Maintenance and Service Guide

HP ap5000 All-In-One Point of Sale System

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HP ap5000 All-In-One Point of Sale System

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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.

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1 Product Features

Standard Features

The HP ap5000 All-In-One Point of Sale System features include:

- Water-resistant touch screen panel support. You can use a stylus, finger tip, finger nail, or credit card edge on the touch screen.

- Two-line customer facing vacuum fluorescent display (VFD).

- Three-track magnetic strip reader (MSR) integrated into the system.

- Advertising display panel allows you to insert and display print advertisements (non-electrical).

- Easily adjustable cashier display rotates 90 degrees from full vertical to full horizontal.

- Easily adjustable customer facing display rotates 80 degrees.

- Industrial hinge allows the system to remain firm and stable at any angle.

- Cable management feature allows cables to tuck into the stand and route out the bottom from either the front, sides, or rear of the stand.

- Color coded I/O panel for ease of installing cables.

- COM stickers so you can label your serial port cables.

- 24V USB+POWER port.

- 5V (COM1, COM2) and 12V (COM3) power configurable serial ports (configurable in BIOS).

- 40° C ambient thermal environment.

- Solid State drive (some models) for improved reliability against drive failure.

- RAID support for mirroring or striping.

- Eco-friendly design with reduction in hazardous materials (RoHS 2), partial reduction in Brominated Flame Retardants (BFRs) and Polyvinyl Chloride (PVC), energy efficient (E-STAR 5.0 compliant, EUP lot 6 and lot 7 compliant).

- Diagnostic beeps/blinks for pre-video issues.

- Stylish industrial design.

- Three year warranty.

- Compatible "plug-n-play" with HP branded POS peripherals.

System Components

Figure 1-1 System Components
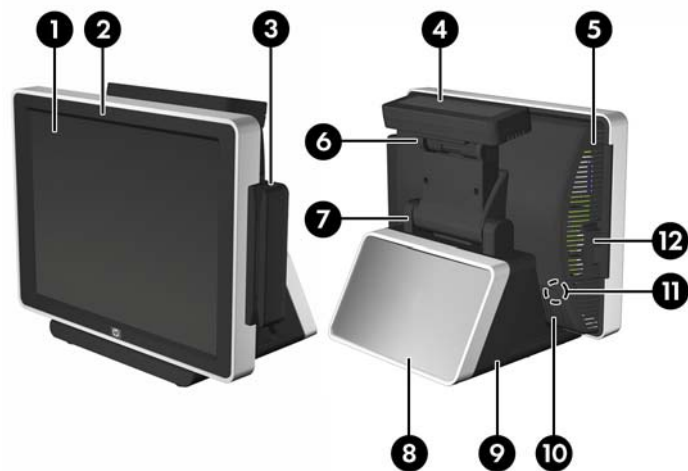
1	Touch Screen	8	Print Advertisement Panel (non-electrical)
2	Power LED	9	Base and Power Supply Housing
3	Magnetic Stripe Reader (MSR)	10	Bottom I/O Cover
4	VFD Customer Display	11	Power Button (underneath I/O cover)
5	Drive Cover	12	Side I/O cover
6	Adjustable VFD Hinge		Rubber Feet[1] (not illustrated)
7	Adjustable Touch Screen Hinge		

[1] Unit is elevated so cables can route out from front, rear, or sides.

Bottom I/O Panel Components
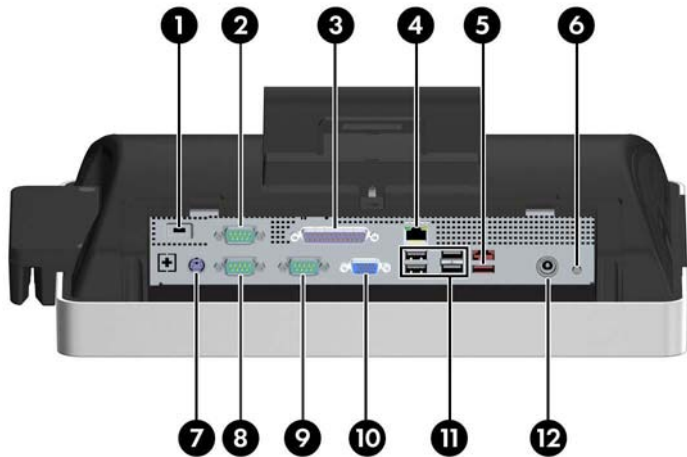
1	Kensington Lock Slot	7	PS/2 Keyboard or Mouse Connector
2	Serial Connector (COM2, 5V)	8	Serial Connector (COM1, 5V)
3	Parallel Connector	9	Serial Connector (COM3, 12V)
4	RJ-45 Network Connector	10	VGA Connector
5	24V USB+POWER Connector	11	Universal Serial Bus (USB) Connectors
6	Power Button	12	Power Cord Connector

