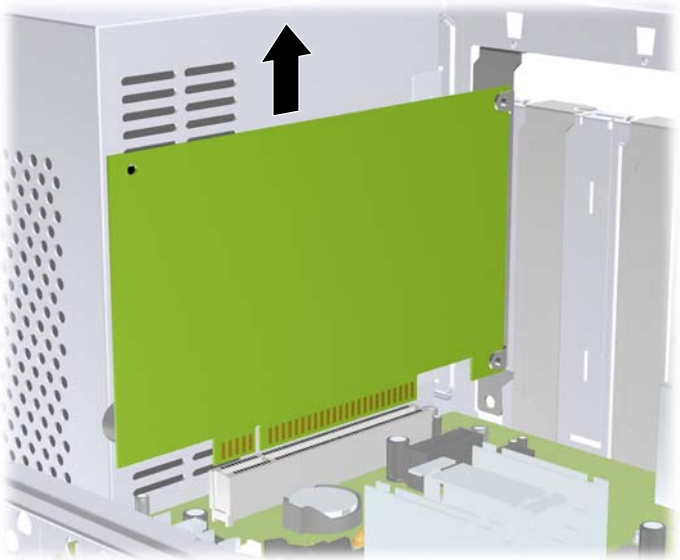
a. If you are installing an expansion card in a vacant socket, you must use a flatblade screwdriver to pry out the metal shield on the rear panel that covers the expansion slot. Be sure to remove the appropriate shield for the expansion card you are installing.

Figure 5-12 Removing an Expansion Slot Cover



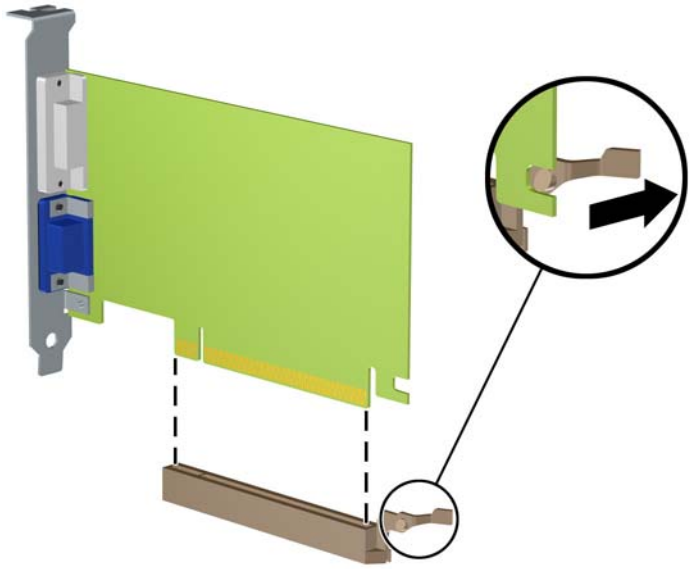
b. If you are removing a standard PCI Express x1 card, hold the card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket then away from the inside of the chassis to release it from the chassis frame. Be sure not to scrape the card against the other components.

Figure 5-13 Removing a PCI Express x1 Expansion Card



c. If you are removing a PCI Express x16 card, pull the retention arm on the back of the expansion socket away from the card and carefully rock the card back and forth until the connectors pull free from the socket. Be sure not to scrape the card against the other components.

Figure 5-14 Removing a PCI Express x16 Expansion Card

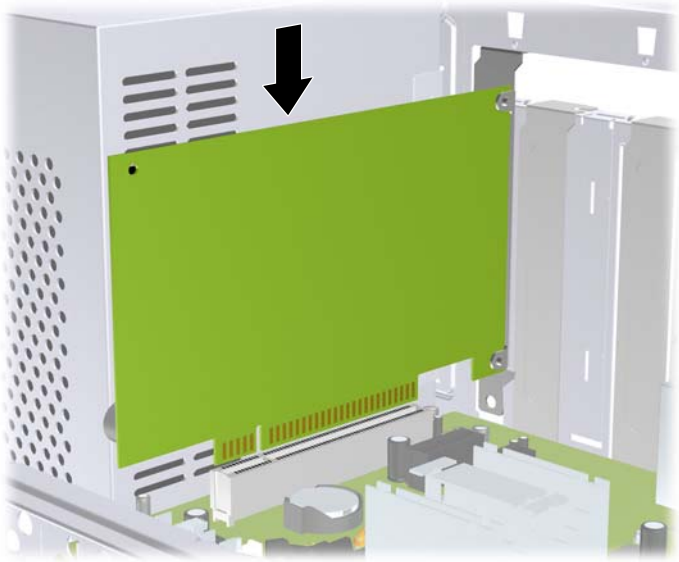


6. Store the removed card in anti-static packaging.
7. If you are not installing a new expansion card, install an expansion slot cover to close the open slot.

△ **CAUTION:** After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

8. To install a new expansion card, hold the card just above the expansion socket on the system board then move the card toward the rear of the chassis so that the bottom of the bracket on the card slides into the small slot on the chassis. Press the card straight down into the expansion socket on the system board.

Figure 5-15 Installing an Expansion Card



NOTE: When installing an expansion card, press firmly on the card so that the whole connector seats properly in the expansion card slot.

9. Replace the slot cover lock and secure it in place with the screw that was previously removed.

Figure 5-16 Securing the Expansion Cards and Slot Covers

10. Connect external cables to the installed card, if needed. Connect internal cables to the system board, if needed.

11. Replace the computer access panel.

12. Reconnect the power cord and any external devices, then turn on the computer.
13. Lock any security devices that were disengaged when the access panel was removed.
14. Reconfigure the computer, if necessary. Refer to Computer Setup (F10) Utility on page 4 for instructions on using Computer Setup.

Cable Management

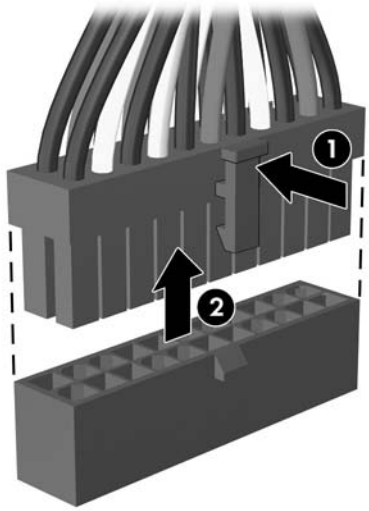
Always follow good cable management practices when working inside the computer.

- Keep cables away from major heat sources like the heat sink.
- Do not jam cables on top of expansion cards or memory modules. Printed circuit cards like these are not designed to take excessive pressure on them.
- Some flat ribbon cables come prefolded. Never change the folds on these cables.
- Never bend a SATA data cable tighter than a 30 mm (1.18 in) radius.
- Never crease a SATA data cable.
- Do not rely on components like the drive cage, power supply, or computer cover to push cables down into the chassis. Always position the cables to lay properly by themselves.

When removing the power supply power cable from the 24-pin connector on the system board, always follow these steps:

1. Squeeze on the top of the retaining latch attached to the cable end of the connector **(1)**.
2. Grasp the cable end of the connector and pull it straight up **(2)**.

△ **CAUTION:** Always pull the connector - NEVER pull on the cable. Pulling on the cable could damage the cable and result in a failed power supply.



Cable Connections

HP Pro 3120

System board connectors are color-coded to make it easier to find the proper connection.

Connector Name	Connector Color	Description
ATX PWR	white	Power supply, 24-pin
ATX_CPU	white	Power supply, 4-pin
CHASSIS_FAN1	brown	Chassis fan
CPU_FAN	white	Heat sink fan
F_USB2	black	Media card reader
J_PANEL	black	Power switch
FRNT AUD	yellow	Front I/O audio
F_USB1	white	Front I/O USB
SATA1	dark blue	Primary hard drive
SATA2	white	Primary optical drive
SATA3	light blue	Second hard drive
SATA4	orange	Second optical drive

HP Pro 3125

System board connectors are color-coded to make it easier to find the proper connection.

Connector Name	Connector Color	Description
P15	white	Power supply, 24-pin
PU521	white	Power supply, 4-pin
SYS_FAN	brown	Chassis fan
CPU_FAN	white	Heat sink fan
J18	black	Power switch
F_AUDIO	yellow	Front I/O audio
F_USB1	white	Front I/O USB
F_USB3	white	Media card reader
SATA1	dark blue	Primary hard drive
SATA2	white	Primary optical drive
SATA3	light blue	Second hard drive
SATA4	orange	Second optical drive

HP Pro 3130

System board connectors are color-coded to make it easier to find the proper connection.

Connector Name	Connector Color	Description
ATX1	white	Power supply, 24-pin
PWR1	white	Power supply, 4-pin
SYS_FAN1	brown	Chassis fan
CPU_FAN1	white	Heat sink fan
JPF1	black	Power switch
JAUD1	yellow	Front I/O audio
JUSB2	white	Front I/O USB
JUSB1	white	Media card reader
JJ1394_1	red	1394 connector
SATA1	dark blue	Primary hard drive
SATA2	white	Primary optical drive
SATA3	light blue	Second hard drive
SATA4	orange	Second optical drive

Drives

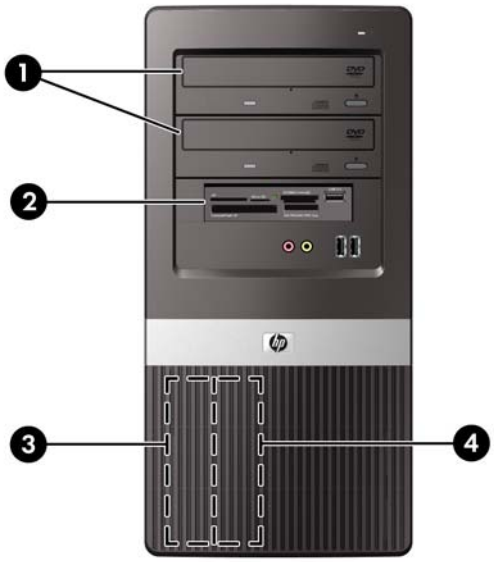
The computer supports up to five drives that may be installed in various configurations.

This section describes the procedure for replacing or upgrading the storage drives. A Torx T-15 screwdriver is needed to remove and install the guide screws on a drive.

Drive Positions

NOTE: Front bezel appearance may vary.

Figure 5-17 Drive Positions



1	Two 5.25-inch external drive bays for optional drives (optical drives shown)
2	One 3.5-inch external drive bay for optional drive (media card reader shown)
3	Primary 3.5-inch internal hard drive bay
4	Secondary 3.5-inch internal hard drive bay for optional hard drive

To verify the type, size, and capacity of the storage devices installed in the computer, run Computer Setup. Refer to Computer Setup (F10) Utility on page 4 for more information.

Installing Additional Drives

When installing additional drives, follow these guidelines:

- The primary Serial ATA (SATA) hard drive must be connected to the dark blue primary SATA connector on the system board.
- Connect the first SATA optical drive to the white SATA connector on the system board.
- Always populate the dark blue and white connectors before the light blue and orange connectors.
- The system does not support Parallel ATA (PATA) optical drives or PATA hard drives.

△ **CAUTION:** To prevent loss of work and damage to the computer or drive:

If you are inserting or removing a drive, shut down the operating system properly, turn off the computer, and unplug the power cord. Do not remove a 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.

Handle a drive carefully; do not drop it.

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.

If a drive must be mailed, place the drive in a bubble-pack mailer or other protective packaging and label the package “Fragile: Handle With Care.”

System Board Drive Connections

Refer to the following illustrations and tables to identify the system board drive connectors.

System Board Drive Connections

Figure 5-18 System Board Drive Connections – HP Pro 3120

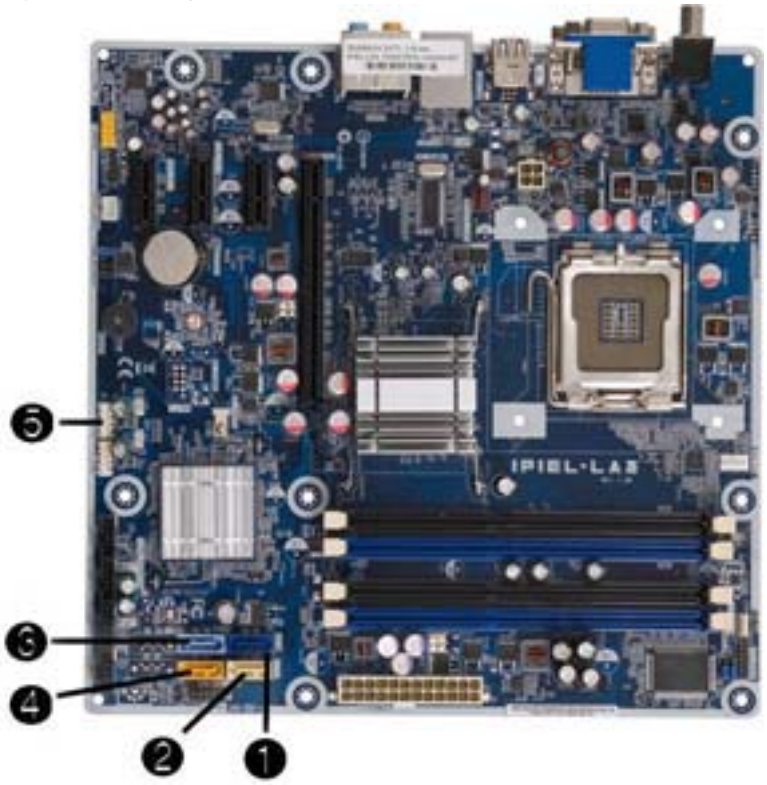


Table 5-5 System Board Drive Connections – HP Pro 3120

No.	System Board Connector	System Board Label	Color
1	SATA0	SATA0	dark blue
2	SATA1	SATA1	white
3	SATA2	SATA2	light blue
4	SATA3	SATA3	orange
5	Media Card Reader	F_USB2	white

Figure 5-19 System Board Drive Connections – HP Pro 3125

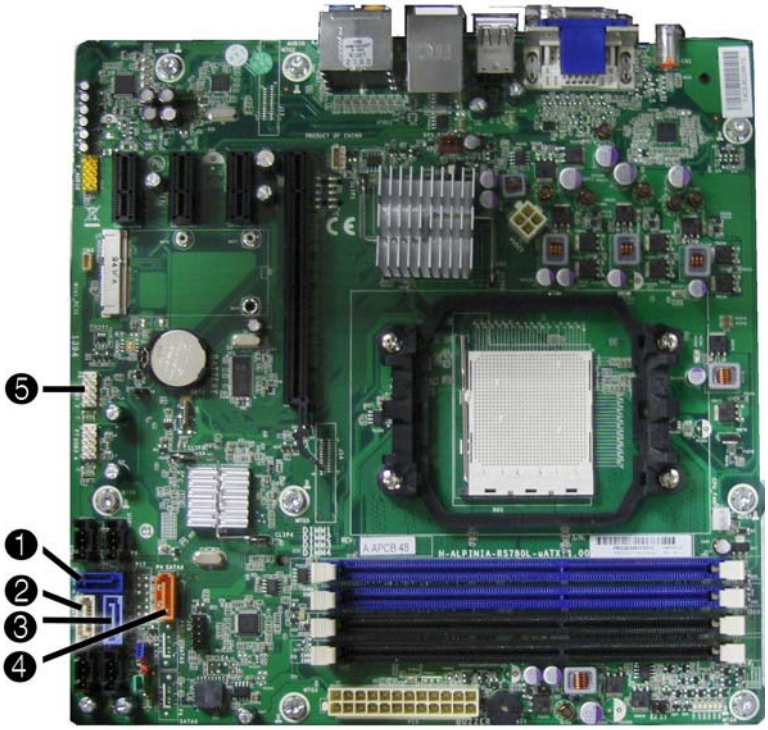


Table 5-6 System Board Drive Connections – HP Pro 3125

No.	System Board Connector	System Board Label	Color
1	SATA1	SATA1	dark blue
2	SATA2	SATA2	white
3	SATA3	SATA3	light blue
4	SATA4	SATA4	orange
5	Media Card Reader	F_USB1	white

Figure 5-20 System Board Drive Connections – HP Pro 3130

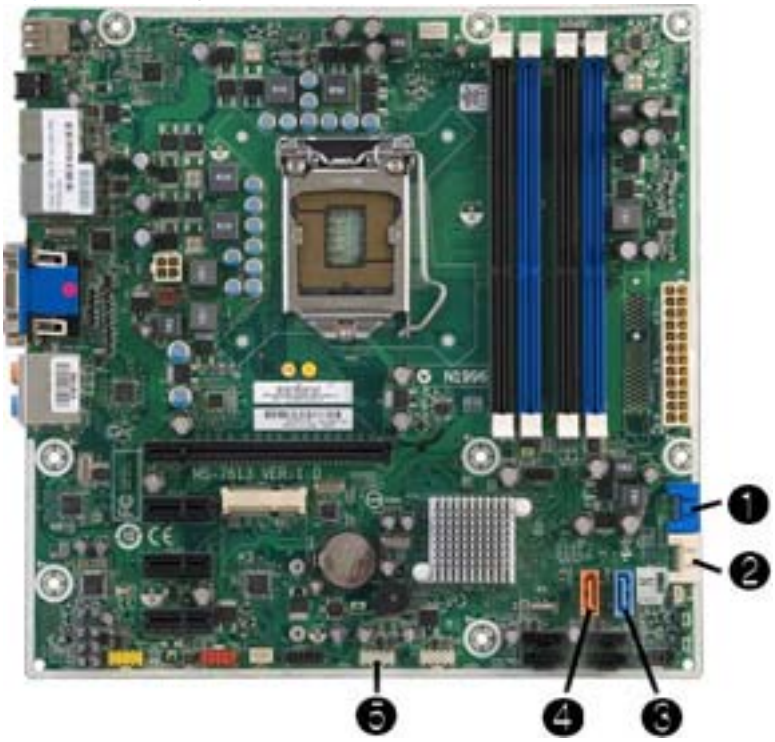


Table 5-7 System Board Drive Connections – HP Pro 3130

No.	System Board Connector	System Board Label	Color
1	SATA1	SATA1	dark blue
2	SATA2	SATA2	white
3	SATA3	SATA3	light blue
4	SATA4	SATA4	orange
5	Media Card Reader	JUSB1	white

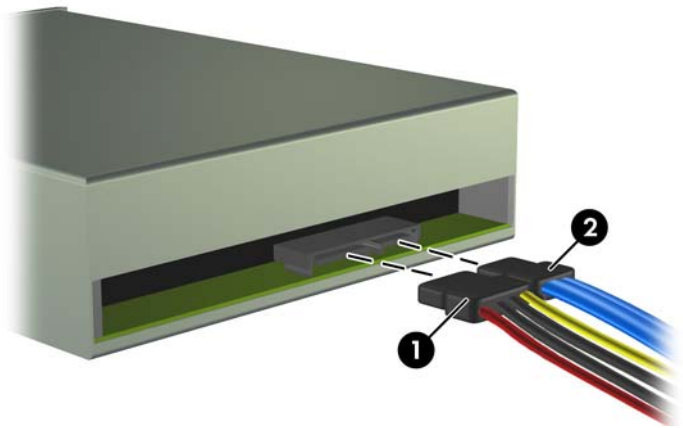
Removing an Optical Drive

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

To remove an optical drive:

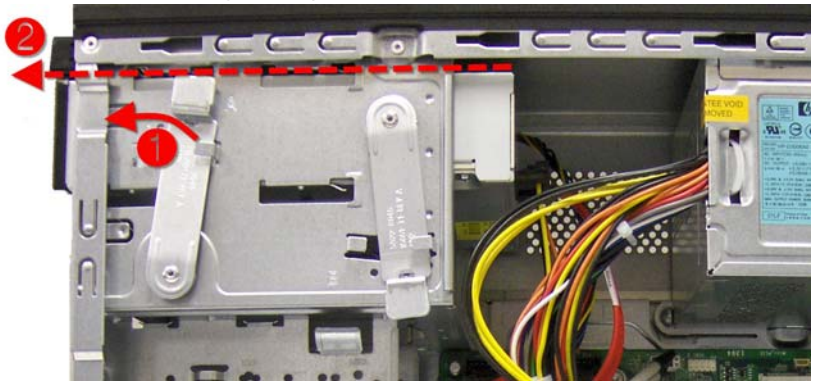
1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Remove the front bezel (Front Bezel on page 44).
4. Disconnect the power cable **(1)** and data cable **(2)** from the rear of the optical drive.

Figure 5-21 Disconnecting the Power and Data Cables



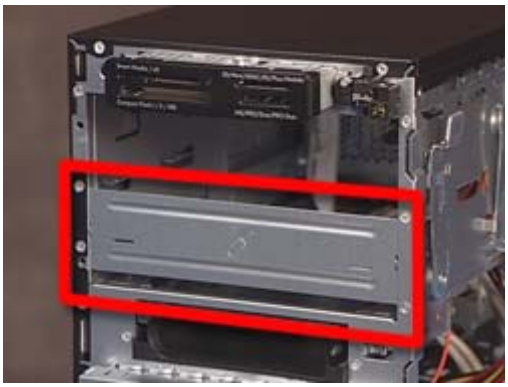
5. Pull out the drive latch and swing it to the left**(1)**, then slide the drive out of the front of the chassis **(2)**.

Figure 5-22 Removing the Optical Drive



Reverse the removal procedure to install an optical drive.

If installing a new optical drive in a previously unused drive bay, first remove the break-away EMF shield from the front of the PC.



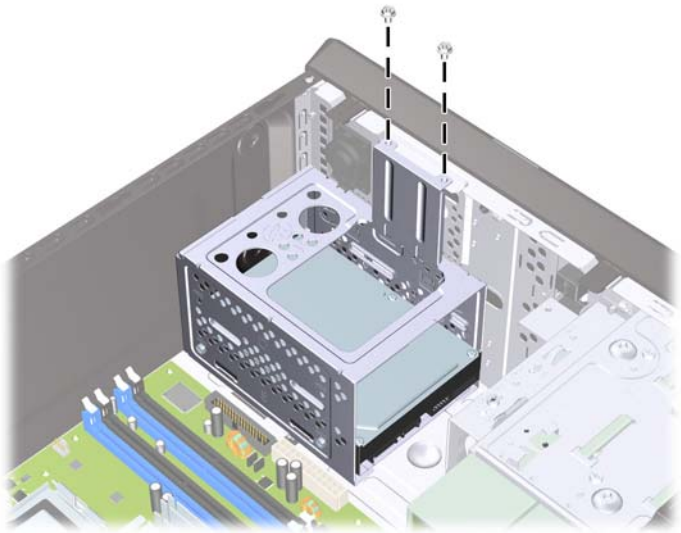
When inserting an optical drive, pull out on the drive latch and insert its peg into the hole marked 2, and then slide the drive back until it locks into position.

Removing an Internal 3.5-inch Hard Drive

NOTE: Before you remove the old hard drive, be sure to back up the data from the old hard drive so that you can transfer the data to the new hard drive. Also, if you are replacing the primary hard drive, make sure you have created a Recovery Disc Set to restore the operating system, software drivers, and any software applications that were preinstalled on the computer. If you do not have this CD set, select **Start** > **HP Backup and Recovery** and create it now.

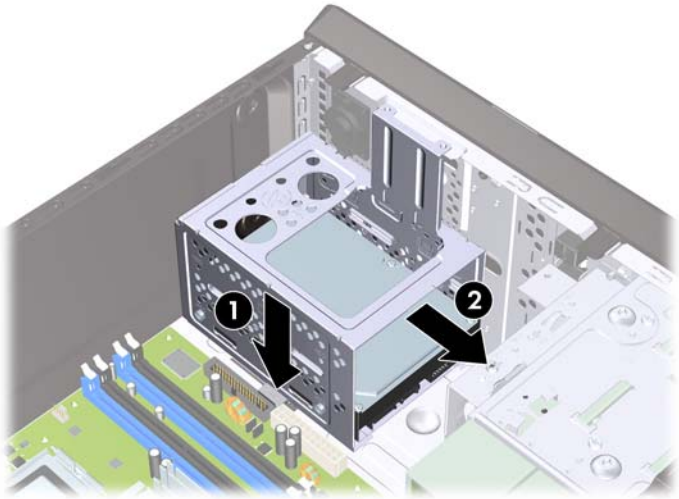
1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Remove the two screws that secure the hard drive cage to the chassis.

Figure 5-23 Removing the Hard Drive Cage Screws



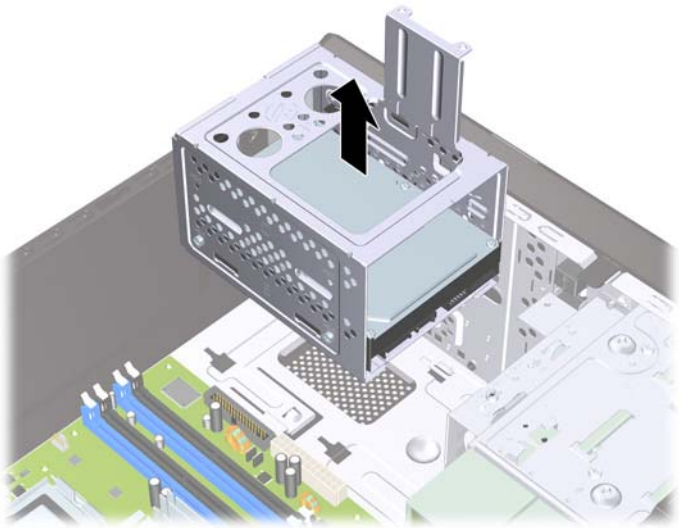
4. Push down the latch on the side of the hard drive cage **(1)**, then slide the hard drive cage away from the bottom of the chassis **(2)** as shown below.

Figure 5-24 Releasing the Hard Drive Cage



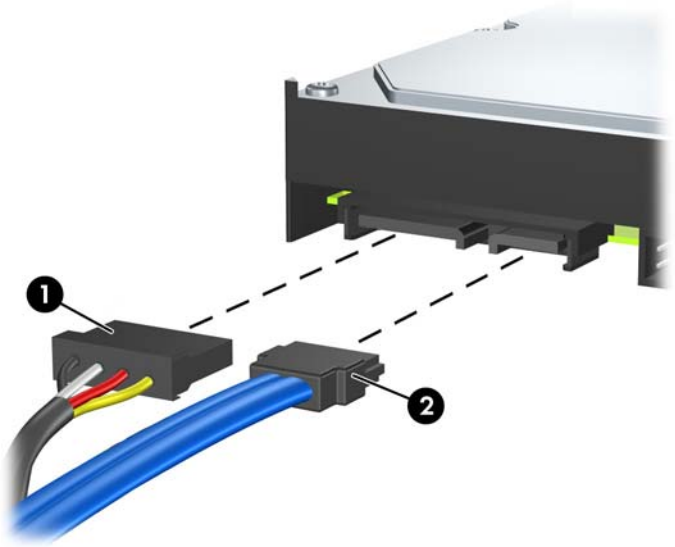
5. Lift the hard drive cage out of the chassis.

Figure 5-25 Removing the Hard Drive Cage



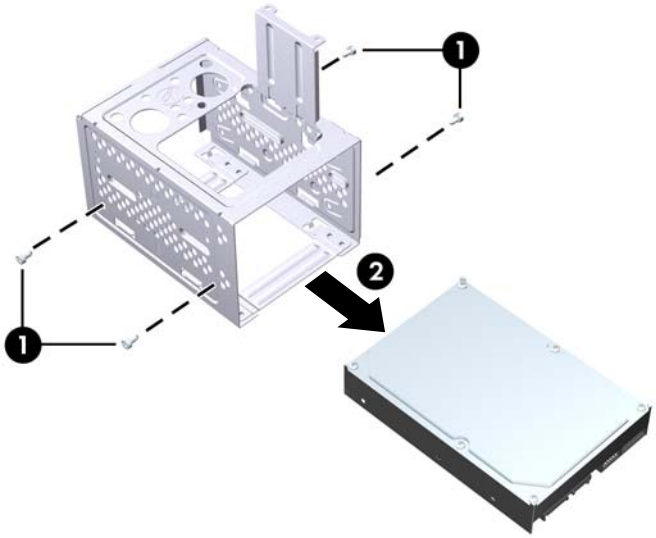
6. Disconnect the power cable **(1)** and data cable **(2)** from the back of the hard drive.

Figure 5-26 Disconnecting the Hard Drive Cables



7. Remove the four screws that secure the hard disk drive to the hard drive cage **(1)**, then slide the hard disk drive out of the hard drive cage **(2)**.

Figure 5-27 Removing the Hard Drive

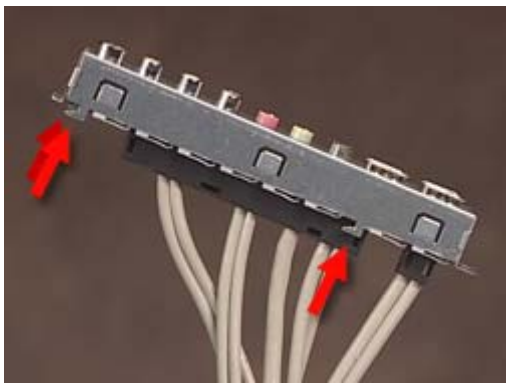


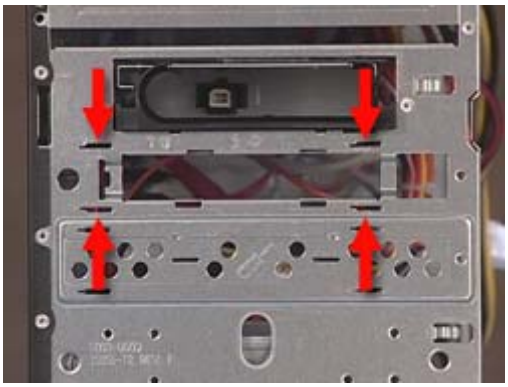
Front I/O and USB Panel Housing Assembly

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43)
3. Lay the computer on its side with the front facing toward you.
4. Remove the front bezel (Front Bezel on page 44).
5. Unplug the two cables from the yellow and white system board connectors on the system board.
6. Remove the screw that secures the housing to the chassis, and then pull the assembly away from the chassis while guiding the cables through the hole in the chassis.

To install the housing assembly, reverse the removal procedures.

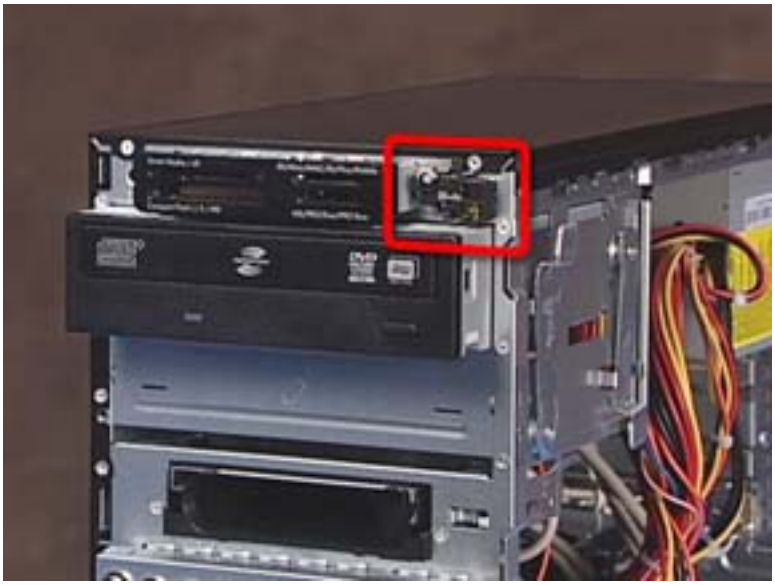
When installing the assembly, note that the assembly has hooks that fit into slots in the chassis, as shown in the following images.



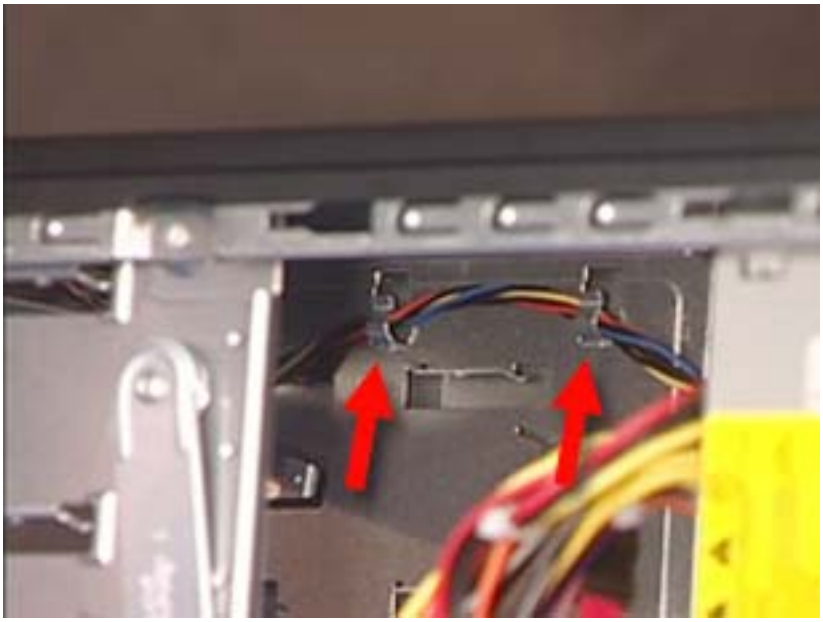


Power Switch/LED Assembly

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the front facing toward you.
4. Remove the front bezel (Front Bezel on page 44).
5. Remove the optical drive (Removing an Optical Drive on page 68).
6. Disconnect the braided cables from the black system board connector.
7. Remove the cable from the clips in the optical drive cage.
8. Press the tab on the top of the power switch to disengage it from the chassis, lift the switch upward to disengage the tab at the bottom of the switch from the chassis, and then pull the power switch away from the chassis while guiding the wires through the hole in the chassis.



9. Remove the power switch cable from the clips located in the optical drive bay on the inside of the chassis.



To install the power switch/LED assembly, reverse the removal procedures.

System Fan

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the rear facing toward you.
4. Disconnect the cable from the red/brown system board connector.
5. Remove the four Phillips screws that secure the fan to the chassis, rotate the top of the fan forward, and then remove the fan from the chassis.

NOTE: Rear I/O panel appearance may vary.

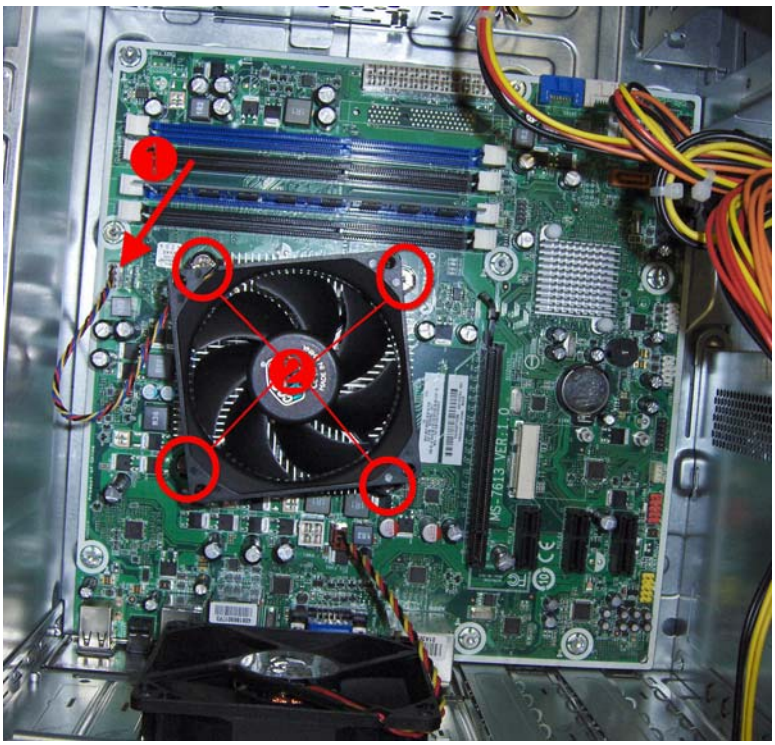
To install the fan, reverse the removal procedures.

NOTE: Arrows on the side of the fan indicate the direction the fan blows. Make sure the fan is oriented so air flows out of the chassis and the system fan cable exits from the bottom right side of the system fan.

Heat sink assembly

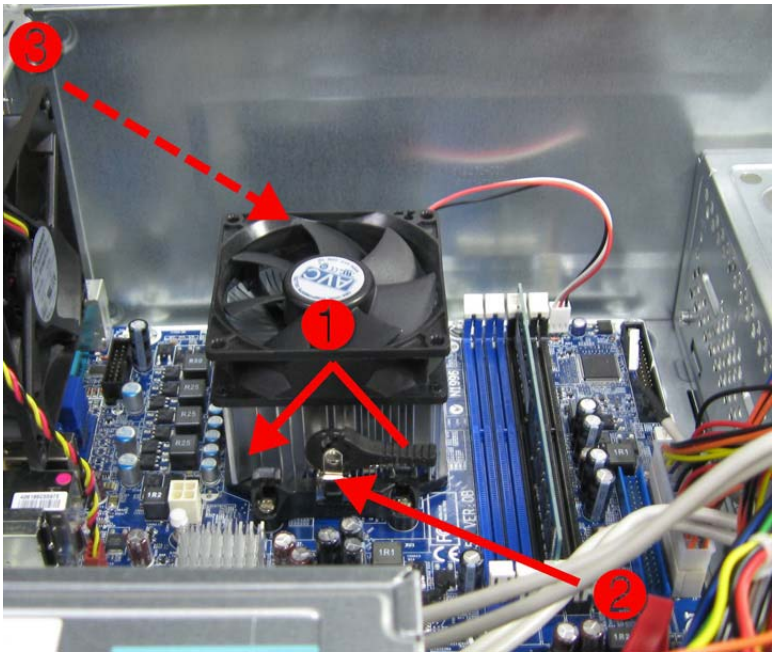
There are two different types of heat sinks available. One uses four Torx screws to secure it to the system board. The other uses a latch and clips. Both heat sink types are shown in the following section.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the rear facing toward you.
4. Disconnect the heat sink fan control cable **(1)** from the white system board connector.
5. If the computer uses a heat sink secured with four Torx screws, loosen the four captive torx T15 screws **(2)** that secure the heat sink to the system board.



6. If the heat sink is secured using a lever mechanism, lift the lever **(1)** that secures the heat sink latch to the heat sink bracket attached to the system board.
7. After loosening the lever, press downward on the lever to release the square clip **(2)** from the tab on the heat sink bracket.
8. Use the lever to maneuver the square clip on the opposite side on the heat sink **(3)** free from the tab on the heat sink bracket.

9. Lift the heat sink from the processor and set it on its side to keep from contaminating the work area with thermal grease.



To install a heat sink, reverse the removal procedures.

△ **CAUTION:** For heat sinks secured with retaining screws, tighten the screws in diagonally opposite pairs (as in an X) to evenly seat the heat sink to the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

When installing the heat sink, recommended torque = 4-6 in-lbs.

NOTE: When installing a new heat sink, remove protective plastic cover from thermal pad on bottom of heat-sink.

When installing a heat sink, if sufficient pressure is not applied during heat sink installation, heat sink may cant (tilt), causing boot errors.

△ **CAUTION:** Do not apply pressure to the heat sink fan blades or center area. This may damage the fan. When installing the heat sink, apply pressure only to fan frame.

Processor

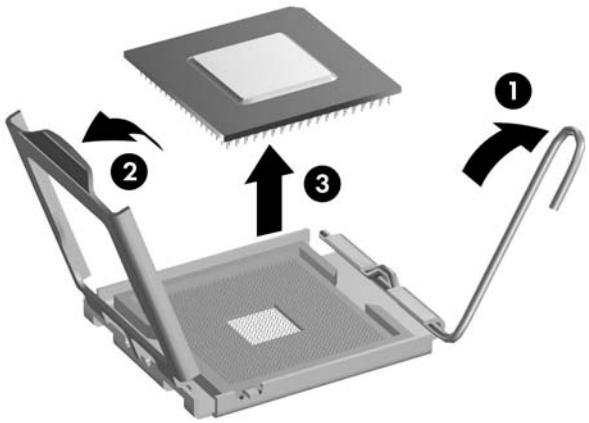
The computer may use an Intel or an AMD processor. Removal and replacement procedures vary depending on processor type.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the rear facing toward you.
4. Disconnect the heat sink control cable from the system board and remove the heatsink Heat sink assembly on page 75).

5. If the computer has an Intel processor, go to steps 7 – 9.
6. If the computer has an AMD processor, go to steps 10 – 11.
7. Rotate the locking lever to its full open position **(1)**.
8. Raise and rotate the microprocessor retainer to its full open position **(2)**.
9. Carefully lift the processor from the socket **(3)**.

△ **CAUTION:** Do NOT handle the pins in the processor socket. These pins are very fragile and handling them could cause irreparable damage. Once pins are damaged it may be necessary to replace the system board.

CAUTION: The heat sink must be installed within 24 hours of installing the processor to prevent damage to the processor's solder connections.



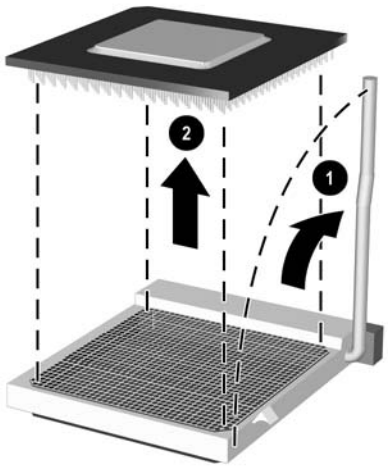
NOTE: Steps 10 – 11 are for computers with AMD processors. See steps 7 – 9 for instructions to remove Intel processors.

10. Rotate the locking lever to its full open position **(1)**.

11. Carefully lift the processor from the socket **(2)**.

△ **CAUTION:** Do NOT handle the pins in the processor socket. These pins are very fragile and handling them could cause irreparable damage. Once pins are damaged it may be necessary to replace the system board.

CAUTION: The heat sink must be installed within 24 hours of installing the processor to prevent damage to the processor's solder connections.



To install a new processor:

1. Place the processor in its socket. Make sure the gold triangle on the processor is aligned with the triangle on the socket.
2. If installing an Intel processor, close the retainer.
3. Secure the locking lever.

   If reusing the existing heat sink, go to step 4.

   If using a new heat sink, go to step 7.
4. If reusing the existing heat sink, clean the bottom of the heat sink with the alcohol pad provided in the spares kit.
5. Apply the thermal grease provided in the spares kit to the top of the processor and install the heat sink atop the processor.
6. Go to step 8.
7. If using a new heat sink, remove the protective covering from the bottom of the heat sink and place it in position atop the processor.
8. Secure the heat sink to the system board, and then attach the heat sink control cable to the system board, if applicable.

△ **CAUTION:** Heat sink retaining screws should be tightened in diagonally opposite pairs (as in an X) to evenly seat the heat sink on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

NOTE: After installing a new processor onto the system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system ROM BIOS can be found on the Web at: http:\\h18000.www1.hp.com/support/files.

Power Supply

The power supply is secured to the back of the chassis with four Torx screws. Additionally, the power supply is held in place by a lever on the interior chassis floor.

⚠ **WARNING!** Voltage is always present on the system board when the computer is plugged into an active AC outlet. To avoid possible personal injury and damage to the equipment the power cord should be disconnected from the computer and/or the AC outlet before opening the computer.

Table 5-8 Model 3120 power supply cable connections

Power supply connector label	Connects to
P1	Main power connector (24 pin)
P7	CPU power connector (4 pin)
P4	Hard drive 1
P3	Optical drive 1
P5	Hard drive 2
P2	Optical drive 2

Table 5-9 Model 3125 power supply cable connections

Power supply connector label	Connects to
P1	Main power connector (24 pin)
P6	CPU power connector (4 pin)
P4	Hard drive 1
P3	Optical drive 1
P5	Hard drive 2
P2	Optical drive 2

Table 5-10 Model 3130 power supply cable connections

Power supply connector label	Connects to
P1	Main power connector (24 pin)
P7	CPU power connector (4 pin)

Table 5-10 Model 3130 power supply cable connections (continued)

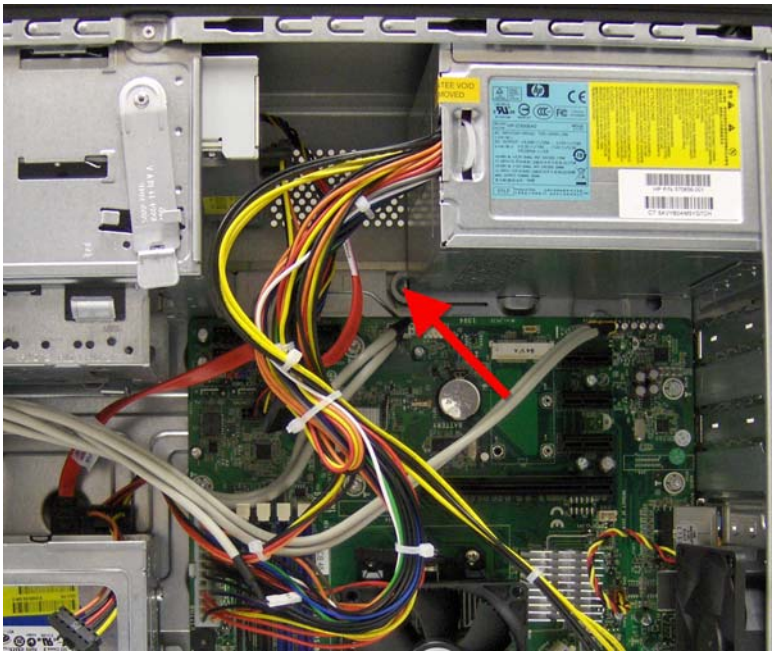
P4	Hard drive 1
P3	Optical drive 1
P5	Hard drive 2
P2	Optical drive 2

NOTE: If the power supply includes a voltage select switch, make sure to set the red switch to the setting (230 V or 115 V) appropriate for the country in which the computer is used. See the table at the end of this section for a list of settings. Spare power supplies normally arrive set for 230 V.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the rear facing toward you.
4. Disconnect all power cables from the mass storage devices and from the system board (two connectors).
5. Remove the four screws that secure the power supply to the chassis.

NOTE: Rear appearance varies by model.

6. Inside of the unit, press the power supply release latch on the chassis base, and then lift up the rear of the power supply to disengage it from the chassis.



NOTE: System board appearance varies by model.

7. Slide the power supply toward the front/bottom of the computer, then lift the power supply out of the computer.

To install the power supply, reverse the removal procedure.

Table 5-11 Country power supply settings

Country	Voltage setting	Country	Voltage setting
Austria	230W	Mexico	115W
Australia	230W	The Netherlands	230W
Argentina	230W	New Zealand	230W
Belgium	230W	Portugal	230W
Brazil	230W	Norway	230W
Canada	115W	People's Republic of China	230W
Caribbean	230W	Singapore	230W
Denmark	230W	South Korea	230W
Finland	230W	Spain	230W
France	230W	Sweden	230W
Germany	230W	Switzerland	230W
India	230W	Taiwan	115W
Italy	230W	Thailand	230W

Table 5-11 Country power supply settings (continued)

Japan	115W	The United Kingdom	230W
Latin America	115W	The United States	115W

System Board

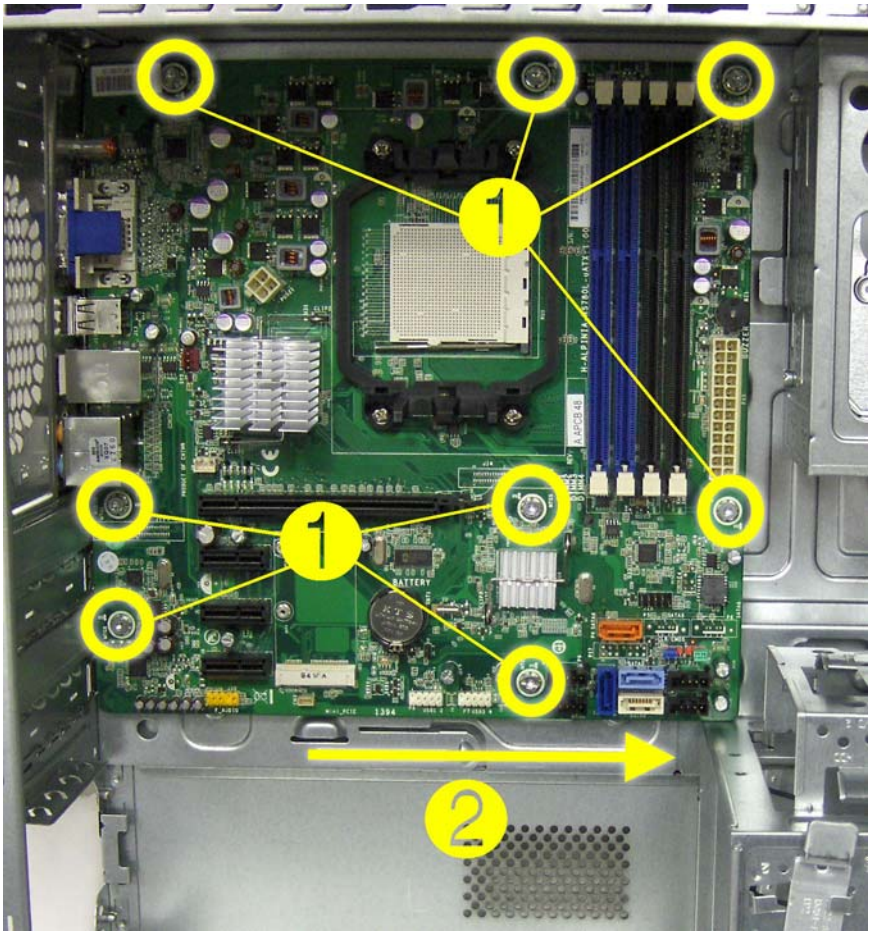
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory modules
- Processor
- Expansion cards

To remove the system board:

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the rear facing toward you.
4. Remove the front bezel (Front Bezel on page 44).
5. Remove an expansion cards (Expansion Cards on page 54).
6. Disconnect the power, and data cables from the back of all installed drives.
7. Disconnect all cables from the system board.
8. Remove the eight screws that secure the system board to the chassis **(1)**.

9. Slide the system board toward the front of the chassis **(2)**, and then lift it up and out of the chassis.



NOTE: System board appearance varies by model.

To install the system board, reverse the removal procedure.

Note the following when installing a system board:

- To insure correct installation while fastening the first two screws, press the system board firmly in place against the rear I/O panel so that the system board screw holes are aligned to the mounting holes in the chassis.
- When installing a system board, align the ports on the rear of the system board to cutouts in the rear of the chassis (keep EMI tabs on top of the connectors), and firmly slide toward the chassis rear until system board screw holes are aligned to mounting holes in the chassis.
- Ensure ground fingers make contact with the connectors on the system board and are not damaged.
- When installing the system board, recommended torque = 4-6 in-lbs.
- When replacing the system board, you must also change the chassis serial number in the BIOS.
- After installing a new system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system ROM BIOS can be found at: http:\\h18000.www1.hp.com/support/files.

Battery

The battery that comes with your computer provides power to the real-time clock and has a lifetime of about three years. When replacing the battery, use a battery equivalent to the battery originally installed on the computer. The computer comes with a 3-volt lithium coin cell battery.

NOTE: The lifetime of the lithium battery can be extended by plugging the computer into a live AC wall socket. The lithium battery is only used when the computer is NOT connected to AC power.

WARNING! This computer contains an internal lithium manganese dioxide battery. There is a risk of fire and burns if the battery is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60°C (140°F)
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace the battery only with the HP/Compaq spare designated for this product.

CAUTION: Before replacing the battery, it is important to back up the computer CMOS settings. When the battery is removed or replaced, the CMOS settings will be cleared. Refer to the *Troubleshooting Guide* for information on backing up the CMOS settings.

NOTE: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, its authorized partners, or its agents.

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.

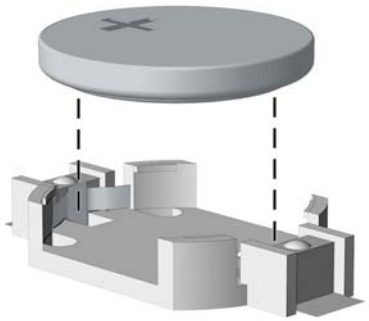
1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).