Side Panel Components

Figure 1-3 Side Connectors
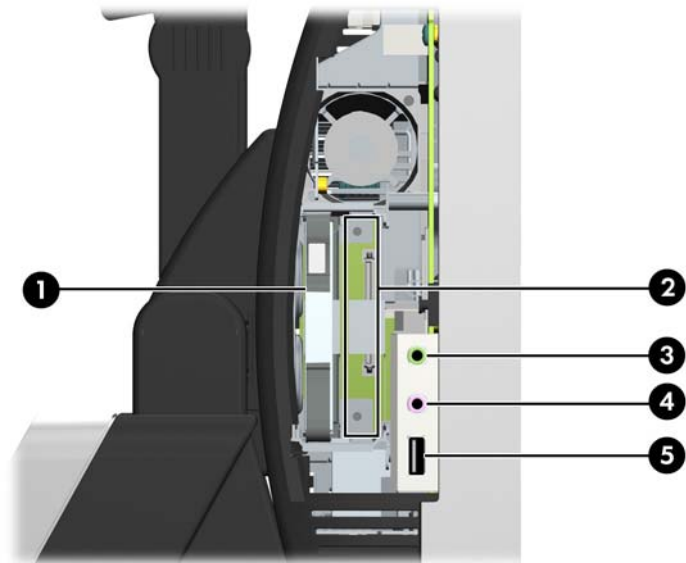
1	Primary Hard Drive	4	Microphone Connector (pink)
2	Secondary Hard Drive Bay	5	Universal Serial Bus (USB) Connector
3	Audio Line-Out Connector (green)		

2 Installing and Customizing the Software

A keyboard is required to unbundle the software image.

NOTE: If the computer was shipped with Windows Vista 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: Operate the computer on a sturdy, level surface. The front should be 100% open. Leave a 10-mm (.39-inch) clearance on the sides and top of the computer and at least a 50-mm (1.97-inch) clearance in the rear. The rear vents should be 100% open.

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.

Installing or Upgrading Device Drivers

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.

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, 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.

3 Computer Setup (F10) Utility

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 serial and parallel ports.

- View settings for processor and memory.

- Modify the boot order of bootable devices.

- Adjust the brightness of the LCD panel.

- Establish a supervisor password that controls access to Computer Setup (F10) Utility and the settings described in this section.

△ **CAUTION:** The VGA port on the ap5000 is a Powered VGA Port. If your monitor does not support the "Powered VGA" feature, make sure to plug it in prior to powering on the POS system in order to prevent possible damage to your monitor.

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

   - Boot

- Security

- 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 3-1 Computer Setup—Main

Option	Description
System Overview	Allows you to view:
	- BIOS Version - BIOS Build Date - EC Version - Product Name - Serial Number - Asset Tag - MAC Address - CPU Speed - Memory Size
System Time	Allows you to set system time.
System Date	Allows you to set system date.

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 3-2 Computer Setup—Advanced

Option	Description
SATA Configuration	Allows you to configure the SATA ports as one of the following: ● SATA ● RAID

Super IO Configuration	Allows you to configure the Super IO chipsets.
	
	● Parallel Port Address – Select the IO base address for the parallel port:
	
	  ◦ Disabled
	  ◦ 378
	  ◦ 278
	  ◦ 3BC
	
	● Parallel Port Mode – Select the parallel port mode:
	
	  ◦ SPP
	  ◦ Bi-Directional
	  ◦ EPP
	  ◦ ECP
	
	● Parallel Port IRQ – select the IRQ for the parallel port:
	
	  ◦ 5
	  ◦ 7
	
	● Serial Port1 Address – select the IO base address of the serial port
	
	  ◦ Disabled
	  ◦ 3F8
	  ◦ 2F8
	  ◦ 3E8
	  ◦ 2E8
	  ◦ 2F0
	  ◦ 2E0
	
	● Serial Port1 IRQ – select the IRQ for this serial port:
	
	  ◦ 3
	  ◦ 4

Table 3-2 Computer Setup—Advanced (continued)