   NOTE: It may be necessary to remove an expansion card to gain access to the battery.

3. Locate the battery and battery holder on the system board.

Type 1 Battery Holder

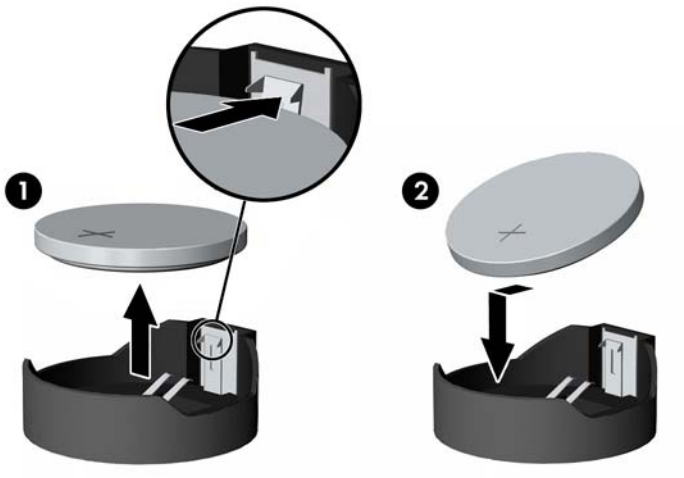
1. Lift the battery out of its holder.



2. Slide the replacement battery into position, positive side up.
3. The battery holder automatically secures the battery in the proper position.
4. Replace the computer access panel.
5. Plug in the computer and turn on power to the computer.
6. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide*.

Type 2 Battery Holder

1. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out **(1)**.
2. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up **(2)**. Push the other edge down until the clamp snaps over the other edge of the battery.

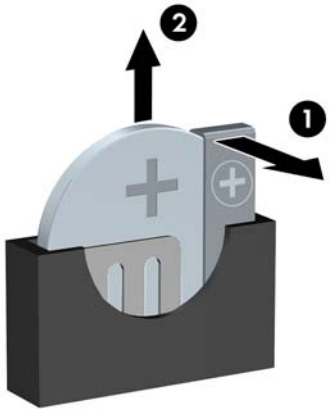


3. Replace the computer access panel.

4. Plug in the computer and turn on power to the computer.
5. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide*.

Type 3 Battery Holder

1. Pull back on the clip **(1)** that holds the battery in place, then remove the battery **(2)**.
2. Insert the new battery and position the clip back in place.



3. Replace the computer access panel.
4. Plug in the computer and turn on power to the computer.
5. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide*.

6 Removal and Replacement Procedures Small Form Factor (SFF) Chassis

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.

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

Preparation for Disassembly

See Identifying the Chassis, Routine Care, and Disassembly Preparation on page 32 for initial safety procedures.

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

   CAUTION: Turn off the computer before disconnecting any cables.

   Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. In some systems the cooling fan is on even when the computer is in the “Standby,” or “Suspend” modes. The power cord should always be disconnected before servicing a unit.

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

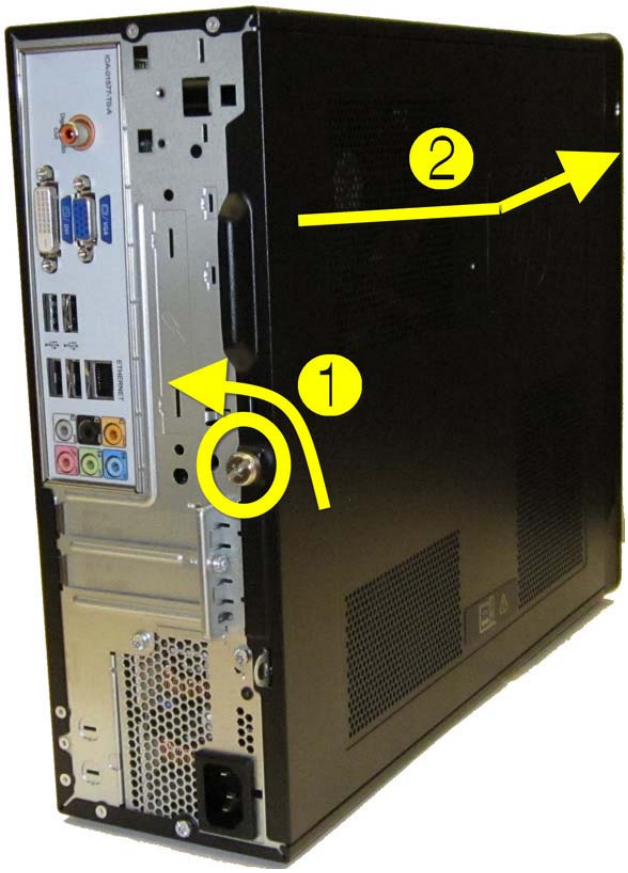
NOTE: During disassembly, label each cable as you remove it, noting its position and routing. Keep all screws with the units removed.

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

Access Panel

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. If the computer is on a stand, remove the computer from the stand.
3. Loosen the thumbscrew **(1)**, and then grasp the handle and remove the panel from the computer **(2)**.

Figure 6-1 Removing the Access Panel



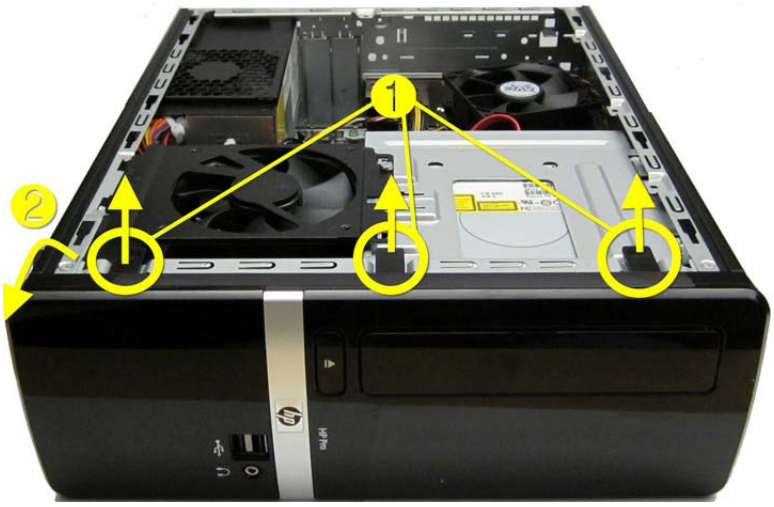
To install the access panel, reverse the removal procedure.

Front Bezel

NOTE: Computer appearance may vary.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Lift up the three tabs on the side of the bezel **(1)**, then rotate the bezel off the chassis **(2)**.

Figure 6-2 Removing the Front Bezel



To install the front bezel, reverse the removal procedure.

Installing Additional Memory

The computer comes with double data rate 3 synchronous dynamic random access memory (DDR3-SDRAM) dual inline memory modules (DIMMs).

DIMMs

The memory sockets on the system board can be populated with up to four industry-standard DIMMs. These memory sockets are populated with at least one preinstalled DIMM. To achieve the maximum memory support, you can populate the system board with up to either 4 GB, 8 GB, or 16-GB of memory configured in a high-performing dual channel mode.

Model Number	Maximum Memory
HP Pro 2110	4 GB
HP Pro 3120	8 GB
HP Pro 3130	16 GB

DDR3-SDRAM DIMMs

For proper system operation, the DDR3-SDRAM DIMMs must be:

- industry-standard 240-pin
- unbuffered non-ECC PC3-8500 DDR3-1066 MHz-compliant or PC3-10600 DDR3-1333 MHz-compliant
- 1.5 volt DDR3-SDRAM DIMMs

The DDR3-SDRAM DIMMs must also:

- support CAS latency 7 DDR3 1066 MHz (7-7-7 timing) and CAS latency 9 DDR3 1333 MHz (9-9-9 timing)
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

- 512-Mbit, 1-Gbit, and 2-Gbit non-ECC memory technologies
- single-sided and double-sided DIMMs
- DIMMs constructed with x8 and x16 DDR devices; DIMMs constructed with x4 SDRAM are not supported

NOTE: The system will not operate properly if you install unsupported DIMMs.

Populating DIMM Sockets

There are four DIMM sockets on the system board, with two sockets per channel.

DIMM Socket Locations – HP Pro 2110

When installing memory modules:

- If installing only one memory module, install it in DIMM1.
- If installing 2 memory modules:
  - 2 matching memory modules - install in DIMM1 and DIMM2.
  - 2 non-matching memory modules - install in DIMM1 and DIMM2. Install the larger (GB) module in DIMM1 and smaller (MB) module in DIMM2.

Figure 6-3 DIMM Socket Locations – HP Pro 2110

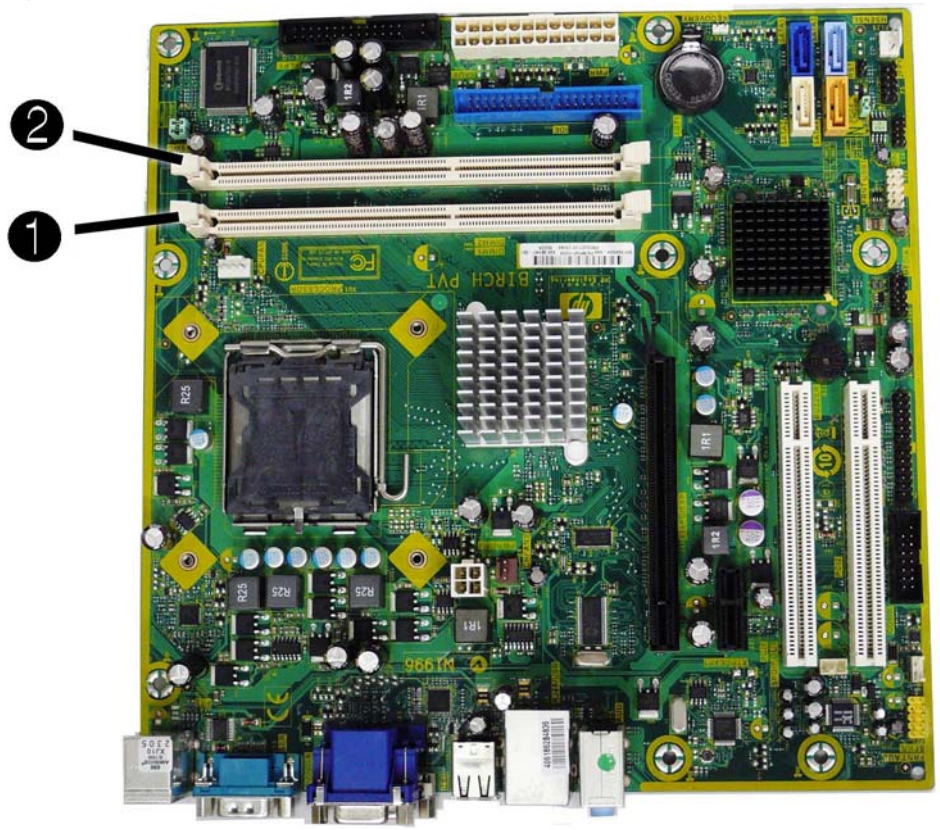


Table 6-1 DIMM Socket Locations – HP Pro 2110

Item	Description	Socket Color	Insertion Order
1	DIMM1 socket, Channel A (populate first)	White	1
2	DIMM2 socket, Channel A	White	2

NOTE: A DIMM must occupy the XMM1 socket.

DIMM Socket Locations – HP Pro 3120

When installing memory modules:

- If installing only one memory module, install it in DIMM1.
- If installing 2 memory modules:
  - 2 matching memory modules - install in DIMM1 and DIMM3.
  - 2 non-matching memory modules - install in DIMM1 and DIMM3. Install the larger (GB) module in DIMM1 and smaller (MB) module in DIMM3.
- If installing 3 memory modules:
  - 3 matching memory modules - install in DIMM1, DIMM3, and DIMM2.
  - 2 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 2x2GB and 1x1GB) - install the matching pair in DIMM1 and DIMM2 and smaller (MB) module in DIMM2.
- If installing 4 memory modules:
  - 4 matching memory modules - install in DIMM1, DIMM3, DIMM2, and DIMM4.
  - 3 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 3x2GB & 1x1GB) -install the matching pair in DIMM2, DIMM4, and DIMM1 and smaller (MB) module in DIMM3.

Figure 6-4 DIMM Socket Locations – HP Pro 3120

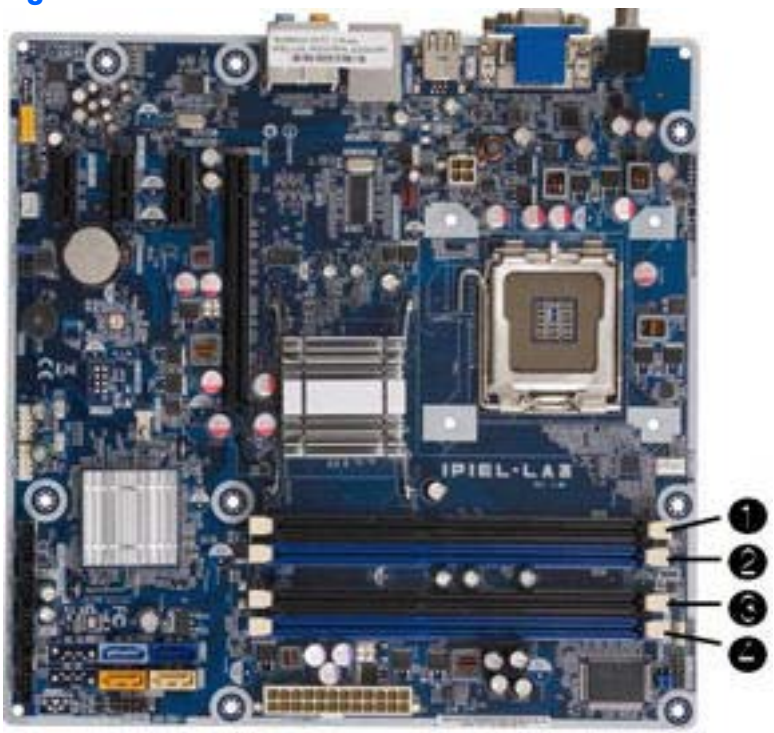


Table 6-2 DIMM Socket Locations – HP Pro 3120

Item	Description	Socket Color	Insertion Order
1	XMM1 socket, Channel A (populate first)	Black	1
2	XMM2 socket, Channel A	Blue	2
3	XMM3 socket, Channel B	Black	3
4	XMM4 socket, Channel B	Blue	4

NOTE: A DIMM must occupy the XMM1 socket.

DIMM Socket Locations – HP Pro 3130

When installing memory modules:

- If installing only one memory module, install it in DIMM2.
- If installing 2 memory modules:
  - 2 matching memory modules - install in DIMM2 and DIMM4.
  - 2 non-matching memory modules - install in DIMM2 and DIMM4. Install the larger (GB) module in DIMM2 and smaller (MB) module in DIMM4.
- If installing 3 memory modules:
  - 3 matching memory modules - install in DIMM2, DIMM4, and DIMM1.
  - 2 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 2x2GB and 1x1GB) - install the matching pair in DIMM2 and DIMM4 and smaller (MB) module in DIMM1.
- If installing 4 memory modules:
  - 4 matching memory modules - install in DIMM2, DIMM4, DIMM1, and DIMM3.
  - 3 matching memory modules and 1 non-matching memory module of smaller size (MB) than combined matching modules (example: 3x2GB & 1x1GB) -install the matching pair in DIMM2, DIMM4, and DIMM1 and smaller (MB) module in DIMM3.

Figure 6-5 DIMM Socket Locations – HP Pro 3130

Table 6-3 DIMM Socket Locations – HP Pro 3130

Item	Description	Socket Color	Insertion Order
1	XMM1 socket, Channel B	Black	3
2	XMM2 socket, Channel B (populate first)	Blue	1
3	XMM3 socket, Channel A	Black	4
4	XMM4 socket, Channel A	Blue	2

NOTE: A DIMM must occupy the XMM2 socket.

The system will automatically operate in single channel mode, dual channel mode, or flex mode, depending on how the DIMMs are installed.

- The system will operate in single channel mode if the DIMM sockets are populated in one channel only.
- The system will operate in a higher-performing dual channel mode if the total memory capacity of the DIMMs in Channel A is equal to the total memory capacity of the DIMMs in Channel B. The technology and device width can vary between the channels. For example, if Channel A is populated with two 1-GB DIMMs and Channel B is populated with one 2-GB DIMM, the system will operate in dual channel mode.

- The system will operate in flex mode if the total memory capacity of the DIMMs in Channel A is not equal to the total memory capacity of the DIMMs in Channel B. In flex mode, the channel populated with the least amount of memory describes the total amount of memory assigned to dual channel and the remainder is assigned to single channel. For optimal speed, the channels should be balanced so that the largest amount of memory is spread between the two channels. If one channel will have more memory than the other, the larger amount should be assigned to Channel A. For example, if you are populating the sockets with one 2-GB DIMM, and three 1-GB DIMMs, Channel A should be populated with the 2-GB DIMM and one 1-GB DIMM, and Channel B should be populated with the other two 1-GB DIMMs. With this configuration, 4-GB will run as dual channel and 1-GB will run as single channel.
- In any mode, the maximum operational speed is determined by the slowest DIMM in the system.

Installing DIMMs

△ **CAUTION:** You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board. If you see an LED light on the system board, voltage is still present.

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

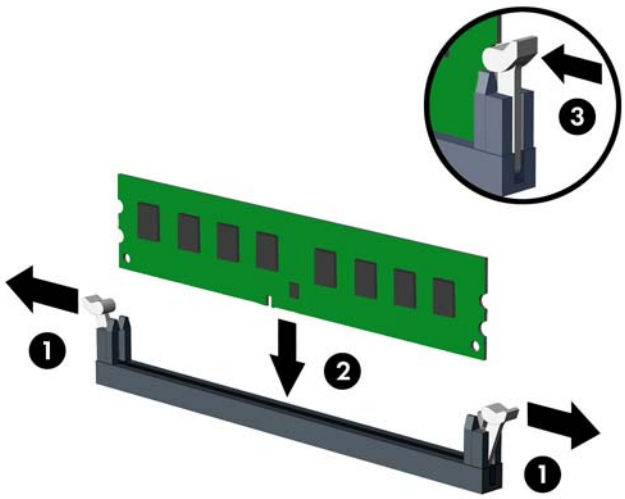
Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

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

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Move any cables aside that interfere with removing the memory modules.

4. Open both latches of the memory module socket **(1)**, and insert the memory module into the socket **(2)**.

Figure 6-6 Installing a DIMM



NOTE: A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

Populate the DIMM sockets in the following order: DIMM1, DIMM3, DIMM2, then DIMM4.

For maximum performance, populate the sockets so that the memory capacity is spread as equally as possible between Channel A and Channel B.

5. Push the module down into the socket, ensuring that the module is fully inserted and properly seated. Make sure the latches are in the closed position **(3)**.
6. Repeat steps 4 and 5 to install any additional modules.
7. Replace the access panel.
8. If the computer was on a stand, replace the stand.
9. Reconnect the power cord and turn on the computer.
10. Lock any security devices that were disengaged when the access panel was removed.

The computer should automatically recognize the additional memory the next time you turn on the computer.

Expansion Cards

Although the system boards contain four expansion slots, the power supply covers two of them, leaving only two accessible expansion slots.

HP Pro 2110, 3120 and 3130 models all offer one accessible PCI Express x1 expansion slot and one accessible PCI Express x16 expansion slot. There are two other PCI Express x1 expansion slots that the power supply blocks access to. The expansion slots accommodate full-height or half-height expansion cards.

Expansion Slot Locations

Figure 6-7 Expansion Slot Locations – HP Pro 2110

Figure 6-8 Expansion Slot Locations – HP Pro 3120

Figure 6-9 Expansion Slot Locations – HP Pro 3130

Table 6-4 Expansion Slot Locations

Item	Description
1	Inaccessible – PCI x1 expansion slot
2	Inaccessible – PCI x1 expansion slot
3	PCI Express x1 expansion slot
4	PCI Express x16 expansion slot

NOTE: You can install a PCI Express x1, x4, x8, or x16 expansion card in the PCI Express x16 expansion slot.

To remove, replace, or add an expansion card:

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Locate the correct vacant expansion socket on the system board and the corresponding expansion slot on the back of the computer chassis.
4. On the rear of the computer, a slot cover lock secures the expansion card brackets in place. Remove the screw from the slot cover lock then slide the slot cover lock up to remove it from the chassis.

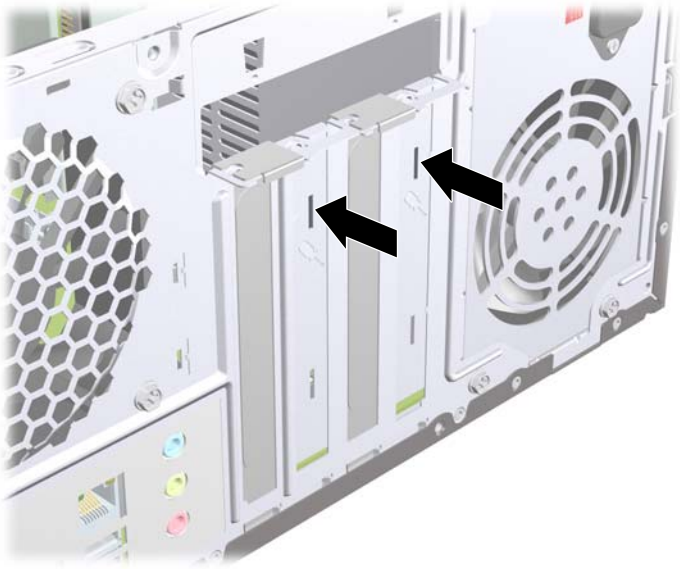
Figure 6-10 Opening the Slot Cover Lock

5. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.

NOTE: Before removing an installed expansion card, disconnect any cables that may be attached to the expansion card.

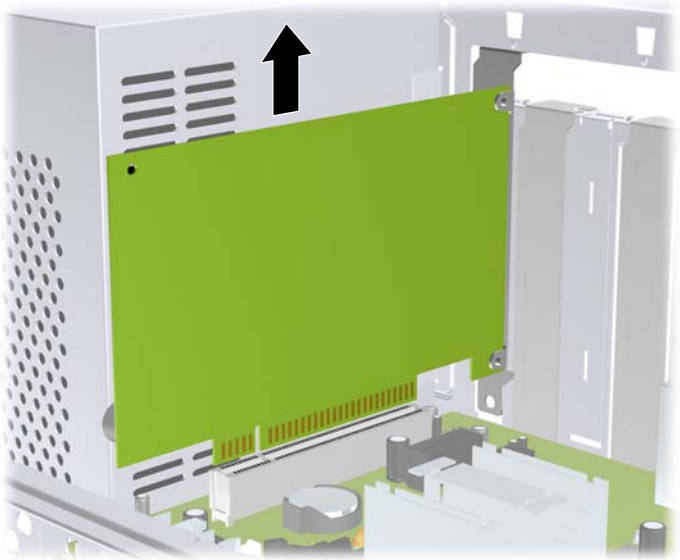
a. If you are installing an expansion card in a vacant socket, you must use a flatblade screwdriver to pry out the metal shield on the rear panel that covers the expansion slot. Be sure to remove the appropriate shield for the expansion card you are installing.

Figure 6-11 Removing an Expansion Slot Cover



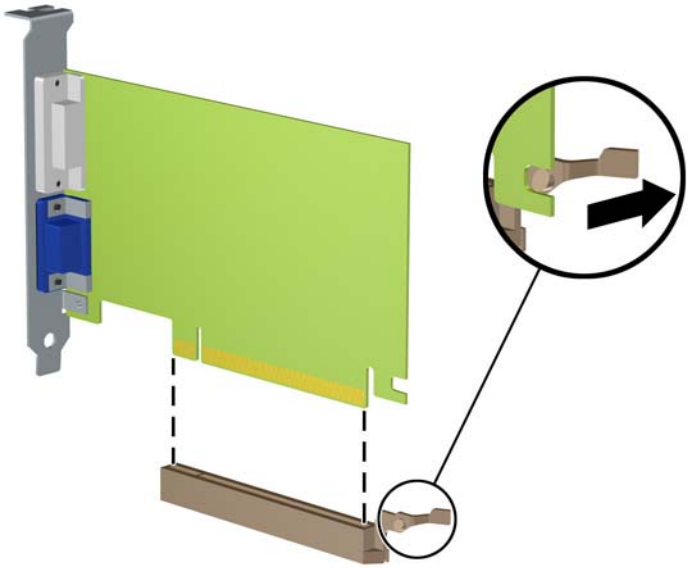
b. If you are removing a standard PCI card or PCI Express x1 card, hold the card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket then away from the inside of the chassis to release it from the chassis frame. Be sure not to scrape the card against the other components.

Figure 6-12 Removing a PCI or PCI Express x1 Expansion Card



c. If you are removing a PCI Express x16 card, pull the retention arm on the back of the expansion socket away from the card and carefully rock the card back and forth until the connectors pull free from the socket. Be sure not to scrape the card against the other components.

Figure 6-13 Removing a PCI Express x16 Expansion Card

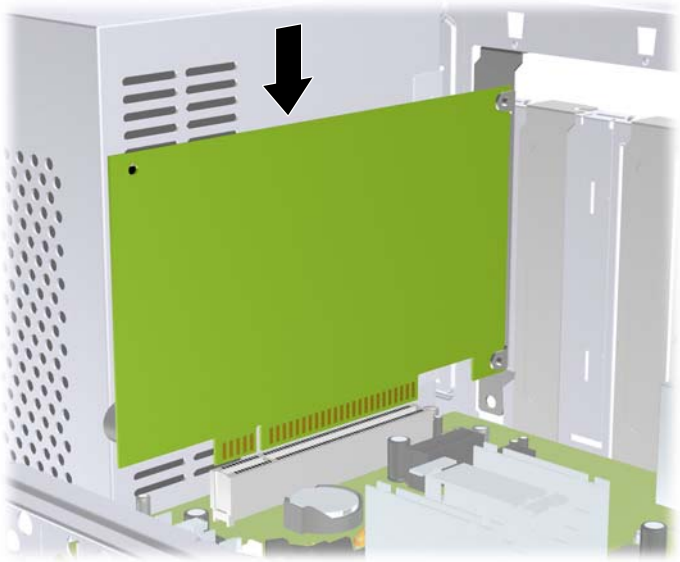


6. Store the removed card in anti-static packaging.
7. If you are not installing a new expansion card, install an expansion slot cover to close the open slot.

△ **CAUTION:** After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

8. To install a new expansion card, hold the card just above the expansion socket on the system board then move the card toward the rear of the chassis so that the bottom of the bracket on the card slides into the small slot on the chassis. Press the card straight down into the expansion socket on the system board.

Figure 6-14 Installing an Expansion Card



NOTE: When installing an expansion card, press firmly on the card so that the whole connector seats properly in the expansion card slot.

9. Replace the slot cover lock and secure it in place with the screw that was previously removed.

Figure 6-15 Securing the Expansion Cards and Slot Covers

10. Connect external cables to the installed card, if needed. Connect internal cables to the system board, if needed.

11. Replace the computer access panel.

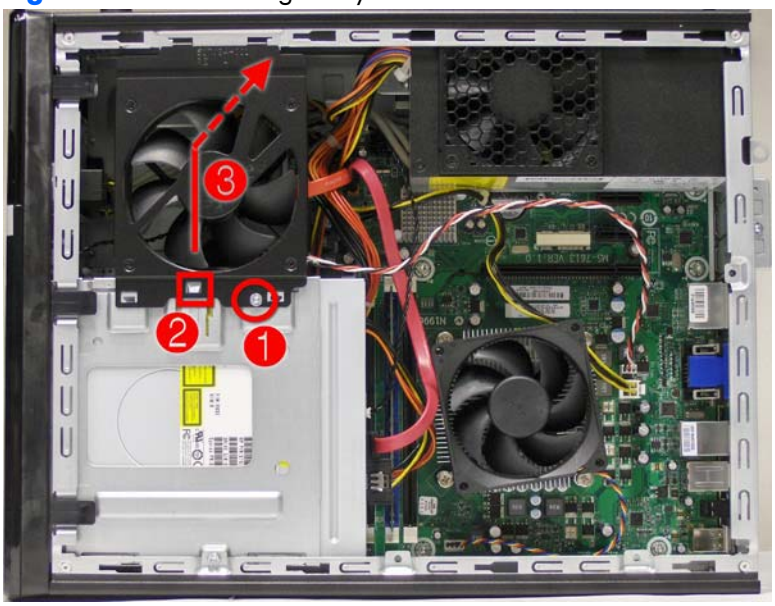
12. Reconnect the power cord and any external devices, then turn on the computer.
13. Lock any security devices that were disengaged when the access panel was removed.
14. Reconfigure the computer, if necessary. Refer to the *Computer Setup (F10) Utility Guide* for instructions on using Computer Setup.

System Fan

The front fan assembly is attached to the front of the chassis.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Remove the front bezel (Front Bezel on page 89).
4. Disconnect the fan cable from the red/brown system board connector.
5. Remove the Torx screw that secures the fan to the computer **(1)**.
6. While pressing the tab **(2)**, slide the fan away from the optical drive and then lift it out of the chassis **(3)**.

Figure 6-16 Removing the system fan



To install the system fan, reverse the removal procedure.

Cable Management

The Small Form Factor chassis is a very compact computer and proper routing of the internal cables is critical to the operation of the computer. Follow good cable management practices when working inside the computer.

- Keep cables away from major heat sources like the heat sink.
- Do not jam cables on top of expansion cards or memory modules. Printed circuit cards like these are not designed to take excessive pressure on them.
- Keep cables clear of movable or rotating parts like the power supply and drive cage to prevent them from being cut or crimped when the component is lowered into its normal position.
- When folding a flat ribbon cable, never fold to a sharp crease. Sharp creases may damage the wires.
- Some flat ribbon cables come prefolded. Never change the folds on these cables.
- Do not bend any cable sharply. A sharp bend can break the internal wires.
- Never bend a SATA data cable tighter than a 30 mm (1.18 in) radius.
- Never crease a SATA data cable.
- Do not rely on components like the drive cage, power supply, or computer cover to push cables down into the chassis. Always position the cables to lay properly by themselves.

When removing the power supply power cables from the connector on the system board, always follow these steps:

1. Squeeze on the top of the retaining latch attached to the cable end of the connector.
2. Grasp the cable end of the connector and pull it straight up.

△ **CAUTION:** Always pull the connector - NEVER pull on the cable. Pulling on the cable could damage the cable and result in a failed power supply.

Cable Connections

HP Pro 2110

System board connectors are color-coded to make it easier to find the proper connection.

Connector Name	Connector Color	Description
ATXPOWER	white	Power supply, 24-pin
ATX_CPU	white	Power supply, 4-pin
CHASSIS_FAN	brown	Chassis fan
CPU_FAN	white	Heat sink fan
F_USB2	black	Media card reader
JFP1	black	Power switch
F_AUDIO	yellow	Front I/O audio
F_USB1	white	Front I/O USB
SATA1	dark blue	Primary hard drive
SATA2	white	Primary optical drive
SATA3	light blue	Not used
SATA4	orange	Not used

HP Pro 3120

System board connectors are color-coded to make it easier to find the proper connection.

Connector Name	Connector Color	Description
ATX PWR	white	Power supply, 24-pin
ATX_CPU	white	Power supply, 4-pin
CHASSIS_FAN1	brown	Chassis fan
CPU_FAN	white	Heat sink fan
F_USB1	white	Front USB cable
JFP1	black	Power switch
F_AUDIO	yellow	Front I/O audio
F_USB2	white	Media card reader
SATA1	dark blue	Primary hard drive
SATA2	white	Primary optical drive
SATA3	light blue	Not used
SATA4	orange	Not used

HP Pro 3130

System board connectors are color-coded to make it easier to find the proper connection.

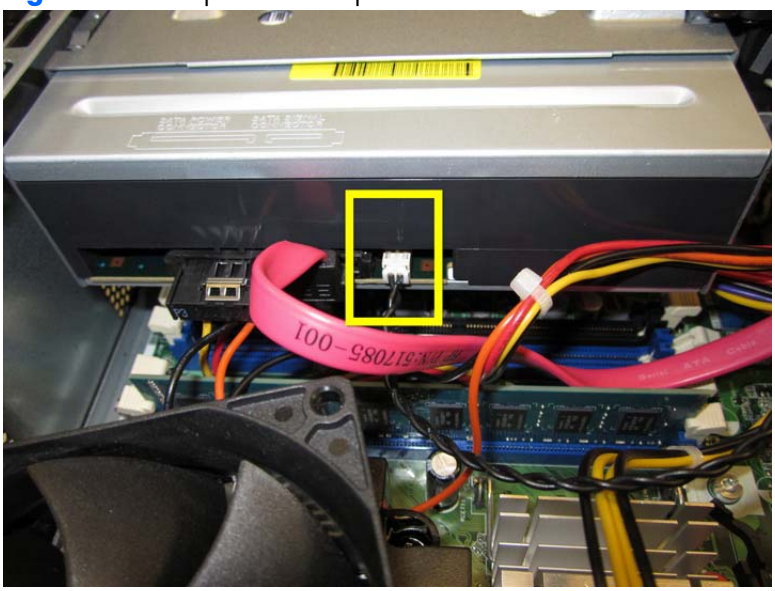
Connector Name	Connector Color	Description
ATX1	white	Power supply, 24-pin
PWR1	white	Power supply, 4-pin
SYS_FAN1	brown	Chassis fan
CPU_FAN1	white	Heat sink fan
JPF1	black	Power switch
JAUD1	yellow	Front I/O audio
JUSB2	white	Front I/O USB
JUSB1	white	Media card reader
JJ1394_1	red	1394 connector
SATA1	dark blue	Primary hard drive
SATA2	white	Primary optical drive
SATA3	light blue	Second hard drive
SATA4	orange	Second optical drive

Optical Drive Eject Button

The optical drive eject button is mounted to the front of the chassis under the front bezel. It has a cable that plugs into the back of the optical drive.

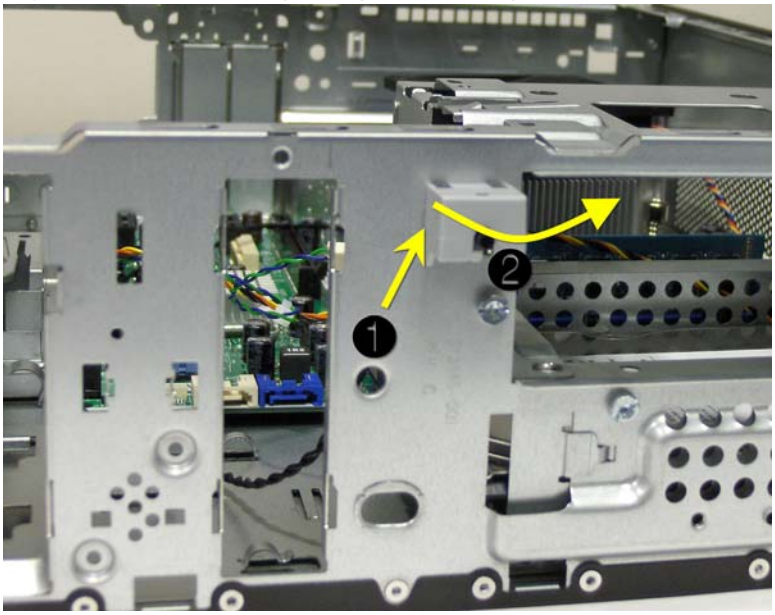
1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the front facing toward you.
4. Remove the front bezel (Front Bezel on page 44).
5. Disconnect the cable from the rear of the optical drive.

Figure 6-17 Optical drive eject button cable



6. Press the tab **(1)** on the left side of the button assembly, rotate the assembly from left to right **(2)**, and then pull the assembly from the chassis while threading the wire through the hole in the chassis.

Figure 6-18 Removing the optical drive eject button



To install the optical drive eject button, reverse the removal procedures.

Drives

△ **CAUTION:** Make sure personal files on the hard drive are backed up to an external storage device before removing the hard drive. Failure to do so will result in data loss.

Drive Positions

Figure 6-19 Drive Positions

Table 6-5 Drive Positions

1	5.25-inch external drive bay for optional drives (optical drive shown)
2	3.5-inch internal hard drive bay

NOTE: The drive configuration on your computer may be different than the drive configuration shown above.

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

Installing and Removing Drives

When installing additional drives, follow these guidelines:

- The primary Serial ATA (SATA) hard drive must be connected to the dark blue primary SATA connector on the system board.
- Connect a SATA optical drive to the white SATA connector on the system board..
- Connect a media card reader USB cable to the USB connector on the system board.
- The system does not support Parallel ATA (PATA) optical drives or PATA hard drives.

△ **CAUTION:** To prevent loss of work and damage to the computer or drive:

If you are inserting or removing a drive, shut down the operating system properly, turn off the computer, and unplug the power cord. Do not remove a 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.

Handle a drive carefully; do not drop it.

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.

If a drive must be mailed, place the drive in a bubble-pack mailer or other protective packaging and label the package “Fragile: Handle With Care.”

System Board Drive Connections

Refer to the following illustrations and tables to identify the system board drive connectors.

Figure 6-20 System Board Drive Connections – HP Pro 2110

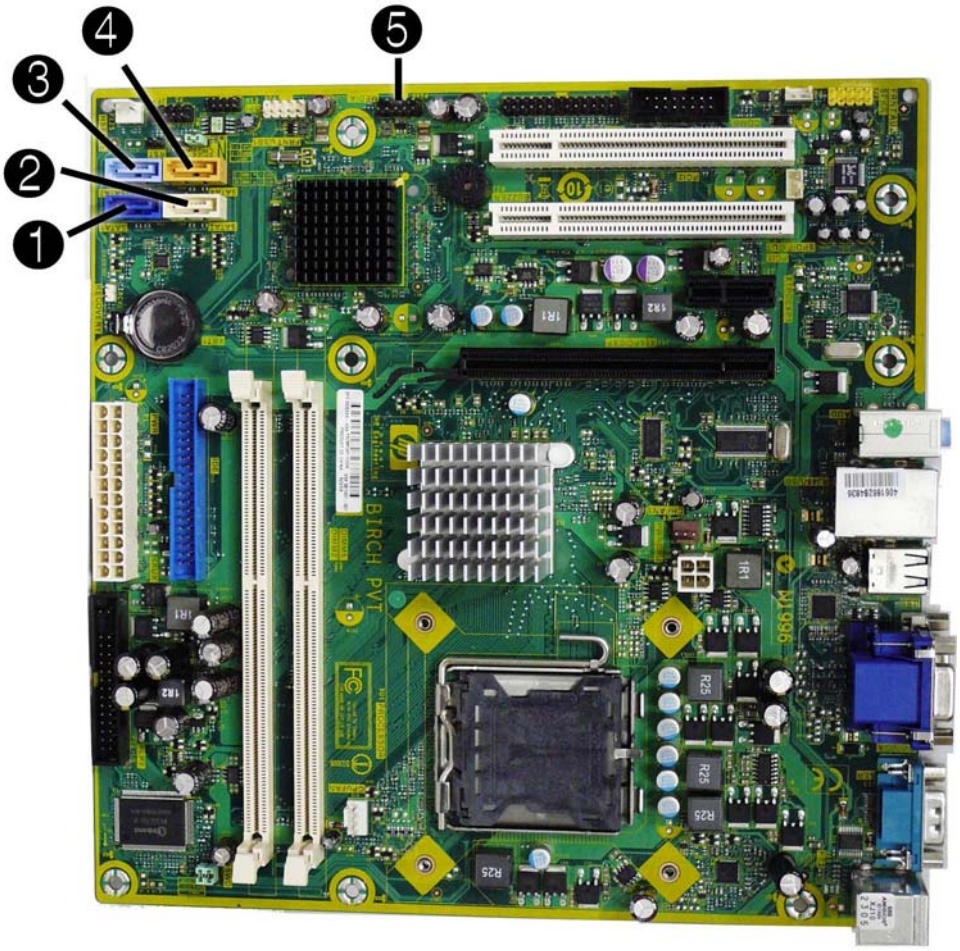


Table 6-6 System Board Drive Connections – HP Pro 2110

No.	System Board Connector	System Board Label	Color
1	SATA1	SATA1	dark blue
2	SATA2	SATA2	white
3	SATA3 (not used)	SATA3	light blue
4	SATA4 (not used)	SATA4	orange
5	Media Card Reader	F_USB2	black

Figure 6-21 System Board Drive Connections – HP Pro 3120

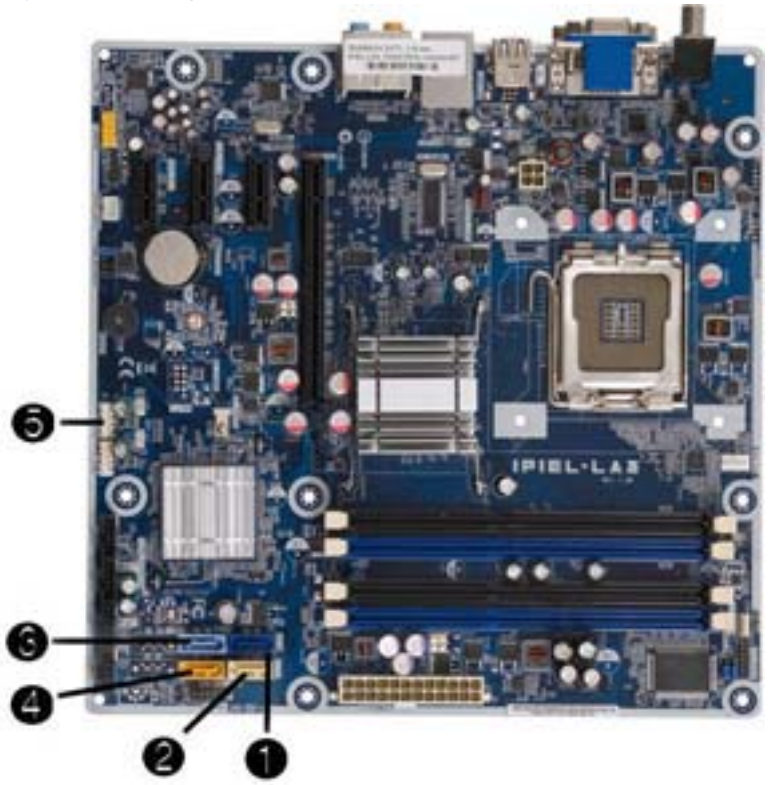


Table 6-7 System Board Drive Connections – HP Pro 3120

No.	System Board Connector	System Board Label	Color
1	SATA0	SATA0	dark blue
2	SATA1	SATA1	white
3	SATA2 (not used)	SATA2	light blue
4	SATA3 (not used)	SATA3	orange
5	Media Card Reader	F_USB1	white

Figure 6-22 System Board Drive Connections – HP Pro 3130

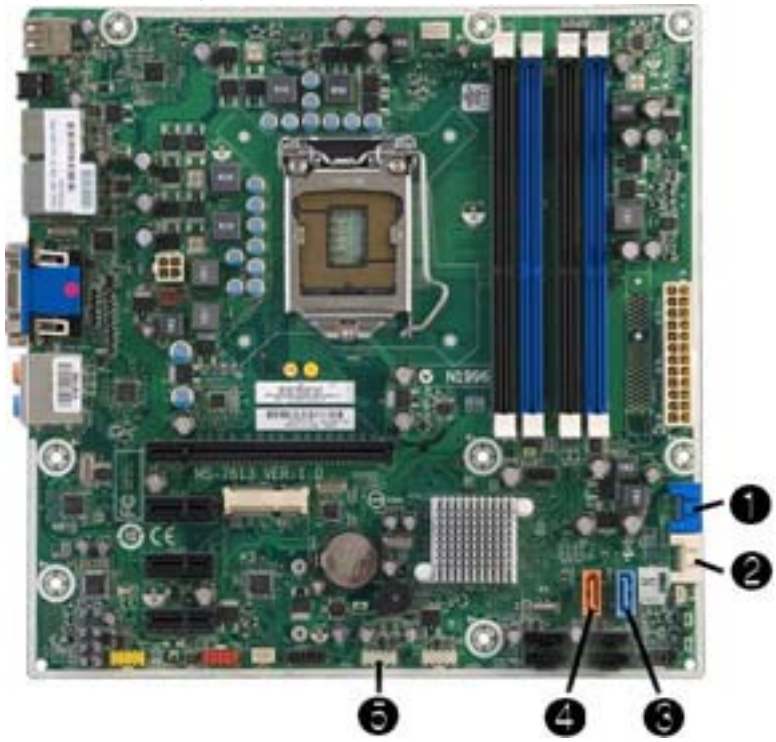


Table 6-8 System Board Drive Connections – HP Pro 3130

No.	System Board Connector	System Board Label	Color
1	SATA1	SATA1	dark blue
2	SATA2	SATA2	white
3	SATA3	SATA3	light blue
4	SATA4	SATA4	orange
5	Media Card Reader	JUSB1	white

Removing the Optical Drive

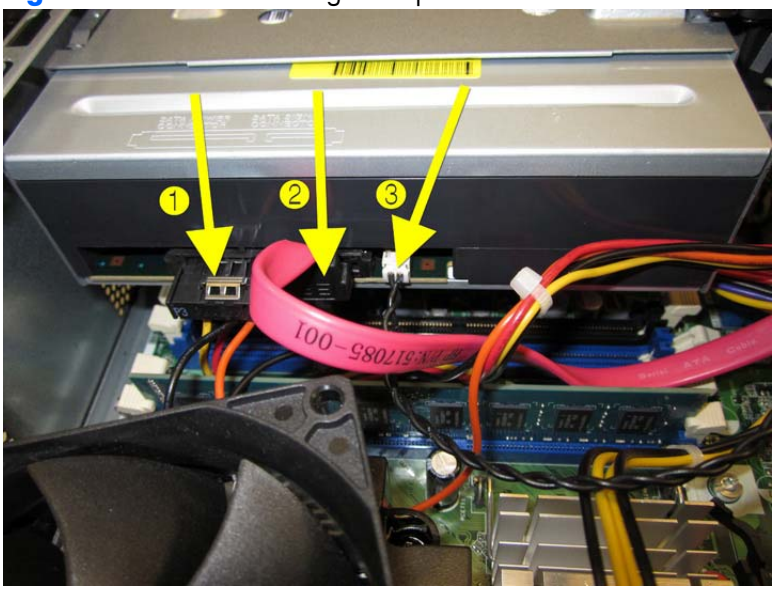
△ **CAUTION:** All removable media should be taken out of a drive before removing the drive from the computer.

To remove the optical drive:

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Remove the front bezel (Front Bezel on page 89).
4. Remove the system fan (System Fan on page 103).

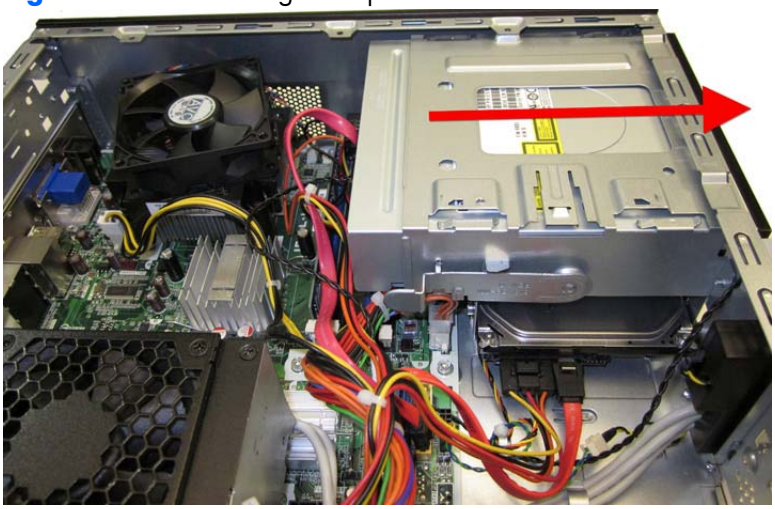
5. Disconnect the power cable **(1)**, data cable **(2)**, and eject cables **(3)** from the rear of the optical drive.

Figure 6-23 Disconnecting the Optical Drive Cables



6. Slide the drive out the front of the unit.

Figure 6-24 Removing the Optical Drive



NOTE: To replace the drive, reverse the removal procedure.

When installing an optical drive, slide it into the drive bay until it snaps into place.

Removing the Hard Drive

NOTE: The system does not support Parallel ATA (PATA) hard drives.

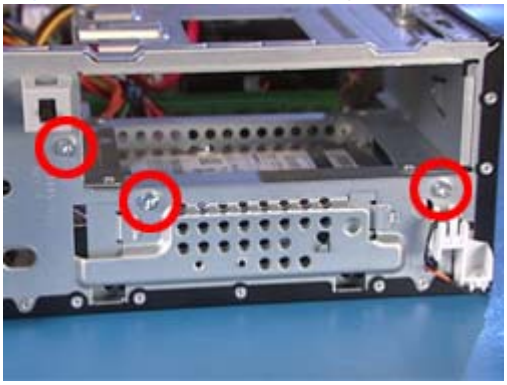
Before you remove the old hard drive, be sure to back up the data from the old hard drive so that you can transfer the data to the new hard drive.

The 3.5-inch hard drive is located under the optical drive. To remove the hard drive:

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Remove the front bezel (Front Bezel on page 89).
4. Remove the system fan (System Fan on page 103).
5. Remove the optical drive (Removing the Optical Drive on page 113).
6. Disconnect the power cable and data cable from the back of the hard drive.
7. Remove the four screws securing the drive cage assembly to the PC – one at the top of the assembly and three on the front of the PC.

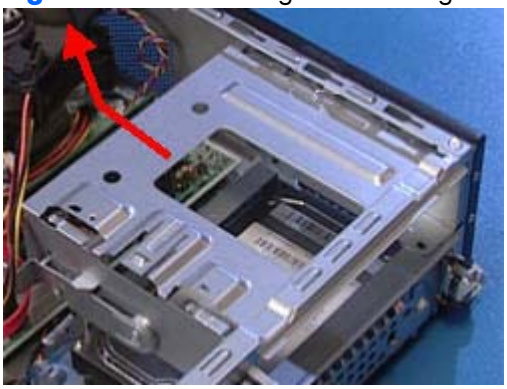
Figure 6-25 Hard drive cage screw location – top

Figure 6-26 Hard drive cage screw location – front



8. Slide the cage down and pull the assembly out of the computer.

Figure 6-27 Removing the drive cage



9. The hard drive is secured to the drive cage by four screws, two on each side. Remove the screws, and then slide the hard drive out of the drive cage assembly.

Figure 6-28 Hard drive screws

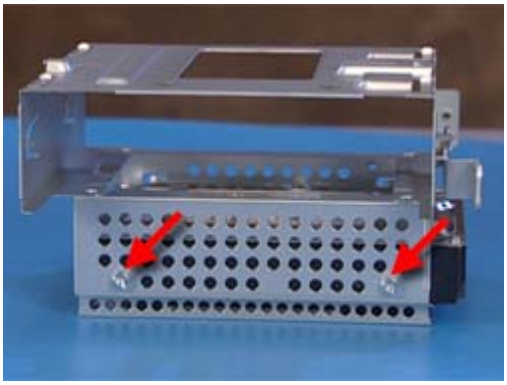
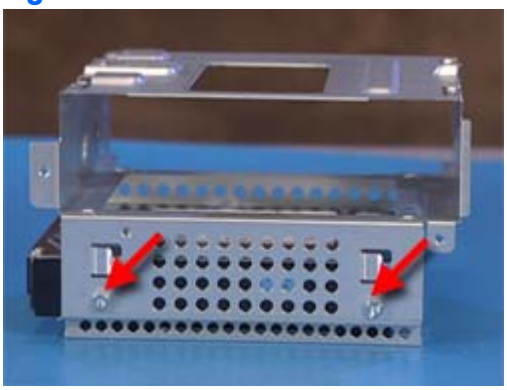


Figure 6-29 Hard drive screws



10. Slide the hard drive out of the drive cage assembly.

To install a hard drive, reverse the removal procedures.