- ◦ 5

- ◦ 10

- ◦ 11

- ● Serial Port1 Standard Mode/5V – select the power mode for this serial port:

  - ◦ 5V

  - ◦ Standard Mode

- ● Serial Port2 Address – select the IO base address of the serial port

  - ◦ Disabled

  - ◦ 3F8

  - ◦ 2F8

  - ◦ 3E8

  - ◦ 2E8

  - ◦ 2F0

  - ◦ 2E0

- ● Serial Port2 IRQ – select the IRQ for this serial port:

  - ◦ 3

  - ◦ 4

  - ◦ 5

  - ◦ 10

  - ◦ 11

- ● Serial Port2 Standard Mode/5V – select the power mode for this serial port:

  - ◦ 5V

  - ◦ Standard Mode

- ● Serial Port3 Address – select the IO base address of the serial port

  - ◦ Disabled

  - ◦ 3E8

  - ◦ 2E8

  - ◦ 2F0

  - ◦ 2E0

  - ◦ 2D8

  - ◦ 2D0

- ● Serial Port3 IRQ – select the IRQ for this serial port:

  - ◦ 3

  - ◦ 4

Table 3-2 Computer Setup—Advanced (continued)

	◦ 5
	◦ 10
	◦ 11
	● Serial Port3 Standard Mode/12V – select the power mode for this serial port:
	◦ 12V
	◦ Standard Mode
	● MSR Port Address – select the IO base address of the serial port:
	◦ Disabled
	◦ 3E8
	◦ 2E8
	◦ 2F0
	◦ 2E0
	◦ 2D8
	◦ 2D0
	● MSR Port IRQ – select the IRQ for this serial port:
	◦ 3
	◦ 4
	◦ 5
	◦ 10
	◦ 11
USB Configuration	Allows you to configure the USB support:
	● All USB Ports – enable or disable
	● USB Port 3/4 – enable or disable
	● USB Port 5 – enable or disable
	● Side USB Port – enable or disable
	● Legacy USB Support – enables support for legacy USB:
	◦ Disabled
	◦ Enabled
	◦ Auto – disables legacy support if no USB devices are connected
	● USB 2.0 Controller Mode – configures the USB controller speed:
	◦ Full Speed (12 Mbps)
	◦ High Speed (480 Mbps)
Manual Brightness Setting	Allows you to select the brightness level of the LCD panel form 0 through 7. 0 is the lowest brightness and 7 is the highest brightness.

Table 3-2 Computer Setup—Advanced (continued)

Restore on AC Power Loss	Allows you to select system restart behavior after power loss: ● Power Off ● Power On ● Last State
Wake On LAN	Allows you to disable or enable wake-on-LAN to generate a wake event.
HD Audio	Allows you to disable or enable HD audio.
Factory Recovery Boot Support	Allows you to disable or enable factory recovery boot support.
PXE ROM	Allows you to disable or enable the PXE option ROM for the integrated/onboard LAN.
F9 Prompt	Allows you to enable or disable the option to press the F9 key to access the Diagnostics menu during computer startup.
F10 Prompt	Allows you to enable or disable the option to press the F10 key to access the Setup menu during computer startup.
F12 Prompt	Allows you to enable or disable the option to press the F12 key to access the Boot from LAN option during computer startup.
Spread Spectrum	Allows you to enable or disable the spread spectrum.

Computer Setup—Boot

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

Table 3-3 Computer Setup—Security

Option	Description
1st Boot Device	Allows you to specify the boot sequence from the list of available devices. The number of boot devices listed depends on how many bootable devices are installed. Devices that have been disabled will appear in parentheses.
2nd Boot Device	
3rd Boot Device	
4th Boot Device	

Computer Setup—Security

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

Table 3-4 Computer Setup—Security

Option	Description
Supervisor Password	Allows you to view the Supervisor Password.
User Password	Allows you to view the User Password.

Table 3-4 Computer Setup—Security (continued)

Change Supervisor Password	Allows you to change the Supervisor Password.
Change User Password	Allows you to change the User Password.

Computer Setup—Exit

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

Table 3-5 Computer Setup—Exit

Option	Description
Save Changes and Exit	Press Enter to exit saving changes.
Discard Changes and Exit	Press Enter to exit discarding changes.
Load Defaults	Press Enter to load setup defaults.

Recovering the Configuration Settings

To reset all BIOS Setup options to their default values (including options for Ctrl+F10), you must enter F10 Setup mode and select **Load Defaults** from the **Exit** menu or press F9.