When installing the hard drive into the drive cage, slide the drive into the cage so that the connector edge of the drive is on the side of the cage with the optical drive retaining latch.

Front I/O Assembly

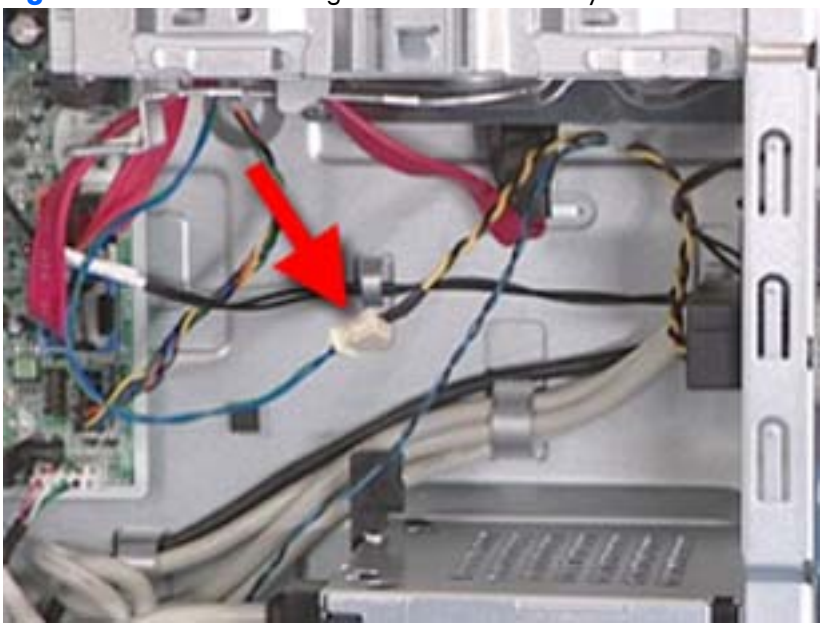
The front I/O assembly is attached to the front of the chassis. Pull the assembly away from the chassis to remove it.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Remove the front bezel (Front Bezel on page 89).
4. Remove the system fan (System Fan on page 103).
5. Disconnect the front audio and front USB cables from the yellow and white system board connectors.
6. Remove the cables from the clips on the base of the computer.

Figure 6-30 Front I/O assembly cable clip locations

7. Disconnect the hard drive activity LED connector from rest of the power switch cable bundle.

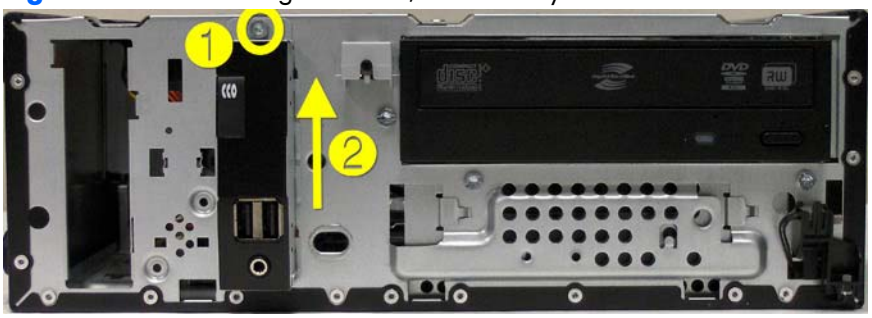
Figure 6-31 Disconnecting the hard drive activity LED



8. Remove the screw that secures the assembly to the front of the chassis **(1)**.

9. Slide the assembly up and pull it away from the front of the chassis while threading the wires through the hole in the chassis **(2)**.

Figure 6-32 Removing the front I/O assembly



To install the front I/O assembly, reverse the removal procedure.

NOTE: Be sure to correctly route the cables when reinstalling the assembly. Proper cable routing prevents damage to the cables and promotes proper air flow.

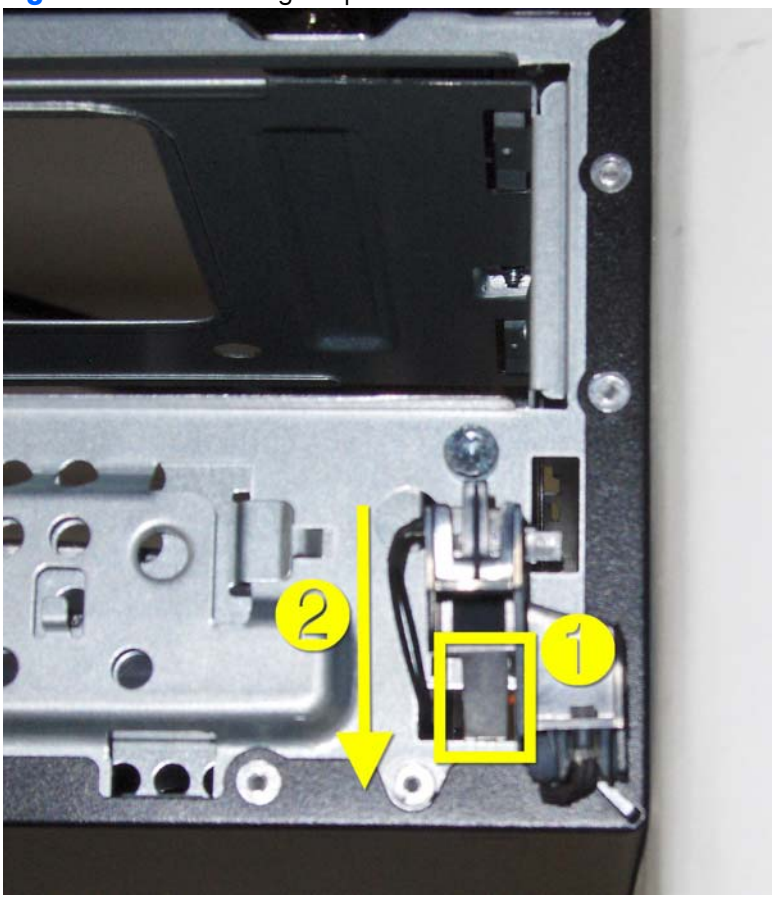
Power Switch/LED Assembly

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the front facing toward you.
4. Remove the front bezel (Front Bezel on page 44).
5. Remove the optical drive (Removing an Optical Drive on page 68).
6. Remove the hard drive (Removing the Hard Drive on page 114).
7. Disconnect the cable from the black system board connector.
8. Remove the cable from the clips under the hard drive cage.

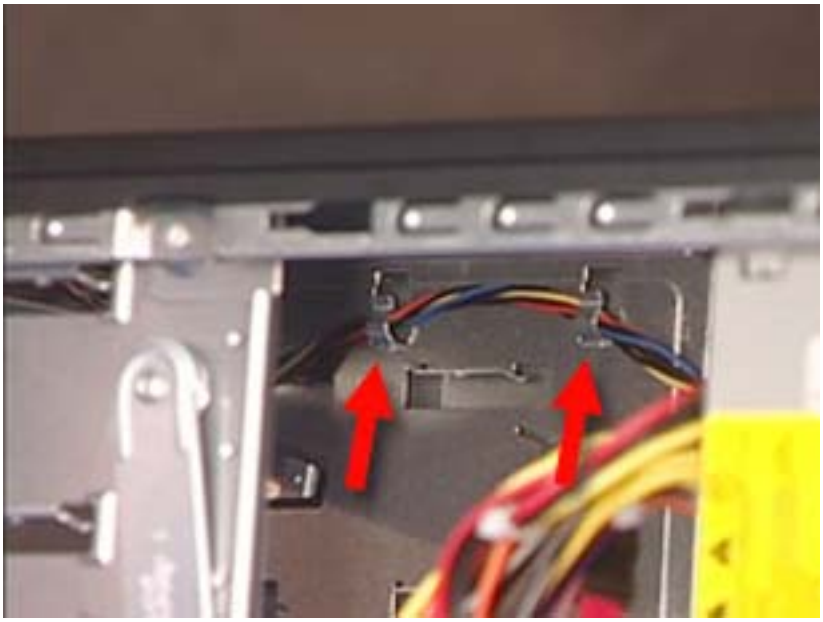
Figure 6-33 Removing the power switch cable

9. Press the tab **(1)** on the bottom of the power switch to disengage it from the chassis, slide the switch downward to disengage the tabs from the chassis **(2)**, and then pull the power switch away from the chassis while guiding the wires through the hole in the chassis.

Figure 6-34 Removing the power switch



10. Remove the power switch cable from the clips located in the optical drive bay on the inside of the chassis.

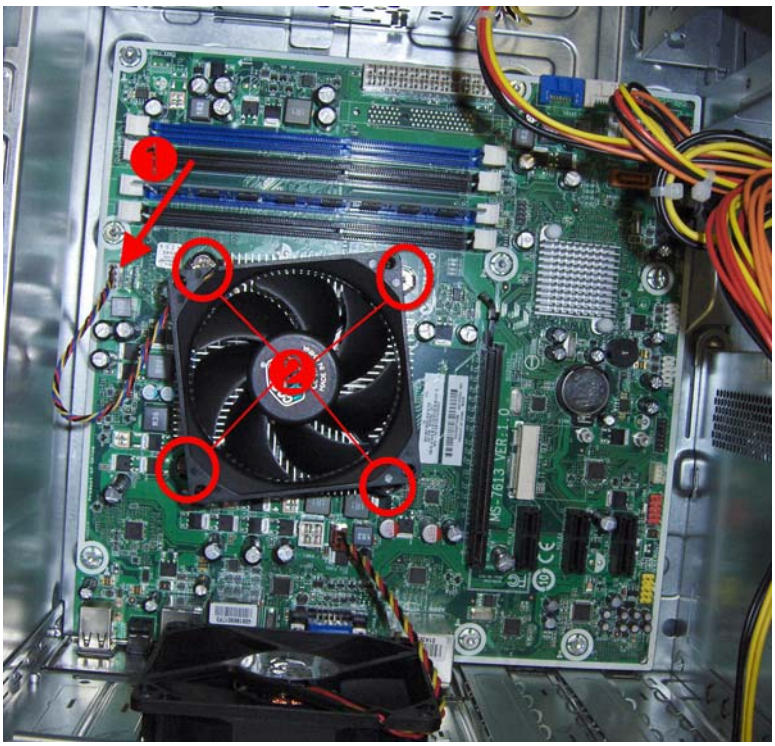


To install the power switch/LED assembly, reverse the removal procedures.

Heat sink

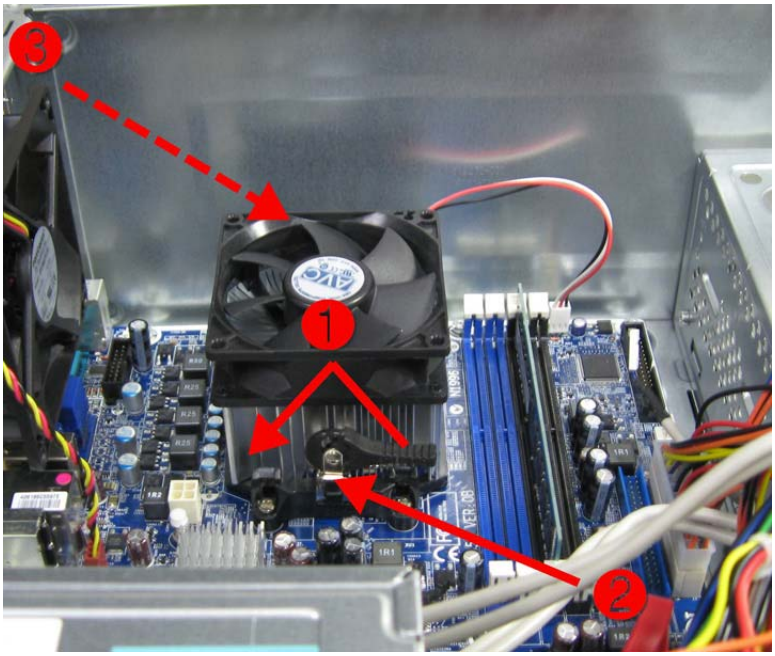
The heat sink is secured atop the processor with four captive Torx screws. The heat sink does not include a fan.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Remove the chassis fan (System Fan on page 103).
4. Disconnect the heat sink fan control cable **(1)** from the white system board connector.
5. If the computer uses a heat sink secured with four Torx screws, loosen the four captive torx T15 screws **(2)** that secure the heat sink to the system board.



6. Lift the lever **(1)** that secures the heat sink latch to the heat sink bracket attached to the system board.
7. After loosening the lever, press downward on the lever to release the square clip **(2)** from the tab on the heat sink bracket.
8. Use the lever to maneuver the square clip on the opposite side on the heat sink **(3)** free from the tab on the heat sink bracket.

9. Lift the heat sink from the processor and set it on its side to keep from contaminating the work area with thermal grease.



△ **CAUTION:** Heat sink retaining screws should be tightened in diagonally opposite pairs (as in an X) to evenly seat the heat sink to the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

Processor

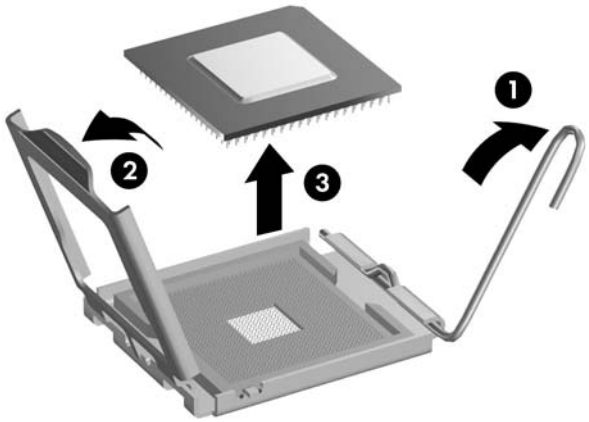
The computer may use an Intel or an AMD processor. Removal and replacement procedures vary depending on processor type.

1. Prepare the computer for disassembly (Preparation for Disassembly on page 42).
2. Remove the access panel (Access Panel on page 43).
3. Lay the computer on its side with the rear facing toward you.
4. Disconnect the heat sink control cable from the system board and remove the heatsink Heat sink assembly on page 75).
5. If the computer has an Intel processor, go to steps 7 – 9.
6. If the computer has an AMD processor, go to steps 10 – 11.
7. Rotate the locking lever to its full open position **(1)**.
8. Raise and rotate the microprocessor retainer to its full open position **(2)**.

9. Carefully lift the processor from the socket **(3)**.

△ **CAUTION:** Do NOT handle the pins in the processor socket. These pins are very fragile and handling them could cause irreparable damage. Once pins are damaged it may be necessary to replace the system board.

CAUTION: The heat sink must be installed within 24 hours of installing the processor to prevent damage to the processor's solder connections.



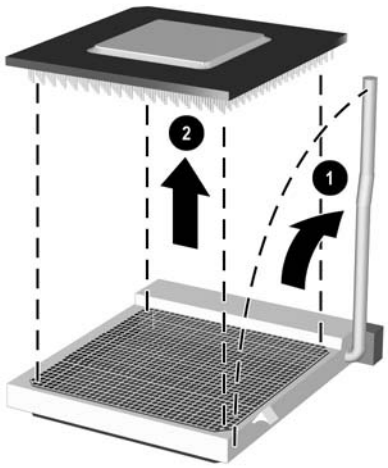
NOTE: Steps 10 – 11 are for computers with AMD processors. See steps 7 – 9 for instructions to remove Intel processors.

10. Rotate the locking lever to its full open position **(1)**.

11. Carefully lift the processor from the socket **(2)**.

△ **CAUTION:** Do NOT handle the pins in the processor socket. These pins are very fragile and handling them could cause irreparable damage. Once pins are damaged it may be necessary to replace the system board.

CAUTION: The heat sink must be installed within 24 hours of installing the processor to prevent damage to the processor's solder connections.



To install a new processor:

1. Place the processor in its socket.
2. If installing an Intel processor, close the retainer.
3. Secure the locking lever.

   If reusing the existing heat sink, go to step 4.

   If using a new heat sink, go to step 7.
4. If reusing the existing heat sink, clean the bottom of the heat sink with the alcohol pad provided in the spares kit.
5. Apply the thermal grease provided in the spares kit to the top of the processor and install the heat sink atop the processor.
6. Go to step 8.
7. If using a new heat sink, remove the protective covering from the bottom of the heat sink and place it in position atop the processor.
8. Secure the heat sink to the system board, and then attach the heat sink control cable to the system board, if applicable.

△ **CAUTION:** Heat sink retaining screws should be tightened in diagonally opposite pairs (as in an X) to evenly seat the heat sink on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

NOTE: After installing a new processor onto the system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system ROM BIOS can be found on the Web at: http:\\h18000.www1.hp.com/support/files.

Power Supply

⚠ **WARNING!** To reduce potential safety issues, only the power supply provided with the computer, a replacement power supply provided by HP, or a power supply purchased as an accessory from HP should be used with the computer.

WARNING! Voltage is always present on the system board when the computer is plugged into an active AC outlet. To avoid possible personal injury and damage to the equipment the power cord should be disconnected from the computer and/or the AC outlet before opening the computer.

Table 6-9 HP Pro 2110, 3120, and 3130 power supply cable connections

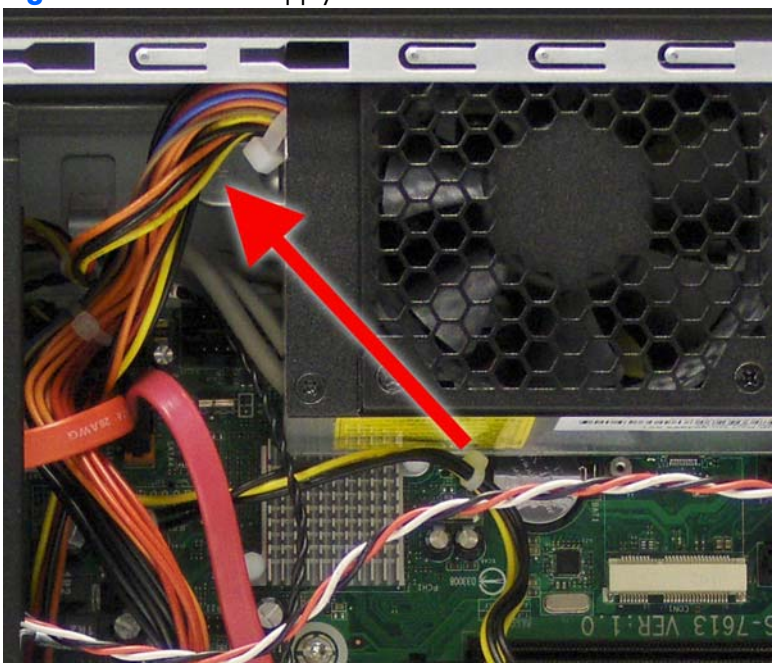
Power supply connector label	Connects to
P1	Main power connector (24 pin)
P2	CPU power connector (4 pin)
P4	Hard drive 1
P3	Optical drive 1

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).
3. Disconnect the power cables from the system board (two connectors) and drives.
4. Remove the three Torx screws that secure the power supply to the back of the chassis.

Figure 6-35 Power supply screw locations

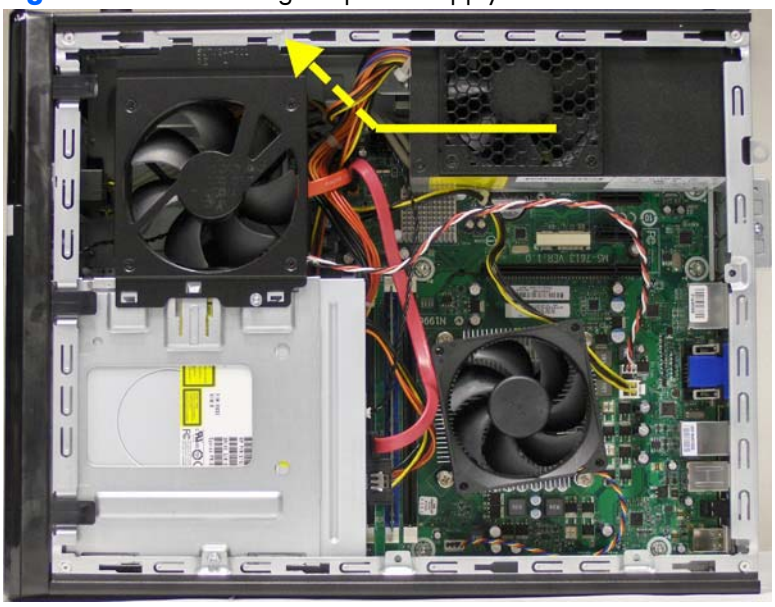
5. Press down on the tab in front of the power supply on the inside of the chassis.

Figure 6-36 Power supply tab



6. Pull the power supply toward the front of the chassis, and then lift the power supply up and out of the chassis.

Figure 6-37 Removing the power supply



NOTE: If the power supply includes a voltage select switch, make sure to set the red switch to the setting (230 V or 115 V) appropriate for the country in which the computer is used. Spare power supplies normally arrive set for 230 V.

To install the power supply, reverse the removal procedure.

When installing the power supply, make sure the front I/O cables are in the clips under the power supply.

Table 6-10 Country power supply settings

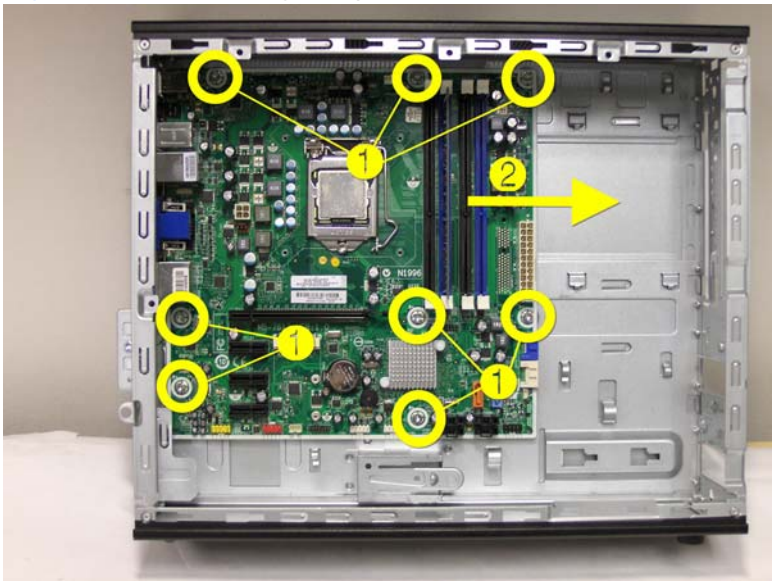
Country	Voltage setting	Country	Voltage setting
Austria	230W	Mexico	115W
Australia	230W	The Netherlands	230W
Argentina	230W	New Zealand	230W
Belgium	230W	Portugal	230W
Brazil	230W	Norway	230W
Canada	115W	People's Republic of China	230W
Caribbean	230W	Singapore	230W
Denmark	230W	South Korea	230W
Finland	230W	Spain	230W
France	230W	Sweden	230W
Germany	230W	Switzerland	230W
India	230W	Taiwan	115W
Italy	230W	Thailand	230W
Japan	115W	The United Kingdom	230W
Latin America	115W	The United States	115W

System Board

1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. When replacing the system board, make sure the following components are removed from the defective system board and installed on the replacement system board:
   - Memory modules (seeInstalling Additional Memory on page 90)
   - Expansion cards (Expansion Cards on page 97)
   - Heat sink (Heat sink on page 122)
   - Processor (Processor on page 123)
3. Remove the access panel (Access Panel on page 88).
4. Remove the front bezel (Front Bezel on page 89).
5. Remove the system fan (System Fan on page 103).
6. Remove the drives (Drives on page 109).

7. Remove the power supply (Power Supply on page 126).
8. Disconnect all data and power cables from the system board.
9. Disconnect the balance of the cables from the system board.
10. Remove the eight screws that secure the system board to the chassis **(1)**.

Figure 6-38 Removing the system board



11. Slide the system board toward the front of the chassis, and then lift the board out of the computer **(2)**.

To install the system board, reverse the removal procedure.

Note the following when installing a system board:

- To insure correct installation while fastening the first two screws, press the system board firmly in place against the rear I/O panel so that the system board screw holes are aligned to the mounting holes in the chassis.
- When installing a system board, align the ports on the rear of the system board to cutouts in the rear of the chassis (keep EMI tabs on top of the connectors), and firmly slide toward the chassis rear until system board screw holes are aligned to mounting holes in the chassis.
- Ensure ground fingers make contact with the connectors on the system board and are not damaged.
- When installing the system board, recommended torque = 4-6 in-lbs.
- When replacing the system board, you must also change the chassis serial number in the BIOS.
- After installing a new system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system ROM BIOS can be found at: http:\\h18000.www1.hp.com/support/files.

Battery

The battery that comes with your computer provides power to the real-time clock and has a lifetime of about three years. When replacing the battery, use a battery equivalent to the battery originally installed on the computer. The computer comes with a 3-volt lithium coin cell battery.

NOTE: The lifetime of the lithium battery can be extended by plugging the computer into a live AC wall socket. The lithium battery is only used when the computer is NOT connected to AC power.

WARNING! This computer contains an internal lithium manganese dioxide battery. There is a risk of fire and burns if the battery is not handled properly. To reduce the risk of personal injury:

Do not attempt to recharge the battery.

Do not expose to temperatures higher than 140°F (60°C).

Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Replace the battery only with the HP spare designated for this product.

CAUTION: Before replacing the battery, it is important to back up the computer CMOS settings. When the battery is removed or replaced, the CMOS settings will be cleared.

NOTE: HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, go to http://www.hp.com/recycle.

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.

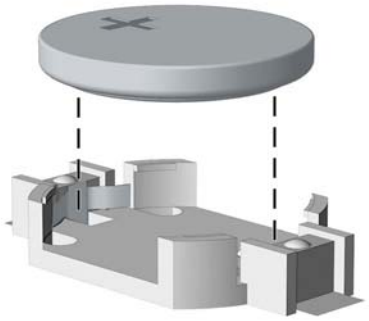
1. Prepare the computer for disassembly (Preparation for Disassembly on page 87).
2. Remove the access panel (Access Panel on page 88).

   NOTE: It may be necessary to remove an expansion card to gain access to the battery.
3. Locate the battery and battery holder on the system board.
4. Depending on the type of battery holder on your system board, complete the following instructions to replace the battery:

Type 1 Battery Holder

1. Lift the battery out of its holder.

   Figure 6-39 Removing the battery from a type 1 holder

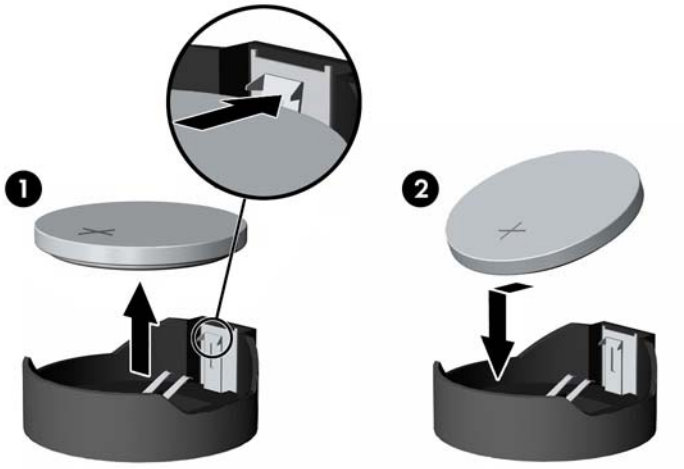


2. Slide the replacement battery into position, positive side up.
3. The battery holder automatically secures the battery in the proper position.
4. Replace the computer access panel.
5. Plug in the computer and turn on power to the computer.
6. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to Computer Setup (F10) Utility on page 4.

Type 2 Battery Holder

1. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out **(1)**.
2. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up **(2)**. Push the other edge down until the clamp snaps over the other edge of the battery.

   Figure 6-40 Removing the battery from a type 2 holder



3. Replace the computer access panel.
4. Plug in the computer and turn on power to the computer.
5. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to Computer Setup (F10) Utility on page 4.

7 Restore and Recovery

Microsoft System Restore

If you have a problem that might be due to software that was installed on your computer, use System Restore to return the computer to a previous restore point. You can also set restore points manually.

NOTE: Always use this System Restore procedure before you use the System Recovery program.

NOTE: Some features might not be available on systems that are shipped without a version of Microsoft Windows.

To start a System Restore:

1. Close all open programs.
2. Click the **Start** button, right-click **Computer**, and then click **Properties**.
3. Click **System protection**, **System Restore**, click **Next**, and then follow the onscreen instructions.

To add restore points manually:

1. Close all open programs.
2. Click the **Start** button, right-click **Computer**, click **Properties**, and then click **System protection**.
3. Under **Protection Settings**, select the disk for which you want to create a restore point.
4. Click **Create**, and then follow the onscreen instructions.

System Recovery

System Recovery completely erases and reformats the hard disk drive, deleting all data files you have created, and then reinstalls the operating system, programs, and drivers. However, you must reinstall any software that was not installed on the computer at the factory. This includes software that came on media included in the computer accessory box, and any software programs you installed after purchase.

NOTE: Always use the System Restore procedure before you use the System Recovery program. See Microsoft System Restore on page 133.

NOTE: Some features might not be available on systems that are shipped without a version of Microsoft Windows.

You must choose one of the following methods to perform a System Recovery:

- Recovery Image — Run the System Recovery from a recovery image stored on your hard disk drive. The recovery image is a file that contains a copy of the original factory-shipped software. To perform a System Recovery from a recovery image, see System Recovery from the Windows Start Menu on page 134.

NOTE: The recovery image uses a portion of the hard disk drive that cannot be used for data storage.

- Recovery Discs — Run the System Recovery from a set of recovery discs that you create from files stored on your hard disk drive or purchased separately. To create recovery discs, see Recovery Discs on page 136.

System Recovery Options

You should attempt a System Recovery in the following order:

1. Through the hard disk drive, from the Windows Start menu.
2. Through the hard disk drive, by pressing the F11 key on the keyboard during system startup.
3. Through recovery discs that you create.
4. Through recovery discs purchased from HP Support. To purchase recovery discs, visit http://www.hp.com/support.

System Recovery from the Windows Start Menu

△ **CAUTION:** System Recovery deletes all data and programs you created or installed. Back up any important data to a removable disc.

If the computer is working and Windows is responding, use these steps to perform a System Recovery.

1. Turn off the computer.
2. Disconnect all peripheral devices from the computer except the monitor, keyboard, and mouse.
3. Turn on the computer.
4. Click the **Start** button, click **All Programs**, click **Recovery Manager**, and then click **Recovery Manager**. If prompted, click **Yes** to allow the program to continue.
5. Under **I need help immediately**, click **System Recovery**.
6. Select **Yes**, and then click **Next**. Your computer restarts.

NOTE: If your system does not detect a recovery partition, it prompts you to insert a recovery disc. Insert the disc, select **Yes**, and then click **Next** to restart the computer and run Recovery Manager from the recovery disc. Insert the remaining recovery discs when prompted.

7. When the computer restarts, once again you see the Recovery Manager welcome screen. Under **I need help immediately**, click **System Recovery**. If you are prompted to back up your files, and you have not done so, select **Back up your files first (recommended)**, and then click **Next**. Otherwise, select **Recover without backing up your files**, and then click **Next**.
8. System Recovery begins. After System Recovery is complete, click **Finish** to restart the computer.
9. Complete the registration process, and wait until you see the desktop.
10. Turn off the computer, reconnect all peripheral devices, and turn the computer back on.

System Recovery at System Startup

△ **CAUTION:** System Recovery deletes all data and programs you created or installed. Back up any important data to a removable disc.

If Windows is not responding, but the computer is working, follow these steps to perform a System Recovery.

1. Turn off the computer. If necessary, press and hold the On button until the computer turns off.
2. Disconnect all peripheral devices from the computer, except the monitor, keyboard, and mouse.
3. Press the On button to turn on the computer.
4. As soon as you see the initial company logo screen appear, repeatedly press the F11 key on your keyboard until the *Windows is Loading Files…* message appears on the screen.
5. Under **I need help immediately**, click **System Recovery**.
6. If you are prompted to back up your files, and you have not done so, select **Back up your files first (recommended)**, and then click **Next**. Otherwise, select **Recover without backing up your files**, and then click **Next**.
7. System Recovery begins. After System Recovery is complete, click **Finish** to restart the computer.
8. Complete the registration process, and wait until you see the desktop.
9. Turn off the computer, reconnect all peripheral devices, and turn the computer back on.

System Recovery from Recovery Discs

△ **CAUTION:** System Recovery deletes all data and programs you created or installed. Back up any important data to a removable disc.

To create recovery discs, see Recovery Discs on page 136.

To perform a System Recovery using recovery discs:

1. If the computer is working, create a backup DVD containing all the data files you want to save, and then remove the backup disc from the drive tray.
2. Insert recovery disc #1 into the DVD drive tray, and close the tray.

3. If the computer works, click the **Start** button, click the **Arrow** button next to Shut Down, and then click **Shut Down**. Or, if the computer is not responding, press and hold the On button for approximately 5 seconds, or until the computer turns off.
4. Disconnect all peripheral devices from the computer except the monitor, keyboard, and mouse.
5. Press the On button to turn on the computer. If you are prompted to choose between running System Recovery from disc or from hard drive, select **Run program from disc**, and then click **Next**.
6. Under **I need help immediately**, click **Factory Reset**.
7. If you are prompted to back up your files, and you have not done so, select **Back up your files first (recommended)**, and then click **Next**. Otherwise, select **Recover without backing up your files**, and then click **Next**.
8. If you are prompted to insert the next recovery disc, do so.
9. When the Recovery Manager is finished, remove all recovery discs from the system.
10. Click **Finish** to restart the computer.

Recovery Discs

You should create a set of recovery discs from the recovery image stored on your hard disk drive. This image contains the operating system and software program files that were originally installed on your computer at the factory. You can create only one set of recovery discs for your computer, and the discs can be used only with this computer. Store the recovery discs in a safe place.

NOTE: Some features might not be available on systems that are shipped without a version of Microsoft Windows.

Choosing Recovery Discs

- To create recovery discs, your computer must have a DVD writer, and you must use only high-quality blank DVD+R or DVD-R discs.

  NOTE: You *cannot* use CDs or DVD+RW, DVD-RW, DVD+RW DL, DVD-RW DL, DVD+R DL, or DVD-R DL discs to create recovery discs.

- Use high-quality discs to create your set of recovery discs. It is normal for discs to be rejected if they are not defect-free. You will be prompted to insert a new blank disc to try again.
- The number of discs in the recovery-disc set depends on your computer model (typically 3–6 DVD discs). The Recovery Disc Creator program tells you the specific number of blank discs needed to make the set.

  NOTE: The process of creating recovery discs takes some time to verify that the information written on the disc is correct. You can quit the process at any time. The next time you run the program, it resumes where it left off.

Creating Recovery Discs

To create recovery discs:

1. Close all open programs.
2. Click the **Start** button, click **All Programs**, click **Recovery Manager**, and then click **Recovery Disc Creation**. If prompted, click **Yes** to allow the program to continue.
3. Follow the onscreen instructions. Label each disc as you make it (for example, Recovery 1, Recovery 2).

8 Computer Diagnostic Features

Hewlett-Packard Vision Diagnostics

NOTE: HP Vision Diagnostics is included on CD with some computer models only.

The Hewlett-Packard Vision Diagnostics utility allows you to view information about the hardware configuration of the computer and perform hardware diagnostic tests on the subsystems of the computer. The utility simplifies the process of effectively identifying, diagnosing, and isolating hardware issues.

The Survey tab is displayed when you invoke HP Vision Diagnostics. This tab shows the current configuration of the computer. From the Survey tab, there is access to several categories of information about the computer. Other tabs provide additional information, including diagnostic test options and test results. The information in each screen of the utility can be saved as an html file and stored on a USB flash drive.

Use HP Vision Diagnostics to determine if all the devices installed on the computer are recognized by the system and functioning properly. Running tests is optional but recommended after installing or connecting a new device.

You should run tests, save the test results, and print them so that you have printed reports available before placing a call to the Customer Support Center.

NOTE: Third party devices may not be detected by HP Vision Diagnostics.

Accessing HP Vision Diagnostics

To access HP Vision Diagnostics, you must create a Recovery Disc Set then boot to the CD containing the utility. It can also be downloaded from http://www.hp.com and either burned to CD or installed to a USB flash drive. See Downloading the Latest Version of HP Vision Diagnostics on page 142 for more information.

NOTE: If you have already downloaded HP Vision Diagnostics to a CD, then begin the following procedure at step 2.

1. In Windows Explorer, go to **C:\SWSetup\ISOs** and burn the file **Vision Diagnostics.ISO** to a CD.
2. While the computer is on, insert the CD in the Optical Drive on the computer.
3. Shut down the operating system and turn off the computer.
4. Turn on the computer. The system will boot into HP Vision Diagnostics.

NOTE: If the system does not boot to the CD in the optical drive, you may need to change the boot order in the Computer Setup (F10) utility.

5. At the boot menu, select either the **HP Vision Diagnostics** utility to test the various hardware components in the computer or the **HP Memory Test** utility to test memory only.

NOTE: The HP Memory Test is a comprehensive memory diagnostic utility that is run as a stand-alone application, outside of HP Vision Diagnostics.

6. If running **HP Vision Diagnostics**, select the appropriate language and click **Continue**.

7. In the End User License Agreement page, select **Agree** if you agree with the terms. The HP Vision Diagnostics utility launches with the Survey tab displayed.

Survey Tab

The Survey tab displays important system configuration information.

In the **View level** field, you can select the **Summary** view to see limited configuration data or select the **Advanced** view to see all the data in the selected category. By default, the View Level is set to **Overview** which displays general information about all of the component categories.

In the **Category** field, you can select the following categories of information to display:

All—Gives a listing of all categories of information about the computer.

Architecture—Provides system BIOS and PCI device information.

Asset Control—Shows product name, system serial number, asset tag and universal unique ID information.

Audio—Displays information about the audio controllers present in the system, including PCI audio cards.

Communication—Shows information about the computer parallel (LPT) and serial (COM) port settings, plus USB and network controller information.

Graphics—Shows information about the graphics controller of the computer.

Input Devices—Shows information about the keyboard, mouse, and other input devices connected to the computer.

Memory—Shows information about all memory in the computer. This includes memory slots on the system board and any memory modules installed.

Processors—Shows information about the processor(s) installed in the computer, including clock speeds and cache sizes.

Storage—Shows information about storage media connected to the computer. This list includes all hard drives and optical drives.

System—Shows information about the computer model, internal fans, chassis, and BIOS.

Test Tab

The Test tab allows you to choose various parts of the system to test. You can also choose the type of test and testing mode.

There are three types of tests to choose from:

- **Quick Test**—Provides a predetermined script where a sample of each hardware component is exercised. You may further modify which of the Quick tests are executed by selecting or deselecting individual tests in the hardware component check list.
- **Complete Test**—Provides a predetermined script where each hardware component is fully tested. You may further modify which of the Complete tests are executed by selecting or deselecting individual tests in the hardware component check list.
- **Custom Test**—Provides the most flexibility in controlling the testing of a system. The Custom Test mode allows you to specifically select which devices, tests, and test parameters are run.

By default, the three test modes do not display prompts and require no interaction. If errors are found, they are displayed when testing is complete.

However, for each test type, you may also optionally add interactive tests by clicking the **Include interactive tests** box under **Test mode**. Selecting interactive tests provides the maximum control over the testing process. The diagnostic software will prompt you for input during tests.

NOTE: Memory can not be tested from within the HP Vision Diagnostics application. To test the memory in your computer, you must exit HP Vision Diagnostics, boot to either the CD or USB flash drive and select **HP Memory Test** from the boot menu.

To begin testing:

1. Select the Test tab.
2. Select the type of tests you want to run: **Quick**, **Complete**, or **Custom**.
3. Include optional interactive tests by selecting **Include interactive tests**.
4. Choose how you want the test to be executed, either **Number of Loops** or **Total Test Time**. When choosing to run the test over a specified number of loops, enter the number of loops to perform. If you want the diagnostic test for a specified time period, enter the amount of time in minutes.
5. Click the **Start Test** button to start the testing. The Status tab, which allows you to monitor the progress of the tests, is automatically displayed during the testing process. When the tests are complete, the Status tab shows whether the devices passed or failed.
6. If errors are found, go to the Errors tab to display detailed information and recommended actions.

Status Tab

The Status tab displays the status of the selected tests. The main progress bar displays the percent complete of the current set of tests. While testing is in progress, a **Cancel Testing** button is displayed for use if you want to cancel the test.

The Status tab also shows:

- The devices being tested
- The test status (running, waiting, passed, or failed) of each device being tested
- The overall test progress of all devices being tested
- The test progress for each device being tested
- The elapsed test times for each device being tested

History Tab

The History tab contains information on past test executions.

The History Log displays all tests that have been executed, the number of times of execution, the number of times failed, the date each test was executed, and the time it took to complete each test. The **Clear History** button will clear the contents of the History Log.

The contents of the History Log may be saved as a HTML file to USB flash drive by clicking the **Save** button.

Errors Tab

The Errors tab displays detailed information about any errors found, as well as any recommended actions.

The Error Log displays the tests for devices that have failed during the diagnostic testing and includes the following columns of information.

- The **Device** section displays the device tested.
- The **Test** section displays the type of test run.
- The **Times Failed** is the number of times the device has failed a test.
- The **Defect Code** provides a numerical code for the failure. The error codes are defined in the Help tab.
- The **Description** section describes the error that the diagnostic test found.
- The **Reason** section describes the likely cause of the error.
- The **Recommended Repair** will give a recommended action that should be performed to resolve the failed hardware.
- The **Warranty ID** or **Failure ID** is a unique error code associated with the specific error on your computer. When contacting the HP Support Center for assistance with a hardware failure, please be prepared to provide the Warranty ID or Failure ID.

The **Clear Errors** button will clear the contents of the Error Log.

The contents of the Error Log may be saved as a HTML file to USB flash drive by clicking the **Save** button.

Help Tab

The Help tab contains a **Vision Help** section, and a **Test Components** section. This tab includes search and index features. You may also review the HP End User License Agreement (EULA), as well as the HP Vision Diagnostic application version information on this tab.

The **Vision Help** section contains information on the major functions of Hewlett-Packard Vision Diagnostics.

The **Test Components** section provides a description of each test, as well as the parameters that may be adjusted when running in Custom test mode.

The **Defect codes** section contains information on the numerical error code that may appear in the Errors tab.

The **Memory test tab** section provides information on the **HP Memory Test** application that may be launched from the boot menu.

The **HP Support** section provides information on obtaining technical support from HP.

Saving and Printing Information in HP Vision Diagnostics

You can save the information displayed in the HP Vision Diagnostics **Survey**, **History** and **Errors** tabs to a USB flash drive. You can not save to the hard drive. The system will automatically create an html file that has the same appearance as the information displayed on the screen.

1. Insert a USB flash drive if running HP Vision Diagnostics from CD.
2. Click **Save** in the bottom on any of the **Survey**, **History** or **Errors** tabs. All three log files will be saved regardless of from which tab the Save button was clicked.
3. Select the drive onto which you will save the log files and click the **Save** button. Three html files will be saved to the inserted USB flash drive.

   NOTE: Do not remove the USB flash drive until you see a message indicating that the html files have been written to the media.

4. Print the desired information from the storage device used to save it.

NOTE: To exit HP Vision Diagnostics, click the **Exit Diagnostics** button at the bottom of the screen. Be sure to remove the USB flash drive or CD from the optical drive.

Downloading the Latest Version of HP Vision Diagnostics

1. Go to http://www.hp.com.
2. Click the **Software & Drivers** link.
3. Select **Download drivers and software (and firmware)**.
4. Enter your product name in the text box and press the Enter key.
5. Select your specific computer model.
6. Select your OS.

7. Click the **Diagnostic** link.
8. Click the **Hewlett-Packard Vision Diagnostics** link.
9. Click the **Download** button.

NOTE: The download includes instructions on how to create the bootable CD.

Protecting the Software

To protect software from loss or damage, you should keep a backup copy of all system software, applications, and related files stored on the hard drive. See the operating system or backup utility documentation for instructions on making backup copies of data files.

9 Troubleshooting Without Diagnostics

This chapter provides information on how to identify and correct minor problems, such as diskette drive, hard drive, optical drive, graphics, audio, memory, and software problems. If you encounter problems with the computer, refer to the tables in this chapter for probable causes and recommended solutions.

NOTE: For information on specific error messages that may appear on the screen during Power-On Self-Test (POST) at startup, refer to POST Error Messages on page 181.

Safety and Comfort

WARNING! Misuse of the computer or failure to establish a safe and comfortable work environment may result in discomfort or serious injury. Refer to the *Safety & Comfort Guide* at http://www.hp.com/ergo for more information on choosing a workspace and creating a safe and comfortable work environment. For more information, refer to the *Safety & Regulatory Information* guide.

Before You Call for Technical Support

If you are having problems with the computer, try the appropriate solutions below to try to isolate the exact problem before calling for technical support.

- Run the HP diagnostic tool.
- Run the hard drive self-test in Computer Setup.
- If the computer is beeping, the beeps are error codes that will help you diagnose the problem. Refer to POST Error Messages on page 181 for more information.
- If the screen is blank, plug the monitor into a different video port on the computer if one is available. Or, replace the monitor with a monitor that you know is functioning properly.
- If you are working on a network, plug another computer with a different cable into the network connection. There may be a problem with the network plug or cable.
- If you recently added new hardware, remove the hardware and see if the computer functions properly.
- If you recently installed new software, uninstall the software and see if the computer functions properly.

- Boot the computer to the Safe Mode to see if it will boot without all of the drivers loaded. When booting the operating system, use “Last Known Configuration.”
- Refer to the comprehensive online technical support at http://www.hp.com/support.

To assist you in resolving problems online, HP Instant Support Professional Edition provides you with self-solve diagnostics. If you need to contact HP support, use HP Instant Support Professional Edition's online chat feature. Access HP Instant Support Professional Edition at: http://www.hp.com/go/ispe.

Access the Business Support Center (BSC) at http://www.hp.com/go/bizsupport for the latest online support information, software and drivers, proactive notification, and worldwide community of peers and HP experts.

If it becomes necessary to call for technical assistance, be prepared to do the following to ensure that your service call is handled properly:

- Be in front of your computer when you call.
- Write down the computer serial number, product ID number, and monitor serial number before calling.
- Spend time troubleshooting the problem with the service technician.
- Remove any hardware that was recently added to your system.
- Remove any software that was recently installed.
- Restore the system from backups that you created or restore the system to its original factory condition. Refer to Restore and Recovery on page 133 for more information.

△ **CAUTION:** Restoring the system will erase all data on the hard drive. Be sure to back up all data files before running the restore process.

NOTE: For sales information and warranty upgrades (Care Packs), call your local authorized service provider or dealer.

Helpful Hints

If you encounter problems with the computer, monitor, or software, see the following list of general suggestions before taking further action:

- Check that the computer and monitor are plugged into a working electrical outlet.
- Check that the voltage select switch (some models) is set to the appropriate voltage for your region (115V or 230V).
- Check that the computer is turned on and the blue power light is on.
- Check that the monitor is turned on and the monitor light is on.
- Turn up the brightness and contrast controls of the monitor if the monitor is dim.
- Press and hold any key. If the system beeps, then the keyboard should be operating correctly.
- Check all cable connections for loose connections or incorrect connections.

- Wake the computer by pressing any key on the keyboard or pressing the power button. If the system remains in suspend mode, shut down the computer by pressing and holding the power button for at least four seconds then press the power button again to restart the computer. If the system will not shut down, unplug the power cord, wait a few seconds, then plug it in again. The computer will restart if it is set to power on automatically as soon as power is restored in Computer Setup. If it does not restart, press the power button to start the computer.
- Reconfigure the computer after installing a non-plug and play expansion board or other option. See Solving Hardware Installation Problems on page 165 for instructions.
- Be sure that all the needed device drivers have been installed. For example, if you are using a printer, you need a driver for that model printer.
- Remove all bootable media (diskette, CD, DVD, or USB device) from the system before turning it on.
- If you have installed an operating system other than the factory-installed operating system, check to be sure that it is supported on the system.
- If the system has multiple video sources (embedded, PCI, or PCI-Express adapters) installed (embedded video on some models only) and a single monitor, the monitor must be plugged into the monitor connector on the source selected as the primary video adapter. During boot, the other monitor connectors are disabled and if the monitor is connected into these ports, the monitor will not function. You can select which source will be the default video source in Computer Setup.

△ **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.

Solving General Problems

You may be able to easily resolve the general problems described in this section. If a problem persists and you are unable to resolve it yourself or if you feel uncomfortable about performing the operation, contact an authorized dealer or reseller.

⚠ **WARNING!** When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

Computer will not turn on or start.

Cause	Solution
Power cord is not properly connected or is connected to a defective outlet.	Ensure that the cables connecting the computer to the external power source are plugged in properly. When the cables connecting the computer to the external power source are plugged in properly, and the wall outlet is functioning, the green power supply light on the back of the computer should be on.
Monitor power cord is not connected to a power source, the video cable is not connected to the computer, or the monitor is not turned on.	Connect the monitor to the computer, plug it in, and turn it on. Ensure that the power cord is connected to a functioning electrical outlet.

Computer seems to be locked up and is not responding.

Cause	Solution
A program is not responding.	Use the Windows Task Manager to close any programs not responding, or restart the computer: 1. Press the Ctrl+Alt+Delete keys on the keyboard simultaneously. 2. Click **Start Task Manager**. 3. Select the program that is not responding, and then click **End Task**. If closing programs does not work, restart the computer: 1. Press the Ctrl+Alt+Delete keys on the keyboard simultaneously. 2. Click the **Arrow** button next to the red Shut Down button, and then click **Restart**. 3. Or, press and hold the On button on the computer for 5 or more seconds to turn off the computer, and then press the On button to restart the computer.

Computer appears locked up and will not turn off when the power button is pressed.

Cause	Solution
Software control of the power switch is not functional.	1. Press and hold the power button for at least five seconds until the computer turns off. 2. Disconnect the power cord from the electrical outlet.

Computer shuts down automatically.

Cause	Solution
Thermal protection has been activated.	1. The computer might be in an exceedingly hot environment. Let it cool down. 2. Clean the air vents on the front, back, or any other vented side of the computer. 3. Ensure that there is a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. 4. Ensure that computers are not stacked on top of each other or so near each other that they are subject to each other's re-circulated or preheated air. 5. If the computer is within an enclosure, ensure that there is proper intake and exhaust ventilation for the enclosure. 6. If a message appears on the screen indicating that a fan is not working, replace the fan.

Computer will not respond to USB keyboard or mouse.

Cause	Solution
Computer is in **standby** mode.	To resume from **standby** mode, press the power button or press any key. **CAUTION:** When attempting to resume from **standby** mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.

Computer date and time display is incorrect.

Cause	Solution
RTC (real-time clock) battery may need to be replaced. **NOTE:** Connecting the computer to a live AC outlet prolongs the life of the RTC battery.	First, reset the date and time under **Control Panel** (Computer Setup can also be used to update the RTC date and time). If the problem persists, replace the RTC battery.

Cursor will not move using the arrow keys on the keypad.

Cause	Solution
The Num Lock key may be on.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys.

Cannot remove computer cover or access panel.

Cause	Solution
Smart Cover Lock, featured on some computers, is locked.	Unlock the Smart Cover Lock using Computer Setup. The Smart Cover FailSafe Key, a device for manually disabling the Smart Cover Lock, is available from HP. You will need the FailSafe Key in case of forgotten password, power loss, or computer malfunction. Order PN 166527-001 for the wrench-style key or PN 166527-002 for the screwdriver bit key.

Poor performance is experienced.

Cause	Solution
Processor is hot.	1. Make sure airflow to the computer is not blocked. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow. 2. Make sure fans are connected and working properly (some fans only operate when needed). 3. Make sure the processor heatsink is installed properly.
Hard drive is full.	Transfer data from the hard drive to create more space on the hard drive.
Low on memory.	Add more memory.
Hard drive fragmented.	Defragment hard drive.
Program previously accessed did not release reserved memory back to the system.	Restart the computer.
Virus resident on the hard drive.	Run virus protection program.
Too many applications running.	1. Close unnecessary applications to free up memory. 2. Add more memory. Some applications run in the background and can be closed by right-clicking on their corresponding icons in the task tray. To prevent these applications from launching at startup, go to **Start** > **All Programs** > **Accessories** > **Run** (Windows Vista and Windows 7) and type `msconfig`. On the **Startup** tab of the System Configuration Utility, clear applications that you do not want to launch automatically.