This does not include updates to **system date**, **system time**, **supervisor password**, or **user password**.

4   Troubleshooting

This chapter provides information on how to identify and correct minor hardware and software problems. If you encounter problems with the computer, refer to the tables in this chapter for probable causes and recommended solutions.

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. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. For more information, refer to *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 diagnostics utility.

- Check the Power LED on the front of the computer to see if it is flashing red. The flashing lights are error codes that will help you diagnose the problem. Refer to for more information.

- 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.

- If you are using a Windows operating system, 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.

- Refer to the following in this guide.

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 system when you call.

- Write down the system serial number and product ID number

- 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 the backup that you created with the backup and recovery software or restore the system to its original factory condition.

NOTE: You must connect an external USB optical drive (not included) to perform a restore.

△ **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 system is plugged into a working electrical outlet.

- Check to see that the system is turned on and the green power light is on.

- Check the Power LED on the front of the computer to see if it is flashing red. The flashing lights are error codes that will help you diagnose the problem. Refer to Appendix A, Interpreting POST Diagnostic Front Panel LED and Beep Codes on page 29 for more information.

- Turn up the brightness control of the monitor in F10 Setup (**Advanced > Manual Brightness Setting**) if the monitor is dim.

- Check all cable connections for loose connections or incorrect connections.

- Wake the computer by touching the screen 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 automatic start on power loss is set in Computer Setup. If it does not restart, press the power button to start the computer.

NOTE: You cannot wake the ap5000 via the keyboard or mouse.

- Reconfigure the system after installing a non–plug and play optional device.

- 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 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.

△ **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.

General Troubleshooting Steps for a New Installation

The following are some basic ideas for troubleshooting the initial hardware setup.

- Check that the computer is plugged into a known, good electrical outlet.

- Verify that the computer is turned on and that the green power light is on.

- Verify that the computer can support any OS or peripherals being installed by checking the Quick Specs for the computer.

✎ **NOTE:** A keyboard is required for setting up Windows. The touch screen drivers are not active until after the operating system has been installed.

General Troubleshooting Steps for an Existing Installation

The following are some ideas for troubleshooting problems after the initial setup.

- Check all cable connections for loose or improper connections.

- Check the front LED for error conditions.

- Determine whether the computer is in a low-power (sleep) state; if so, press the touch screen or the power button to wake the computer. If the computer does not "awaken," press and hold down the power button for at least 4 seconds, then press the power button again to shut down and restart the system. If the power button does not shut down the computer, unplug the power cord, wait a few seconds, and then plug it in again. If the computer does not restart automatically when power is restored, press the power button to start the computer.

- Ensure that all the necessary device drivers have been installed.

- Remove any new/additional hardware and see if the computer functions properly.

- Uninstall recently added software and see if the computer functions properly.

- Upgrade the BIOS; a new release of the BIOS could have been released that supports new features or fixes the issue.

✎ **NOTE:** A keyboard or mouse will not wake the system from an S3 sleep state.

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.

Table 4-1 Solving General Problems

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 four seconds until the computer turns off.
	2. Disconnect the power cord from the electrical outlet.

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.
	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.
System has locked up.	Restart computer.

Computer date and time display is incorrect.

Cause	Solution
RTC (real-time clock) battery may need to be replaced.	1. Reset the date and time under Control Panel or Computer Setup.
	2. If the problem persists, replace the Head Unit; the RTC is not replaceable on this unit.

Table 4-1 Solving General Problems (continued)

There is no sound or sound volume is too low.

Cause	Solution
System volume may be set low or muted.	1. Verify that the internal system audio is not disabled in F10 Setup.
	2. Verify that any external speakers are properly connected and powered on, and that the volume control is set correctly.
	3. Verify that the speakers are not muted in the operating system.
	4. Use the operating system volume controls to increase the volume.
The audio device may be connected to the wrong jack on the computer.	Ensure that the device is connected to the correct jack; the microphone and speaker jacks are located on the side of the Head Unit behind a removable cover. The microphone jack is pink; the speaker jack is green.

Poor performance is experienced.

Cause	Solution
Processor is hot.	1. Verify that the airflow for the computer is not blocked.
	2. Leave a 4-inch (10.2-cm) clearance on all vented sides of the base and above the monitor to permit the required airflow.
	3. Verify that the fans are connected and working properly.
	4. Verify that the heat sink is properly in place.
	NOTE: Do not remove or replace the heat sink.
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.