Poor performance is experienced.

Cause	Solution
Some software applications, especially games, are stressful on the graphics subsystem	1. Lower the display resolution for the current application or consult the documentation that came with the application for suggestions on how to improve performance by adjusting parameters in the application. 2. Add more memory. 3. Upgrade the graphics solution.
Computer needs to be restarted.	Restart the computer.

Solving Diskette Problems

Common causes and solutions for diskette problems are listed in the following table.

NOTE: Some computers do not support internal diskette drives. Only USB diskette drives are supported.

NOTE: You may need to reconfigure the computer when you add or remove hardware, such as an additional diskette drive. See Solving Hardware Installation Problems on page 165 for instructions.

Diskette drive light stays on.

Cause	Solution
Diskette is damaged.	In Microsoft Windows Vista and Windows 7, right-click **Start**, click **Explore**, and right-click on a drive. Select **Properties** then select the **Tools** tab. Under **Error-checking** click **Check Now**.
Diskette is incorrectly inserted.	Remove diskette and reinsert.
Drive cable is not properly connected.	Reconnect drive cable.

Diskette drive cannot write to a diskette.

Cause	Solution
Diskette is not formatted.	Format the diskette. 1. From Windows Explorer select the disk **(A)** drive. 2. Right-click the drive letter and select **Format**. 3. Select the desired options, and click **Start** to begin formatting the diskette.
Diskette is write-protected.	Use another diskette or remove the write protection.
Writing to the wrong drive.	Check the drive letter in the path statement.
Not enough space is left on the diskette.	1. Use another diskette. 2. Delete unneeded files from diskette.
Diskette is damaged.	Replace the damaged disk.

Cannot format diskette.

Cause	Solution
Disk may be write-protected.	Open the locking device on the diskette.

A problem has occurred with a disk transaction.

Cause	Solution
The directory structure is bad, or there is a problem with a file.	In Microsoft Windows Vista and Windows 7, right-click **Start**, click **Explore**, and right-click on a drive. Select **Properties** then select the **Tools** tab. Under **Error-checking** click **Check Now**.

Diskette drive cannot read a diskette.

Cause	Solution
You are using the wrong diskette type for the drive type.	Check the type of drive that you are using and use the correct diskette type.
You are reading the wrong drive.	Check the drive letter in the path statement.
Diskette is damaged.	Replace the diskette with a new one.

"Invalid system disk" message is displayed.

Cause	Solution
A diskette that does not contain the system files needed to start the computer has been inserted in the drive.	When drive activity stops, remove the diskette and press the Spacebar. The computer should start up.
Diskette error has occurred.	Restart the computer by pressing the power button.

Cannot Boot to Diskette.

Cause	Solution
Diskette is not bootable.	Replace with a bootable diskette.
Diskette drive has been disabled in Computer Setup.	Run Computer Setup and enable diskette drive.

Solving Hard Drive Problems

Hard drive error occurs.

Cause	Solution
Hard disk has bad sectors or has failed.	1. In Microsoft Windows Vista and Windows 7, right-click **Start**, click **Explore**, and right-click on a drive. Select **Properties** then select the **Tools** tab. Under **Error-checking** click **Check Now**. 2. Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk.

Disk transaction problem.

Cause	Solution
Either the directory structure is bad or there is a problem with a file.	In Microsoft Windows Vista and Windows 7, right-click **Start**, click **Explore**, and right-click on a drive. Select **Properties** then select the **Tools** tab. Under **Error-checking** click **Check Now**.

Drive not found (identified).

Cause	Solution
Cable could be loose.	Check cable connections.
The system may not have automatically recognized a newly installed device.	See reconfiguration directions in Solving Hardware Installation Problems on page 165. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem.
The device is attached to a SATA port that has been disabled in Computer Setup.	Run the Computer Setup utility and ensure that the SATA ports are enabled.

Computer will not boot from hard drive.

Cause	Solution
The device is attached to a SATA port that has been disabled in Computer Setup.	Run the Computer Setup utility and ensure that the SATA ports are enabled.
Boot order is not correct.	Run the Computer Setup utility and change the boot sequence.
Hard drive is damaged.	If any beeps are heard, see POST Error Messages on page 181 to determine possible causes for the beep codes. See the Worldwide Limited Warranty for terms and conditions.

Solving Media Card Reader Problems

△ **CAUTION:** Do not insert or remove memory cards when the in-use light is flashing. To do so may cause data loss, or it may permanently damage the card reader.

Media card will not work in a digital camera after formatting it in Microsoft Windows Vista.

Cause	Solution
By default, Windows Vista will format any media card with a capacity greater than 32MB with the FAT32 format. Most digital cameras use the FAT (FAT16 & FAT12) format and can not operate with a FAT32 formatted card.	Either format the media card in the digital camera or select FAT file system to format the media card in a computer with Windows XP or Windows Vista.

A write-protected or locked error occurs when attempting to write to the media card.

Cause	Solution
Media card is locked. Locking the media card is a safety feature that prevents writing to and deleting from an SD/ Memory Stick/PRO card.	If using an SD card, make sure that the lock tab located on the right of the SD card is not in the locked position. If using a Memory Stick/PRO card, make sure that the lock tab located on the bottom of the Memory Stick/PRO card is not in the locked position.

Can not write to the media card.

Cause	Solution
The media card is a read-only memory (ROM) card.	Check the manufacturer's documentation included with your card to see if it writable. Refer to the previous section for a list of compatible cards.
Media card is locked. Locking the media card is a safety feature that prevents writing to and deleting from an SD/ Memory Stick/PRO card.	If using an SD card, make sure that the lock tab located on the right of the SD card is not in the locked position. If using a Memory Stick/PRO card, make sure that the lock tab located on the bottom of the Memory Stick/PRO card is not in the locked position.

Unable to access data on the media card after inserting it into a slot.

Cause	Solution
The media card is not inserted properly, is inserted in the wrong slot, or is not supported.	Ensure that the card is inserted properly with the gold contact on the correct side. The LED will light if inserted properly.
The media card memory is full.	Make sure the amount of data you are storing has not exceeded the storage limit of the card.
The media card contacts need to be cleaned.	Inspect the ends of the memory cards for dirt or material closing a hole or spoiling a metal contact. Clean the contacts with a lint-free cloth and small amounts of isopropyl alcohol. Replace the memory card if necessary.

Do not know how to remove a media card correctly.

Cause	Solution
The computer's software is used to safely eject the card.	On the Windows desktop, open **Computer**, right-click on the corresponding drive icon, and select **Eject**. Then pull the card out of the slot. **NOTE:** Never remove the card when the LED is flashing

After installing the media card reader and booting to Windows, the reader and the inserted cards are not recognized by the computer.

Cause	Solution
The operating system needs time to recognize the device if the reader was just installed into the computer and you are turning the PC on for the first time.	Wait a few seconds so that the operating system can recognize the reader and the available ports, and then recognize whatever media is inserted in the reader.

After inserting a media card in the reader, the computer attempts to boot from the media card.

Cause	Solution
The inserted media card has boot capability.	If you do not want to boot from the media card, remove it during boot or do not select the option to boot from the inserted media card during the boot process.

Solving Display Problems

If you encounter display problems, see the documentation that came with the monitor and to the common causes and solutions listed in the following table.

Screen is blank, and monitor power light is not lit.

Cause	Solution
Power cord is not properly connected.	Unplug and reconnect the power plug on the back of the monitor and the wall outlet.
Monitor is not turned on.	Press the power button on the front of the monitor.

Blank screen (no video).

Cause	Solution
Computer is not turned on.	Press the power button on the front of the computer.
Computer is in **standby** mode.	Press the power button to resume from **standby** mode. **CAUTION:** When attempting to resume from **standby** mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.
The cable connections are not correct.	Check the cable connection from the monitor to the computer and to the electrical outlet.
You may have a screen blanking utility installed or energy saver features are enabled.	Press any key or click the mouse button and, if set, type your password.
You are using a fixed-sync monitor and it will not sync at the resolution chosen.	Be sure that the monitor can accept the same horizontal scan rate as the resolution chosen.
Monitor cable is plugged into the wrong connector.	If the computer system has both an integrated graphics connector and an add-in graphics card connector, plug the monitor cable into the graphics card connector on the back of the computer.
Monitor settings in the computer are not compatible with the monitor.	1. In Windows Vista or Windows 7 Control Panel, under **Appearance and Personalization**, select **Adjust screen resolution**. 2. Use the sliding control to reset the resolution.
Monitor is configured to use an input that is not active.	Use the monitor's on-screen menu controls to select the input that is being driven by the system. Refer to the monitor's user documentation for more information on the on-screen controls and settings.
Bad monitor.	Try a different monitor.

Monitor does not function properly when used with energy saver features.

Cause	Solution
Monitor without energy saver capabilities is being used with energy saver features enabled.	Disable monitor energy saver feature.

Dim characters.

Cause	Solution
The brightness and contrast controls are not set properly.	Adjust the monitor brightness and contrast controls.
Cables are not properly connected.	Check that the graphics cable is securely connected to the graphics card and the monitor.

Blurry video or requested resolution cannot be set.

Cause	Solution
If the graphics controller was upgraded, the correct graphics drivers may not be loaded.	Install the video drivers included in the upgrade kit.
Monitor is not capable of displaying requested resolution.	Change requested resolution.
Graphics card is bad.	Replace the graphics card.

The picture is broken up, rolls, jitters, or flashes.

Cause	Solution
The monitor connections may be incomplete or the monitor may be incorrectly adjusted.	1. Be sure the monitor cable is securely connected to the computer. 2. In a two-monitor system or if another monitor is in close proximity, be sure the monitors are not interfering with each other's electromagnetic field by moving them apart. 3. Fluorescent lights or fans may be too close to the monitor.

Image is not centered.

Cause	Solution
Position may need adjustment.	Press the monitor's Menu button to access the OSD menu. Select **ImageControl/ Horizontal Position** or **Vertical Position** to adjust the horizontal or vertical position of the image.

"No Connection, Check Signal Cable" displays on screen.

Cause	Solution
Computer is not turned on.	Press the power button on the front of the monitor.
Monitor video cable is disconnected.	Connect the video cable between the monitor and computer. **CAUTION:** Ensure that the computer power is off while connecting the video cable.

"Out of Range" displays on screen.

Cause	Solution
Video resolution and refresh rate are set higher than what the monitor supports.	Change the settings to a supported setting then restart the computer so that the new settings take effect.

High pitched noise coming from inside a flat panel monitor.

Cause	Solution
Brightness and/or contrast settings are too high.	Lower brightness and/or contrast settings.

Fuzzy focus; streaking, ghosting, or shadowing effects; horizontal scrolling lines; faint vertical bars; or unable to center the picture on the screen (flat panel monitors using an analog VGA input connection only).

Cause	Solution
Flat panel monitor's internal digital conversion circuits may be unable to correctly interpret the output synchronization of the graphics card.	1. Select the monitor's Auto-Adjustment option in the monitor's on-screen display menu. 2. Manually synchronize the Clock and Clock Phase on-screen display functions.
Graphics card is not seated properly or is bad.	1. Reseat the graphics card. 2. Replace the graphics card.

Solving Audio Problems

If the computer has audio features and you encounter audio problems, see the common causes and solutions listed in the following table.

Sound does not come out of the speaker or headphones.

Cause	Solution
Software volume control is turned down or muted.	Double-click the **Speaker** icon on the taskbar, then make sure that **Mute** is not selected and use the volume slider to adjust the volume.
The keyboard Mute button has been pressed.	Press the Mute button on the keyboard to see if the Mute feature is turned on.
Monitor volume control is turned down on built-in speakers.	If you are using built-in monitor speakers, use the monitor front panel Volume button to adjust volume. Use the front panel buttons to enter the onscreen display (OSD) and ensure that audio is enabled and that the volume is set appropriately.
The powered external speakers are not turned on.	Ensure powered (active) speakers are turned on. Active speakers have a power cord or batteries. Speakers are sold separately.
The audio device may be connected to the wrong jack.	Ensure that the device is connected to the correct jack on the computer. The speakers should be plugged into the rear line-out jack and the headphones should be plugged into the front headphone jack.
External speakers plugged into the wrong audio jack on a recently installed sound card.	See the sound card documentation for proper speaker connection.
Audio is disabled in Computer Setup.	Run the Computer Setup utility and enable the audio.
Digital CD audio is not enabled.	Enable digital CD audio. In the Device Manager, right-click on the CD/DVD device and select **Properties**. Make sure **Enable digital CD audio for this CD-ROM device** is checked.
Headphones or devices connected to the line-out connector mute the internal speaker.	Turn on and use headphones or external speakers, if connected, or disconnect headphones or external speakers.
Computer is in **standby** mode.	Press the power button to resume from **standby** mode. **CAUTION:** When attempting to resume from **standby** mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.
Headphones are overriding the speakers	Unplug the headphones from the computer to allow audio to flow through the speakers.
Some applications can select which audio output device is used.	Make sure the application has selected the correct audio device.
The operating system controls may be set to use a different audio device as the default output device than what is expected.	Set the operating system to use the correct audio device.

Sound from headphones is not clear or muffled.

Cause	Solution
Headphones are plugged into the rear audio output connector. The rear audio output connector is for powered audio devices and is not designed for headphone use.	Plug the headphones into the headphone connector on the front of the computer.

Computer appears to be locked up while recording audio.

Cause	Solution
The hard disk may be full.	Before recording, make sure there is enough free space on the hard disk. You can also try recording the audio file in a compressed format.

Line-in jack is not functioning properly.

Cause	Solution
Jack has been reconfigured in the audio driver or application software.	In the audio driver or application software, reconfigure the jack or set the jack to its default value.

Sound cuts in and out.

Cause	Solution
Processor resources are being used by other open applications.	Shut down all open processor-intensive applications.

Codec error messages appear when certain audio files are played.

Cause	Solution
Windows Media Player is not configured to automatically download codecs.	Open the file in Windows Media Player. Ensure Windows Media Player is configured to automatically download codecs. • If the correct codec is available, the file will play. Note that you must be connected to the Internet to download the codec file. • If the correct codec is not available, check to see if there is an update available for Windows Media Player. • For more information, open Windows Media Player Help, and then search the online Help for codec.

Solving Printer Problems

If you encounter printer problems, see the documentation that came with the printer and to the common causes and solutions listed in the following table.

Printer will not print.

Cause	Solution
Printer is not turned on and online.	Turn the printer on and make sure it is online.
The correct printer drivers for the application are not installed.	1. Install the correct printer driver for the application. 2. Try printing using the MS-DOS command: `DIR C:\ > [printer port]` where `[printer port]` is the address of the printer being used. If the printer works, reload the printer driver.
If you are on a network, you may not have made the connection to the printer.	Make the proper network connections to the printer.
Printer may have failed.	Run printer self-test.

Printer will not turn on.

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

Printer prints garbled information.

Cause	Solution
The correct printer driver for the application is not installed.	Install the correct printer driver for the application.
The cables may not be connected properly.	Reconnect all cables.
Printer memory may be overloaded.	Reset the printer by turning it off for one minute, then turn it back on.

Printer is offline.

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

Solving Keyboard and Mouse Problems

If you encounter keyboard or mouse problems, see the documentation that came with the equipment and to the common causes and solutions listed in the following table.

Keyboard commands and typing are not recognized by the computer.

Cause	Solution
Keyboard connector is not properly connected.	1. On the Windows 7 Desktop, click **Start** > **Shut Down**. On the Windows Vista Desktop, click **Start**, click the arrow on the lower right corner of the Start menu, then select **Shut Down**. 2. After the shutdown is complete, reconnect the keyboard to the back of the computer and restart the computer.
Program in use has stopped responding to commands.	Shut down your computer using the mouse and then restart the computer.
Keyboard needs repairs.	See the Worldwide Limited Warranty for terms and conditions.
Computer is in **standby** mode.	Press the power button to resume from **standby** mode. **CAUTION:** When attempting to resume from **standby** mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.

Cursor will not move using the arrow keys on the keypad.

Cause	Solution
The Num Lock key may be on.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys.

Wireless keyboard does not work after installation or is not detected.

Cause	Solution
Keyboard is not synchronized with the receiver.	Synchronize the keyboard and receiver. Refer to the documentation included with the keyboard for instructions.
Keyboard is out of range of the receiver.	Place the keyboard closer to the receiver.
Keyboard batteries are not installed or too weak.	Install or replace the keyboard batteries.

Mouse does not respond to movement or is too slow.

Cause	Solution
Mouse connector is not properly plugged into the back of the computer.	Shut down the computer using the keyboard. 1. Press the Ctrl and Esc keys at the same time (or press the Windows logo key) to display the **Start** menu. 2. Use the arrow keys to select **Shut Down** and then press the Enter key. 3. After the shutdown is complete, plug the mouse connector into the back of the computer (or the keyboard) and restart.
Program in use has stopped responding to commands.	Shut down the computer using the keyboard then restart the computer.
Mouse is not detected.	Unplug and reconnect the mouse cable to your computer.
Mouse may need cleaning.	Remove the roller ball cover on the mouse and clean the internal components.
Surface under the mouse is too smooth for the roller ball to work effectively.	Use a mouse pad or other rough surface under the mouse.
Mouse may need repair.	See the Worldwide Limited Warranty for terms and conditions.
Computer is in **standby** mode.	Press the power button to resume from **standby** mode. **CAUTION:** When attempting to resume from **standby** mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.

Mouse will only move vertically, horizontally, or movement is jerky.

Cause	Solution
Mouse roller ball or the rotating encoder shafts that make contact with the ball are dirty.	Remove roller ball cover from the bottom of the mouse and clean the internal components with a mouse cleaning kit available from most computer stores.

Optical mouse does not track cursor well.

Cause	Solution
Surface under mouse is not conducive to optics.	1. Gently wipe the light sensor lens on the bottom of the mouse with a lint-free cloth (not paper). 2. Place a mouse pad, white sheet of paper, or other less reflective surface under the mouse.

Cursor moves too fast or too slow.

Cause	Solution
Cursor speed needs adjustment.	Adjust the cursor speed: 1. Click **Start** > **Control Panel** > **Hardware and Sound** > **Mouse**. 2. Click the **Pointer Options** tab. 3. Adjust the **Motion** slider toward **Slow** or **Fast** to decrease or increase the speed at which the pointer (cursor) responds to mouse movement. 4. Click **OK**.

Wireless mouse does not work after installation or is not detected.

Cause	Solution
Mouse is not synchronized with the receiver.	Synchronize the mouse and receiver. Refer to the documentation included with the mouse for instructions.
Mouse is out of range of the receiver.	Place the mouse closer to the receiver.
Mouse batteries are not installed or too weak.	Install or replace the Mouse batteries.

Solving Hardware Installation Problems

You may need to reconfigure the computer when you add or remove hardware, such as an additional drive or expansion card. If you install a plug and play device, Windows automatically recognizes the device and configures the computer. If you install a non–plug and play device, you must reconfigure the computer after completing installation of the new hardware. In Windows, use the **Add Hardware Wizard** and follow the instructions that appear on the screen.

⚠ **WARNING!** When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

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

Cause	Solution
Device drivers are not installed.	Install the device driver from the CD provided with the device, or download and install the driver from the device manufacturer Web site. For HP peripheral devices, visit http://www.hp.com for the latest drivers.
Device is not seated or connected properly.	Ensure that the device is properly and securely connected and that pins in the connector are not bent down.
Cable(s) of new external device are loose or power cables are unplugged.	Ensure that all cables are properly and securely connected and that pins in the cable or connector are not bent down.
Power switch of new external device is not turned on.	Turn off the computer, turn on the external device, then turn on the computer to integrate the device with the computer system.
When the system advised you of changes to the configuration, you did not accept them.	Reboot the computer and follow the instructions for accepting the changes.
A plug and play board may not automatically configure when added if the default configuration conflicts with other devices.	Use Windows Device Manager to deselect the automatic settings for the board and choose a basic configuration that does not cause a resource conflict. You can also use Computer Setup to reconfigure or disable devices to resolve the resource conflict.
USB ports on the computer are disabled in Computer Setup.	Run the Computer Setup utility and ensure that the USB ports are enabled.
There is a resource conflict.	Deselect the automatic settings in the operating system for the device and choose a basic configuration that does not cause a resource conflict. You can also reconfigure or disable devices to resolve the resource conflict.

New device does not work.

Cause	Solution
You may need to be logged in as the computer administrator to install or uninstall a device driver.	To switch users, click **Start**, click **Log Off**, and then click **Switch User**; log in as the computer administrator and install the driver.

New or existing device does not work after installing a new device.

Cause	Solution
There is a conflict with an existing device.	To resolve a device conflict, you may need to disable one of the devices or uninstall an old device driver: 1. Click **Start**, and click **Control Panel**. 2. Click **Hardware and Sound**. 3. Click **Device Manager**. 4. Click the plus sign (**+**) next to the problem device and check for exclamation points in a yellow circle near the device icon. The exclamation point means there is a device conflict or problem with the device. Exclamation points do not always appear when a device is not working properly. 5. If there is an old or unnecessary device driver listed in the Device Manager, this may be causing the device conflict. To uninstall the old driver for the new device driver to work properly, right-click the device, click **Uninstall**, and then click **OK**. 6. Right-click the device, and select **Properties**. 7. If available, click the **Resources** tab to verify that there is a device conflict. 8. Click the **General** tab to see if your device is enabled and working properly. If it is available, click the **Troubleshoot** button, and follow the onscreen instructions in the device troubleshooter wizard. 9. Restart the computer.

Solving Network Problems

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

Wake-on-LAN feature is not functioning.

Cause	Solution
S5 Maximum Power Saving feature (some models) is enabled in Computer Setup.	Disable the S5 Maximum Power Saving option in Computer Setup.
S5 Wake on LAN is disabled.	Enable the S5 Wake on LAN option in Computer Setup.
Wake-on-LAN is not enabled.	To enable Wake-on-LAN in Windows Vista: 1. Select **Start** > **Control Panel**. 2. Under **Network and Internet**, select **View network status and tasks**. 3. In the **Tasks** list, select **Manage network connections**. 4. Double-click **Local Area Connection**. 5. Click the **Properties** button. 6. Click the **Configure** button. 7. Click the **Power Management** tab, then select the check box to **Allow this device to wake the computer**. To enable Wake-on-LAN in Windows 7: 1. Select **Start** > **Control Panel**. 2. Under **Network and Internet**, select **View network status and tasks**. 3. Click **Local Area Connection**. 4. Click the **Properties** button. 5. Click the **Configure** button. 6. Click the **Power Management** tab, then select the check box to **Allow this device to wake the computer**.

Network driver does not detect network controller.

Cause	Solution
Network controller is disabled.	1. Run Computer Setup and enable network controller. 2. Enable the network controller in the operating system via Device Manager.
Incorrect network driver.	Check the network controller documentation for the correct driver or obtain the latest driver from the manufacturer's Web site.

Network status link light never flashes.

NOTE: The network status light is supposed to flash when there is network activity.

Cause	Solution
No active network is detected.	Check cabling and network equipment for proper connection.
Network controller is not set up properly.	Check for the device status within Windows, such as Device Manager for driver load and the Network Connections applet within Windows for link status.
Network controller is disabled.	1. Run Computer Setup and enable network controller. 2. Enable the network controller in the operating system via Device Manager.
Network driver is not properly loaded.	Reinstall network drivers.
System cannot autosense the network.	Disable auto-sensing capabilities and force the system into the correct operating mode.

Diagnostics reports a failure.

Cause	Solution
The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
The cable is attached to the incorrect connector.	Ensure that the cable is attached to the correct connector.
There is a problem with the cable or a device at the other end of the cable.	Ensure that the cable and device at the other end are operating correctly.
Network controller interrupt is shared with an expansion board.	Change the resource settings for the board in Computer Setup.
The network controller is defective.	Contact an authorized service provider.

Diagnostics passes, but the computer does not communicate with the network.

Cause	Solution
Network drivers are not loaded, or driver parameters do not match current configuration.	Make sure the network drivers are loaded and that the driver parameters match the configuration of the network controller. Make sure the correct network client and protocol is installed.
The network controller is not configured for this computer.	Select the **Network** icon in the **Control Panel** and configure the network controller.

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

Cause	Solution
Network controller interrupt is shared with an expansion board.	Change the resource settings for the board in Computer Setup.
The network controller requires drivers.	Verify that the drivers were not accidentally deleted when the drivers for a new expansion board were installed.
The expansion board installed is a network card (NIC) and conflicts with the embedded NIC.	Run the Computer Setup utility and change the resource settings for the board.

Network controller stops working without apparent cause.

Cause	Solution
The files containing the network drivers are corrupted.	Reinstall the network drivers, using the Recovery Disc Set created from the hard drive's Recovery Partition.
The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
The network controller is defective.	Contact an authorized service provider.

New network card will not boot.

Cause	Solution
New network card may be defective or may not meet industry-standard specifications.	Install a working, industry-standard NIC, or change the boot sequence to boot from another source.

Cannot connect to network server when attempting Remote System Installation.

Cause	Solution
The network controller is not configured properly.	Verify Network Connectivity, that a DHCP Server is present, and that the Remote System Installation Server contains the NIC drivers for your NIC.

Solving Memory Problems

If you encounter memory problems, some common causes and solutions are listed in the following table.

△ **CAUTION:** Power may still be supplied to the DIMMs when the computer is turned off. To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module.

For those systems that support ECC memory, HP does not support mixing ECC and non-ECC memory. Otherwise, the computer will not boot the operating system.

System will not boot or does not function properly after installing additional memory modules.

Cause	Solution
A memory module is not seated properly in the socket.	Reseat the memory module. Ensure that the locks on each side of the module are in the closed position.
Memory module is not the correct type or speed grade for the system or the new memory module is not seated properly.	Replace module with the correct industry-standard device for the computer. On some models, ECC and non-ECC memory modules cannot be mixed.

Out of memory error.

Cause	Solution
Memory configuration may not be set up correctly.	Use the Device Manager to check memory configuration.
You have run out of memory to run the application.	Check the application documentation to determine the memory requirements.

Memory count during POST is wrong.