Table 4-1 Solving General Problems (continued)

Poor performance is experienced.

Cause	Solution
Too many applications running.	1. Close unnecessary applications to free up 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** > **Run** and type `msconfig`. On the **Startup** tab of the System Configuration Utility, uncheck applications that you do not want to launch automatically. **CAUTION:** Do not prevent applications from launching at startup that are required for proper system operation. 2. Add more memory.
Some software applications 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.

Solving Power Problems

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

Table 4-2 Solving Power Problems

The computer powered off automatically and the Power LED flashes red 2 times, once every second, followed by a 2 second pause, and the computer beeps 2 times; beeps stop after 5th iteration, but LEDs continue flashing.

Cause	Solution
Processor thermal protection activated:	1. Verify that the computer air vents are not blocked.
A fan may be blocked or not turning.	2. Verify that the fans are running and plugged onto the system board headers.
OR	
The heatsink is not properly attached to the processor.	3. If fan is plugged in but not spinning, replace the Head Unit.

System does not power on and the LEDs on the front of the computer are not flashing.

Cause	Solution
System unable to power on.	Press and hold the power button for less than 4 seconds; if the hard drive LED does not turn on green: 1. Check that the unit is plugged into a working AC outlet. 2. Verify that power supply cables are properly connected to the system board. 3. Replace the power supply. 4. Replace the Head Unit.

Table 4-2 Solving Power Problems (continued)

Power LED flashes red 4 times, once every second, followed by a 2 second pause, and the computer beeps 4 times; beeps stop after 5th iteration but LEDs continue flashing.

Cause	Solution

Power failure (power supply is overloaded).	1. Check if a device is causing the problem:
	
	    a. Remove all attached devices (hard drives, optical drives, printers, displays).
	
	    b. Power on the system.
	
	    c. If the system enters POST, power off and replace one device.
	
	    d. If system enters POST, power off and replace another device until the failure occurs.
	
	2. If the problem persists with all devices removed, replace the power supply.
	
	3. Replace the Head Unit.

Power LED flashes red 9 times, once every second, followed by a 2 second pause, and the computer beeps 9 times; beeps stop after 5th iteration but LEDs continue flashing.

Cause	Solution

The system power is on, but the computer will not boot.	1. Check if a device is causing the problem:
	
	    a. Remove all attached devices (hard drives, optical drives, printers, displays).
	
	    b. Power on the system.
	
	    c. If the system enters POST, power off and replace one device.
	
	    d. If system enters POST, power off and replace another device until the failure occurs.
	
	2. If the problem persists with all devices removed, replace the Head Unit.

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.

Table 4-3 Solving Memory Problems

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.

Power LED flashes red 5 times, once every second, followed by a 2 second pause, and the computer beeps 5 times; beeps stop after 5th iteration but LEDs continue flashing.

Cause	Solution
Memory is installed incorrectly or is bad.	1. Reseat DIMMs. Power on the system.
	2. Replace DIMMs one at a time to isolate the faulty module.
	3. Replace third-party memory with HP memory.
	4. Replace the Head Unit.

Solving Processor Problems

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

Table 4-4 Solving Processor Problems

Power LED flashes red 3 times, once every second, followed by a 2 second pause.

Cause	Solution
Processor is not seated properly or not installed.	1. Check to see if the processor is present.
	2. Replace the Head Unit.

Solving Display Problems

The primary monitor for the ap5000 is a part of the Head Unit. This monitor has no front panel controls and powers on when you turn the Head Unit on. Brightness is adjusted through F10 setup. Even the lowest brightness setting in F10 Setup (**Advanced > Manual Brightness Setting**) will produce video and not blank the screen.

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

Table 4-5 Solving Display Problems

Blank screen (no video).

Cause	Solution
You may have a screen blanking utility installed or energy saver features are enabled.	Touch the screen.
System ROM is corrupted; system is running in Boot Block Emergency Recovery Mode (indicated by eight beeps).	Reflash the system ROM with the latest BIOS image. See the "Boot Block Emergency Recovery Mode" section of the *Desktop Management Guide* for more information.
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.
Monitor settings in the computer are not compatible with the monitor.	**NOTE:** You must connect a keyboard (not included) to perform the following procedure. 1. Restart the computer and press F8 during startup when you see "Press F8" in the bottom right corner of the screen. 2. Using the keyboard arrow keys, select **Enable VGA Mode** and press Enter. 3. In Windows Control Panel, double-click the **Display** icon and select the **Settings** tab. 4. Use the sliding control to reset the resolution.
The monitor is not functioning properly.	Replace the Head Unit.

The second monitor is blank (no video).

CAUTION: The VGA port on the HP ap5000 All-In-One Point of Sale System is a powered VGA port. If you connect a stand-alone monitor to the VGA port that does not support the Powered VGA feature, make sure to plug it in prior to powering on the POS system in order to prevent possible damage to your monitor.

Cause	Solution
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.
Computer is in **standby** mode.	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.

Table 4-5 Solving Display Problems (continued)

The second monitor is blank (no video).

CAUTION: **The VGA port on the HP ap5000 All-In-One Point of Sale System is a powered VGA port. If you connect a stand-alone monitor to the VGA port that does not support the Powered VGA feature, make sure to plug it in prior to powering on the POS system in order to prevent possible damage to your monitor.**

Cause	Solution
The monitor was plugged into the system while the system was powered on.	Power off the system then plug in the monitor. **CAUTION:** The VGA port on the HP ap5000 All-In-One Point of Sale System is a powered VGA port. If you connect a stand-alone monitor to the VGA port that does not support the Powered VGA feature, make sure to plug it in prior to powering on the POS system in order to prevent possible damage to your monitor.
Monitor settings in the computer are not compatible with the monitor.	**NOTE:** You must connect a keyboard (not included) to perform the following procedure. 1. Restart the computer and press F8 during startup when you see "Press F8" in the bottom right corner of the screen. 2. Using the keyboard arrow keys, select **Enable VGA Mode** and press Enter. 3. In Windows Control Panel, double-click the **Display** icon and select the **Settings** tab. 4. Use the sliding control to reset the resolution.

Blank screen and the power LED flashes red 5 times, once every second, followed by a two-second pause, and the computer beeps 5 times; beeps stop after the 5th iteration but LEDs continue flashing.

Cause	Solution
Pre-video memory error.	1. Reseat DIMMs. Power on the system. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the Head Unit.

Blank screen and the power LED flashes red 6 times, once every second, followed by a 2 second pause, and the computer beeps 6 times; beeps stop after 5th iteration, but LEDs continue flashing.

Cause	Solution
Pre-video graphics error.	Replace the Head Unit.

Blank screen and the power LED flashes red 7 times, once every second, followed by a 2 second pause, and the computer beeps 7 times; beeps stop after 5th iteration but LEDs continue flashing.

Cause	Solution
System board failure (ROM detected failure prior to video).	Replace the Head Unit.

Table 4-5 Solving Display Problems (continued)

Characters on monitor are dim.

Cause	Solution
The brightness controls are not set properly.	Change the brightness level in F10 Setup:
	1. From F10 Setup, select **Advanced** and click **Manual Brightness Setting**.
	2. Select the correct setting, 0 providing the least brightness and 7 providing the most brightness.

Blurry video or requested resolution cannot be set.

Cause	Solution
Correct graphics driver may not be loaded or may be corrupt.	Install/re-install the correct graphics driver.
Monitor is not capable of displaying requested resolution.	Change requested resolution.
The system BIOS needs to be updated.	Upgrade the BIOS; a new release of the BIOS could have been released that fixes the issue.
Graphics has failed.	Replace the Head Unit.

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. In a two-monitor system, be sure the monitor cable for the 2nd monitor 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.
The system BIOS needs to be updated.	Upgrade the BIOS; a new release of the BIOS could have been released that fixes the issue.

Image is not centered.

Cause	Solution
Position may need adjustment.	Adjust the monitor.

"Out of Range" displays on screen.

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

Table 4-5 Solving Display Problems (continued)

Certain typed symbols do not appear correct.

Cause	Solution
The font you are using does not support that particular symbol.	Use the Character Map to locate and select the appropriate symbol. Click **Start** > **All Programs** > **Accessories** > **System Tools** > **Character Map**. You can copy the symbol from the Character Map into a document.

Solving Touch Screen Problems

The touch screen on the HP ap5000 system is integrated into the system which is connected internally via PS/2 interface. There is no user connection required for this device.

If you encounter touch screen problems, see the common causes and solutions listed in the following table.

The Touch Screen does not respond.

Cause	Solution

Drivers not installed or corrupted.	1. HP does not provide FreeDOS drivers for the Touch Screen.
	