Cause	Solution
The memory modules may not be installed correctly.	Check that the memory modules have been installed correctly and that proper modules are used.
Integrated graphics may use system memory.	No action required.

Insufficient memory error during operation.

Cause	Solution
Too many Terminate and Stay Resident programs (TSRs) are installed.	Delete any TSRs that you do not need.
You have run out of memory for the application.	Check the memory requirements for the application or add more memory to the computer.

Solving CD-ROM and DVD Problems

If you encounter CD-ROM or DVD problems, see the common causes and solutions listed in the following table or to the documentation that came with the optional device.

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

Cause	Solution
The device is attached to a SATA port that has been disabled in the Computer Setup utility.	Run the Computer Setup utility and ensure that the SATA controller is enabled.
Non-bootable CD in drive.	Try a bootable CD in the drive.
Boot order not correct.	Run the Computer Setup utility and change boot sequence.

Drive not found (identified).

Cause	Solution
Cable could be loose.	Check cable connections.
The system may not have automatically recognized a newly installed device.	See reconfiguration directions in the Solving Hardware Installation Problems on page 165 section. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem.
The device is attached to a SATA port that has been disabled in Computer Setup.	Run the Computer Setup utility and ensure that the SATA controller is enabled.

CD-ROM or DVD devices are not detected or driver is not loaded.

Cause	Solution
Drive is not connected properly or not properly configured.	See the documentation that came with the optional device.

Movie will not play in the DVD drive.

Cause	Solution
Movie may be regionalized for a different country.	See the documentation that came with the DVD drive.
Decoder software is not installed.	Install decoder software.
Damaged media.	Replace media.
Movie rating locked out by parental lock.	Use DVD software to remove parental lock.
Media installed upside down.	Ensure the disc is inserted with the label facing up and centered in the tray.

Cannot eject compact disc (tray-load unit).

Cause	Solution
Disc not properly seated in the drive.	Turn off the computer and insert a thin metal rod into the emergency eject hole and push firmly. Slowly pull the tray out from the drive until the tray is fully extended, then remove the disc.
Eject button may not be functioning.	Turn on your PC, and press the Eject button nearest the drive to open the tray. If you suspect a problem with the actual Eject button: 1. Click **Start** and then **Computer**. 2. Right-click the CD or DVD drive you want to open. 3. Select **Eject** from the menu.

CD-ROM, CD-RW, DVD-ROM, or DVD-R/RW drive cannot read a disc or takes too long to start.

Cause	Solution
Media has been inserted upside down.	Re-insert the media with the label facing up.
The DVD-ROM drive takes longer to start because it has to determine the type of media played, such as audio or video.	Wait at least 30 seconds to let the DVD-ROM drive determine the type of media being played. If the disc still does not start, read the other solutions listed for this topic.
CD or DVD disc is dirty.	Clean CD or DVD with a CD cleaning kit, available from most computer stores.
The driver may be corrupted or outdated.	For information, click **Start** >**Help and Support** on the desktop to open the Help and Support Center, type update driver into the Search box, and then click **Search**.
Windows does not detect the CD-ROM or DVD-ROM drive.	1. Use Device Manager to remove or uninstall the device. 2. Restart the computer and let Windows detect the CD or DVD driver.

Recording or copying CDs is difficult or impossible.

Cause	Solution
Media installed upside down.	Ensure the disc is inserted with the label facing up and centered in the tray.
Media is dirty or damaged.	Make sure the disc is clean and undamaged. If recording stopped during a recording session, the disc may be damaged; use a different disc.
Media already has recorded content.	When using a CD-R disc, make sure that it is blank when recording music and is blank or appendable (with space to add more data files) when recording data.
Wrong drive is being used.	Make sure the disc is in the correct drive and you specify the same drive in the CD or DVD recording software.

Recording or copying CDs is difficult or impossible.

Cause	Solution
Disc space has been exceeded.	The recording software may not let you add a track if it exceeds the available space on your disc. You can make space available by removing one or more tracks from the list before recording the files to disc.
Other applications are causing a resource conflict.	Close all software programs and windows before recording. Restart your PC if necessary.
Wrong or poor quality media type.	1. Try using a slower speed when recording. 2. Verify that you are using the correct media for the drive. 3. Try a different brand of media. Quality varies widely between manufacturers.
Network is slow.	If you are on a network, copy the files from a network drive to your hard disk drive first, and then record them to disc.

Solving USB Flash Drive Problems

If you encounter USB flash drive problems, common causes and solutions are listed in the following table.

USB flash drive is not seen as a drive letter in Windows.

Cause	Solution
The drive letter after the last physical drive is not available.	Change the default drive letter for the flash drive in Windows.

USB flash drive not found (identified).

Cause	Solution
The device is attached to a USB port that has been disabled in Computer Setup.	Run the Computer Setup utility and ensure that the USB ports are enabled.
The device was not properly seated before power-up.	Ensure the device is fully inserted into the USB port before applying power to the system

System will not boot from USB flash drive.

Cause	Solution
Boot order is not correct.	Run the Computer Setup utility and change boot sequence.
The image on the device is not bootable.	Insert a bootable device.

The computer boots to DOS after making a bootable flash drive.

Cause	Solution
Flash drive is bootable.	Install the flash drive only after the operating system boots.

Solving Front Panel Component Problems

If you encounter problems with devices connected to the front panel, refer to the common causes and solutions listed in the following table.

A USB device, headphone, or microphone is not recognized by the computer.

Cause	Solution
Device is not properly connected.	1. Turn off the computer. 2. Reconnect the device to the front of the computer and restart the computer.
The device does not have power.	If the USB device requires AC power, be sure one end is connected to the device and one end is connected to a live outlet.
The correct device driver is not installed.	1. Install the correct driver for the device. 2. You might need to reboot the computer.
The cable from the device to the computer does not work.	1. If possible, replace the cable. 2. Restart the computer.
The device is not working.	1. Replace the device. 2. Restart the computer.
USB ports on the computer are disabled in Computer Setup.	Run the Computer Setup utility and ensure that the USB ports are enabled.

Solving Internet Access Problems

If you encounter Internet access problems, consult your Internet Service Provider (ISP) or refer to the common causes and solutions listed in the following table.

Unable to connect to the Internet.

Cause	Solution
Internet Service Provider (ISP) account is not set up properly.	Verify Internet settings or contact your ISP for assistance.
Modem is not set up properly.	Reconnect the modem. Verify the connections are correct using the quick setup documentation.
Web browser is not set up properly.	Verify that the Web browser is installed and set up to work with your ISP.
Cable/DSL modem is not plugged in.	Plug in cable/DSL modem. You should see a “power” LED light on the front of the cable/DSL modem.
Cable/DSL service is not available or has been interrupted due to bad weather.	Try connecting to the Internet at a later time or contact your ISP. (If the cable/DSL service is connected, the “cable” LED light on the front of the cable/DSL modem will be on.)
Modem cable is not properly connected.	Unplug and reconnect the modem, verifying connections. Note that your PC may also have an Ethernet network interface (also called a network interface card, or NIC) that connects to a local area network (LAN). Although it looks similar to the modem connector, the RJ-45 Ethernet network connector is not the same. Verify that you are using the modem connector. Do not connect a telephone cable to the NIC. Do not plug a network cable into a telephone service line; doing so may damage the NIC.

Unable to connect to the Internet.

Cause	Solution
IP address is not configured properly.	Contact your ISP for the correct IP address.
Cookies are corrupted. (A "cookie" is a small piece of information that a Web server can store temporarily with the Web browser. This is useful for having the browser remember some specific information that the Web server can later retrieve.)	**Windows Vista** 1. Select **Start** > **Control Panel**. 2. Click **Network and Internet**. 3. Click **Internet Options**. 4. In the **Browsing history** section on the **General** tab, click the **Delete** button. 5. Click the **Delete cookies** button. **Windows 7** 1. Select **Start** > **Control Panel**. 2. Click **Network and Internet**. 3. Click **Internet Options**. 4. In the **Browsing history** section on the **General** tab, click the **Delete** button. 5. Select the **Cookies** check box and click the **Delete** button.

Cannot automatically launch Internet programs.

Cause	Solution
You must log on to your ISP before some programs will start.	Log on to your ISP and launch the desired program.

Internet takes too long to download Web sites.

Cause	Solution
Modem is not set up properly.	Verify that the modem is connected and communicating properly. **Windows Vista** 1. Select **Start** > **Control Panel**. 2. Click on **System and Maintenance**. 3. Click on **System**. 4. In the **Tasks** list, select **Device Manager**. 5. Double-click **Modems**. 6. Double-click your modem. 7. On the **General** tab, click **Diagnostics**. 8. Click **Query Modem**. A "Success" response indicates the modem is connected and working properly. **Windows 7** 1. Select **Start** > **Control Panel**. 2. Click on **Hardware and Sound**. 3. Click on **Device Manager**. 4. Double-click **Modems**. 5. Double-click your modem. 6. On the **General** tab, click **Diagnostics**. 7. Click **Query Modem**. A "Success" response indicates the modem is connected and working properly.

Solving Software Problems

Most software problems occur as a result of the following:

- The application was not installed or configured correctly.
- There is insufficient memory available to run the application.
- There is a conflict between applications.
- Be sure that all the needed device drivers have been installed.
- If you have installed an operating system other than the factory-installed operating system, check to be sure it is supported on the system.

If you encounter software problems, see the applicable solutions listed in the following table.

Computer will not continue and no HP logo screen has appeared.

Cause	Solution
POST error has occurred.	If the computer is beeping, see POST Error Messages on page 181 to determine possible causes. See the Restore Kit or the Worldwide Limited Warranty for terms and conditions.

Computer will not continue after HP logo screen has appeared.

Cause	Solution
System files may be damaged.	Use recovery discs to reload system files.

"Illegal Operation has Occurred" error message is displayed.

Cause	Solution
Software being used is not Microsoft-certified for your version of Windows.	Verify that the software is certified by Microsoft for your version of Windows (see program packaging for this information).
Configuration files are corrupt.	If possible, save all data, close all programs, and restart the computer.

Contacting Customer Support

For help and service, contact an authorized reseller or dealer. To locate a reseller or dealer near you, visit http://www.hp.com.

NOTE: If you take the computer to an authorized reseller, dealer, or service provider for service, remember to provide the supervisor and user passwords if they are set.

Refer to the number listed in the warranty or in the *Support Telephone Numbers* guide for technical assistance.

10 POST Error Messages

This appendix lists the error messages and the various audible sequences that you may encounter during Power-On Self-Test (POST) or computer restart, the probable source of the problem, and steps you can take to resolve the error condition.

POST Text Messages

The section includes some text messages that may be encountered during POST.

NOTE: The computer will beep once after a POST text message is displayed on the screen.

Recommended actions in the following table are listed in the order in which they should be performed.

WARNING! When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

Table 10-1 Numeric Codes and Text Messages

Control panel message	Description	Recommended action
Default BIOS settings have been loaded due to BIOS update or checksum issue. Press <F10> to enter Setup. Otherwise, allow the PC to continue.	BIOS has been updated or returned to default settings.	Press F10 to enter Computer Setup and configure the system or ignore the message and accept the default settings.
ERROR: CPU Fan Has Failed. PC will automatically power down in a few seconds. Service PC immediately to prevent damage to CPU.	CPU fan is not connected or may have malfunctioned.	1. Reseat the CPU fan. 2. Reseat the fan cable. 3. Replace the CPU fan.
ERROR: System Fan Has Failed. Service PC to prevent damage to the system. Press F2 to continue.	System fan is not connected or may have malfunctioned.	1. Reseat the system fan. 2. Reseat the fan cable. 3. Replace the system fan.
ERROR: Unsupported CPU installed. PC will automatically power down in a few seconds.	Recently installed CPU is not supported by the system.	Install a CPU supported by your system.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
The machine cover has been removed since last system startup. Please ensure that any system access was authorized. Press <F2> to continue.	Computer cover was removed since last system startup.	On some models no action is required. On other models you must clear the warning message in the Computer Setup utility. To do so, restart the computer and press F10 before the computer boots to the operating system to enter the Computer Setup utility. In the **PC Health** menu, open the **Chassis Opened Warning** item and select **Clear**. Save your changes and exit the Computer Setup utility.
Hard disk failure is imminent. Please back up your hard disk and have it replaced! Press <F10> for Setup, <F2> to continue.	Hard drive is about to fail.	Back up data on the hard drive and replace the drive.
Warning: Changing setup options while resuming from Hibernate may cause your system to fail to resume.	Warning message.	No recommended action.

Interpreting POST Diagnostic Audible Codes

This section covers the audible codes that may occur before or during POST that do not necessarily have a text message associated with them.

⚠ **WARNING!** When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

NOTE: Recommended actions in the following table are listed in the order in which they should be performed.

Not all audible codes are available on all models.

Table 10-2 Diagnostic Audible Codes

Beep Definition	Possible Cause	Recommended Action
1 short beep and 1 long beep followed by long pause	Bad memory or memory configuration error.	**CAUTION:** To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module. 1. Reseat DIMMs. 2. Ensure that the DIMMs are installed in the correct memory sockets. 3. Replace DIMMs one at a time to isolate the faulty module. 4. Replace third-party memory with HP memory. 5. Replace the system board.

Table 10-2 Diagnostic Audible Codes (continued)

Beep Definition	Possible Cause	Recommended Action
2 short beeps and 1 long beep followed by long pause	Graphics card initialization failed.	1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board.
3 short beeps and 1 long beep followed by long pause	CPU configuration error or invalid CPU detected before graphics card initialized.	1. Reseat the processor. 2. Replace the processor. 3. Replace the system board.
One short beep followed by short pause	No legacy floppy drive or optical drive found.	1. Reseat floppy or optical drive. 2. Replace floppy or optical drive.
Two short beeps followed by long pause OR One short beep followed by long pause	No floppy diskette or CD found.	Insert diskette or CD.
Three short beeps followed by long pause	Flashing not ready (missing utility or BIOS image file, etc.)	Flash the BIOS with the proper BIOS flash utility available from HP.
Four short beeps followed by long pause	Flashing operation has failed (checksum error, corrupted image, etc.)	Flash the BIOS with the proper BIOS flash utility available from HP.
Five short beeps followed by long pause	BIOS Recovery was successful.	No action required.

The duration of each beep or pause is defined below.

Beep/Pause Type	Action
Short Beep	Beeps for 1 second.
Short Pause	Pauses for 1 second.
Long Beep	Beeps for 3 seconds.
Long Pause	Pauses for 3 seconds.

11 Password Security and Resetting CMOS

Resetting the Password Jumper

This computer supports two security password features, which can be established through the Computer Setup Utilities menu: supervisor password and user password

To disable the password features, or to clear the passwords, complete the following steps:

1. Shut down the operating system properly, then turn off the computer and any external devices, and disconnect the power cord from the power outlet.
2. With the power cord disconnected, press the power button again to drain the system of any residual power.

⚠ **WARNING!** To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet, and allow the internal system components to cool before touching.

△ **CAUTION:** When the computer is plugged in, the power supply always has voltage applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.

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.

3. Remove the computer cover or access panel.
4. Locate the header and jumper.

NOTE: For assistance locating the password jumper and other system board components, see the Illustrated Parts & Service Map (IPSM) for that particular system. The IPSM can be downloaded from http://www.hp.com/support.

5. On systems with 3-pin jumpers, remove the jumper from pins 1 and 2. Place the jumper on pins 2 and 3.

   On systems with 2-pin jumpers, remove the jumper from pins 1 and 2.
6. Replace the computer cover or 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 establish new passwords, repeat steps 1 through 4, replace the password jumper on pins 1 and 2, then repeat steps 6 through 8. Establish the new passwords in Computer Setup.

Clearing and Resetting the CMOS

The computer's configuration memory (CMOS) stores information about the computer's configuration.

The CMOS jumper resets CMOS but does not clear the supervisor and user 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 equipment connected to the computer.

⚠ **WARNING!** To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet, and allow the internal system components to cool before touching.

△ **CAUTION:** When the computer is plugged in, the power supply always has voltage applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.

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

3. Remove the computer cover or access panel.

△ **CAUTION:** Resetting the CMOS jumper will reset CMOS values to factory defaults. It is important to back up the computer CMOS settings before resetting them in case they are needed later. Back up is easily done through Computer Setup.

4. Locate the header and jumper.

NOTE: For assistance locating the CMOS jumper and other system board components, see the Illustrated Parts & Service Map (IPSM) for that particular system. The IPSM can be downloaded from http://www.hp.com/support.

△ **CAUTION:** Make sure you have disconnected the AC power cord from the wall outlet. Clearing the CMOS while power is connected can damage the system board.

5. Remove the jumper from pins 1 and 2. Place the jumper on pins 2 and 3.
6. Place the jumper back on pins 1 and 2.
7. Replace the computer cover or access panel.
8. Reconnect the external devices.
9. Plug in the computer and turn on power.

NOTE: You will receive POST error messages after clearing CMOS and rebooting advising you that configuration changes have occurred. Use Computer Setup to reset any special system setups along with the date and time.

A Connector Pin Assignments

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

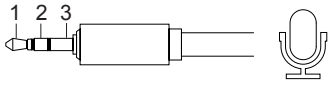
Ethernet BNC

Connector and Icon	Pin	Signal
	1	Data
	2	Ground

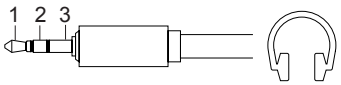
USB

Connector and Icon	Pin	Signal
	1	+5 VDC
	2	- Data
	3	+ Data
	4	Ground

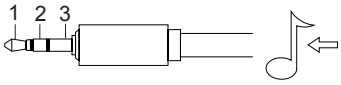
Microphone

Connector and Icon (1/8” miniphone)	Pin	Signal
	1 (Tip)	Audio_left
	2 (Ring)	Audio_Right
	3 (Shield)	Ground

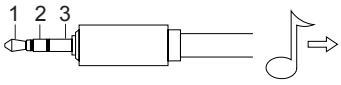
Headphone

Connector and Icon (1/8" miniphone)	Pin	Signal
	1 (Tip)	Audio_left
	2 (Ring)	Power_Right
	3 (Shield)	Ground

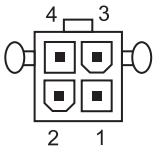
Line-in Audio

Connector and Icon (1/8" miniphone)	Pin	Signal
	1 (Tip)	Audio_In_Left
	2 (Ring)	Audio_In_Right
	3 (Shield)	Ground

Line-out Audio

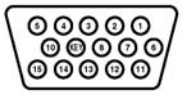
Connector and Icon (1/8" miniphone)	Pin	Signal
	1 (Tip)	Audio_Out_Left
	2 (Ring)	Audio_Out_Right
	3 (Shield)	Ground

4-Pin Power (for CPU)

Connector and Icon	Pin	Signal
	1	GND
	2	GND
	3	+12V CPU
	4	-12V CPU

Monitor

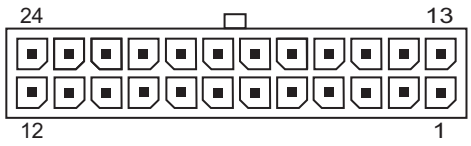
Connector and Icon



Pin	Signal	Pin	Signal
1	Red Analog	9	+5V (fused)
2	Green Analog	10	Ground
3	Blue Analog	11	Not used
4	Not used	12	DDC Serial Data
5	Ground	13	Horizontal Sync
6	Ground	14	Vertical Sync
7	Ground	15	DDC Serial Clock
8	Ground		

24-Pin Power

Connector



Front

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+3.3V	7	GND	13	+3.3V	19	GND
2	+3.3V	8	POK	14	–12V	20	open
3	GND	9	+5 Vaux	15	GND	21	+5V
4	+5V	10	+12V	16	PSON	22	+5V
5	GND	11	+12V	17	GND	23	+5V
6	+5V	12	+3.3V	18	GND	24	GND

PCI Express

x1, x4, x8, and x16 PCI Express Connector

Pin A

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	PRSNT1	6	JTAG3	11	PERST#	16	PERp0	21	PERp1
2	+12V	7	JTAG4	12	GND	17	PERn0	22	PERn1
3	+12V	8	JTAG5	13	REFCLK+	18	GND	23	GND
4	GND	9	+3.3V	14	REFCLK-	19	RSVD	24	GND
5	JTAG2	10	+3.3V	15	GND	20	GND	25	PERp2
26	PERn(2)	31	GND	36	PERn4	41	GND	46	GND
27	GND	32	RSVD	37	GND	42	GND	47	PERp7
28	GND	33	RSVD	38	GND	43	PERp6	48	PERn7
29	PERp3	34	GND	39	PERp5	44	PERn6	49	GND
30	PERn3	35	PERp4	40	PERn5	45	GND	50	RSVD
51	GND	56	PERp9	61	PERn10	66	GND	71	GND
52	PERp8	57	PERn9	62	GND	67	GND	72	PERp13
53	PERN8	58	GND	63	GND	68	PERp12	73	PERn13
54	GND	59	GND	64	PERp11	69	PERn12	74	GND
55	GND	60	PERp10	65	PERn11	70	GND	75	GND
76	PERp14	81	PERn15						
77	PERn14	82	GND						
78	GND								
79	GND								
80	PERp15								

Pin B information is on the next page

NOTE: x1 PCI Express uses pins 1-18. x4 PCI Express uses pins 1-32. x8 PCI Express uses pins 1-49. x16 PCI Express uses pins 1-8.

PCI Express

x1, x4, x8, and x16 PCI Express Connector

Pin B

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+12V	6	SMDAT	11	WAKE#	16	GND	21	GND
2	+12V	7	GND	12	RSVD	17	GND	22	GND
3	RSVD	8	+3.3 V	13	GND	18	PETp1	23	PETp2
4	GND	9	JTAG1	14	PETp0	19	PETn1	24	PETn2
5	SMCLK	10	3.3vAux	15	PETn0	20		25	GND
26	GND	31	PRSNT2#	36	GND	41	PETp6	46	PETn7
27	PETp3	32	GND	37	PETp5	42	PRTn6	47	GND
28	PETn3	33	PETp4	38	PETn5	43	GND	48	PRSNT2#
29	GND	34	PETn4	39	GND	44	GND	49	GND
30	RSVD	35	GND	40	GND	45	PETp7	50	PETp8
51	PETn8	56	GND	61	GND	66	PETp12	71	PETn13
52	GND	57	GND	62	PETp11	67	PETn12	72	GND
53	GND	58	PETp10	63	PETn11	68	GND	73	GND
54	PETp9	59	PETn10	64	GND	69	GND	74	PETp14
55	PETn9	60	GND	65	GND	70	PETp13	75	PETn14
76	GND	81	PRSNT2#						
77	GND	82	RSVD						
78	PETp15								
79	PETn15								
80	GND								

Pin B information is on the next page

NOTE: x1 PCI Express uses pins 1-18. x4 PCI Express uses pins 1-32. x8 PCI Express uses pins 1-49. x16 PCI Express uses pins 1-8.

B Power Cord Set Requirements

The power supplies on some computers have external power switches. The voltage select switch feature on the computer permits it to operate from any line voltage between 100-120 or 220-240 volts AC. Power supplies on those computers that do not have external power switches are equipped with internal switches that sense the incoming voltage and automatically switch to the proper voltage.

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

Power cord sets for use in other countries must meet the requirements of the country where you use the computer.

General Requirements

The requirements listed below are applicable to all countries:

1. The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
2. The power cord set must have a minimum current capacity of 10A (7A Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
3. The diameter of the wire must be a minimum of 0.75 mm_2 or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet).

The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

⚠ **WARNING!** Do not operate this product with a damaged power cord set. If the power cord set is damaged in any manner, replace it immediately.

Japanese Power Cord Requirements

For use in Japan, use only the power cord received with this product.

△ **CAUTION:** Do not use the power cord received with this product on any other products.

Country-Specific Requirements

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

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

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75mm_2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SVT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 0.75 mm_2 conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

C Specifications

Minitower models

Desktop Dimensions		
Height	15.10 in	38.35 cm
Width	7.27 in	18.46 cm
Depth	16.16 in	41.05 cm
Approximate Weight		
HP Pro 3120	17.5 lb	7.94 kg
HP Pro 3125	17.7 lb	8.03 kg
HP Pro 3130	18.4 lb	8.35 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (noncondensing)		
Operating	10-90%	10-90%
Nonoperating (38.7°C max wet bulb)	5-95%	5-95%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m
NOTE: Operating temperature is derated 1.0° C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level; no direct sustained sunlight. Maximum rate of change is 10° C/Hr. The upper limit may be limited by the type and number of options installed.		
Power Supply	**115V**	**230V**
Operating Voltage Range	90-132 VAC	180-264 VAC
Rated Voltage Range	100-127 VAC	200-240 VAC
Rated Line Frequency	50-60 Hz	50-60 Hz
Power Output	300 W	300 W

Rated Input Current (maximum)[1]	6A @ 100 VAC	3A @ 200 VAC

[1] This system utilizes a passive power factor corrected power supply. The power factor correction is present in the 230V operating mode only. This allows the system to pass the CE mark requirements for use in the countries of the European Union. This supply requires the use of an input voltage range select switch.

Small form factor models

Desktop Dimensions		
Height	4.43 in	11.25 cm
Width	12.25 in	31.12 cm
Depth	15.33 in	38.94 cm
Approximate Weight		
HP Pro 2110	14.75 lb	6.69 kg
HP Pro 3120	14.59 lb	6.62 kg
HP Pro 3130	14.60 lb	6.62 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (noncondensing)		
Operating	10-90%	10-90%
Nonoperating (38.7°C max wet bulb)	5-95%	5-95%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m

NOTE: Operating temperature is derated 1.0° C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level; no direct sustained sunlight. Maximum rate of change is 10° C/Hr. The upper limit may be limited by the type and number of options installed.

Power Supply	**115V**	**230V**
Operating Voltage Range	90-132 VAC	180-264 VAC
Rated Voltage Range	100-127 VAC	200-240 VAC
Rated Line Frequency	50-60 Hz	50-60 Hz
Power Output	270 W	270 W
Rated Input Current (maximum)[1]	6A @ 100 VAC	3A @ 200 VAC

[1] This system utilizes a passive power factor corrected power supply. The power factor correction is present in the 230V operating mode only. This allows the system to pass the CE mark requirements for use in the countries of the European Union. This supply requires the use of an input voltage range select switch.

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