	2. Windows drivers:
	
	    a. Using an account with Administrator privileges Go to **Control Panel > Add/Remove Programs**.
	
	    b. Look for the touch screen drivers, HP Touchmon.
	
	    c. If the drivers are not installed, install them from the HP POS SW and DOC.ISO, available from http://www.hp.com.
	
	        NOTE: If Windows has loaded the device drivers for the touch screen there will be an HP icon in the system tray.
	
	    d. If the drivers are installed, remove them and re-install from a new copy.
	
	    e. If the problem persists, re-install Windows or use a known good installation of Windows to test the touch screen (try the hard drive from a system with a working touch screen).
	
	    f. Replace the Head Unit.

The Touch Screen does not respond as expected.

Cause	Solution
The touch screen requires calibration.	Calibrate the touch screen from **HP ap5000 Touch > HP Touchmon Calibration**.

Solving VFD (Vacuum Florescent Display) Problems

The VFD on the HP ap5000 system is connected via serial interface. When attached at the HP factory the VFD is installed on COM2 as the default location and COM2 is set to 5V mode. The HP ap5000 VFD can be connected either on COM2 or COM1 on the ap5000 unit; it cannot be used on COM3.

Windows operating system supports serial port COM1/COM2, so no extra drivers are needed to be installed.

If you encounter VFD problems, see the common causes and solutions listed in the following table.

No scrolling message on VFD when computer is powered on.

Cause	Solution
Serial port used to connect VFD is not configured properly or disabled.	Configure the serial port from F10 Setup: 1. From F10 Setup select **Advanced > Super I/O Configuration**. 2. Verify the settings for the serial port for the VFD. 3. Enable 5V for the serial port to which the VFD is attached. 4. Remember that you cannot use Serial port 3 for the VFD. 5. If problem persists, connect VFD to known good working system. 6. If VFD fails to work on known good working system, replace VFD.
VFD is plugged into incorrect serial port.	Plug VFD into correct serial port (refer to the port labels on the system): ● COM2 is adjacent to the printer port. ● COM1 is between the keyboard port and COM3 (COM3 cannot be used for the VFD).

VFD not responding as expected.

Cause	Solution
VFD not configured properly.	Test the VFD using the utilities pre-installed on the image: 1. To test the COM port, access the HP ap5000 VFD Windows Utility from **Star > HP Point of Sale Information > VFD for ap5000 > Windows Test Utility > HP ap5000 VFD Windows Utility**. 2. Select the COM port from the drop-down box or keep the default option; the ap5000 VFD is shipped by default on COM2 from the HP factory. 3. Click on the **Test** button once "Ready" appears in the status box. 4. Once the test is complete and passes, the VFD will display "Test OK" and the test utility will provide some status information and the test results.

Solving MSR (Magnetic Stripe Reader) Problems

The MSR on the HP ap5000 system is integrated into the system which is connected internally via serial interface; default is COM4. There is no user connection required for this device.

Windows operating system supports serial port COM4, so no extra drivers are needed to be installed.

If you encounter MSR problems, see the common causes and solutions listed in the following table.

MSR fails to read cards

Cause	Solution
Port configured improperly or disabled.	Verify COM4 configuration in F10 Setup: 1. From F10 Setup, select **Advanced > Super I/O Configuration**. 2. Verify the settings for the MSR Port.
Other problems.	Test the MSR using the utilities pre-installed on the image: 1. To test MSR functionality, access the HP ap5000 MSR Windows Test Utility from **Start > HP Point of Sale Information > MSR for ap5000 > Windows Test Utility > HP ap5000 MSR Windows Test Utility**. 2. Select the COM port from the drop-down box or keep the default option of "Auto" which will search for the ap5000 MSR device. Click on the **Test Mode** button to start the test. 3. When the "Test Mode" has been selected the COM port will appear and in the GUI title bar "(Test Mode)" will appear. At this point when one swipes a card in the ap5000 MSR, the data will appear in the test utility.

Solving Audio Problems

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

Table 4-6 Solving Audio Problems

Sound cuts in and out.

Cause	Solution
Processor resources are being used by other open applications.	Shut down all open processor-intensive applications.
Direct sound latency, common in many media player applications.	In Windows XP only: 1. From the **Control Panel**, select **Sounds and Audio Devices**. 2. On the **Audio** tab, select a device from the **Sound Playback** list. 3. Click the **Advanced** button and select the **Performance** tab. 4. Set the **Hardware acceleration** slider to **None** and the **Sample rate conversion quality** slider to **Good** and retest the audio. 5. Set the **Hardware acceleration** slider to **Full** and the **Sample rate conversion quality** slider to **Best** and retest the audio.

Sound does not come out of the speaker.

Cause	Solution
Software volume control is turned down.	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.
Audio is disabled in Computer Setup.	Enable the audio in Computer Setup: **Advanced** > **HD Audio**.
The external speakers are not turned on.	Turn on the external speakers.
The audio device may be connected to the wrong jack.	Ensure that the device is connected to the correct jack on the side I/O panel of the computer. The speaker jack is green; the microphone jack is pink.
Volume is muted.	1. From the **Control Panel** program, click **Sound, Speech and Audio Devices**, then click **Sounds and Audio Devices**. 2. Click the **Mute** check box to remove the check mark from the box.
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.

Solving Printer Problems

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

Table 4-7 Solving Printer Problems

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:\ > LPT1` 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 port is not properly configured or disabled in F10 Setup.	1. From F10 Setup, select **Advanced > Super I/O Configuration**. 2. Configure/enable the parallel port. 3. Test the printer on a known good system.
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.

Interpreting POST Diagnostic Front Panel LED and Beep Codes

This section covers the front panel LED and beeps codes that may occur before or during POST.

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 diagnostic lights and audible codes are available on all models.

Table 4-8 Diagnostic Front Panel LED and Beep Codes

Activity	Beeps	Possible Cause	Recommended Action
Green Power LED On.	None	Computer on.	None
Green Power LED flashes every two seconds.	None	Computer in Suspend to RAM mode (some models only) or normal Suspend mode.	None required. Press any key or move the mouse to wake the computer.
Red Power LED flashes two times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	2	Processor thermal protection activated: A fan may be blocked or not turning. OR The heatsink is not properly attached to the processor.	1. Ensure that the computer air vents are not blocked and the system cooling fan is running. 2. If fan is plugged in, but is not spinning, then replace the Head Unit.
Red Power LED flashes three times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	3	Processor not installed (does not indicate faulty processor).	1. Check to see that the processor is present. 2. Replace the Head Unit.
Red Power LED flashes four times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	4	Power failure (power supply is overloaded).	1. Check if a device is causing the problem by removing ALL attached devices. Power on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly. 2. Replace the power supply. 3. Replace the Head Unit.

Table 4-8 Diagnostic Front Panel LED and Beep Codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes five times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	5	Pre-video memory 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. 1. Reseat DIMMs. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the Head Unit.
Red Power LED flashes six times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	6	Pre-video graphics error.	Replace the Head Unit.
Red Power LED flashes seven times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	7	System board failure (ROM detected failure prior to video).	Replace the Head Unit.
Red Power LED flashes eight times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	8	Invalid ROM based on bad checksum.	1. Reflash the system ROM with the latest BIOS image. See the "Boot Block Emergency Recovery Mode" section of the *Desktop Management Guide* for more information. 2. Replace the Head Unit.

Red Power LED flashes nine times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	9	System powers on but is unable to boot.	1. Check if a device is causing the problem:
			
			  a. Remove all attached devices (hard drives, optical drives, printers, displays).
			
			  b. Power on the system.
			
			  c. If the system enters POST, power off and replace one device.
			
			  d. If system enters POST, power off and replace another device until the failure occurs.
			
			2. If the problem persists with all devices removed, replace the Head Unit.

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 setup and power-on passwords if they are set.

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

5   Serial ATA (SATA) Drive Guidelines and Features

SATA Hard Drives

Serial ATA Hard Drive Characteristics	
Drive voltages	3.3 V, 5 V, 12 V
Jumpers for configuring drive	N/A
Data transfer rate	3.0 Gb/s

NOTE: If an error is identified with a device upon boot up a POST error message may be displayed.

ATA SMART 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/Windows7	32 GB	2 TB
NTFS	ATA	Windows XP/Windows Vista/Windows7	2 TB	2 TB

6 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.

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 removed.

- 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.

- If using a washable USB keyboard, never immerse the USB connector.

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.

Service Considerations

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

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

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.

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 140ºF (60ºC). 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.

7 Removal and Replacement Procedures

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.

Removing the Bottom I/O Cover

To remove the bottom I/O cover, press downward on the two tabs at the top of the cover **(1)** and rotate the cover off **(2)**.

Figure 7-1 Removing the Bottom I/O Cover
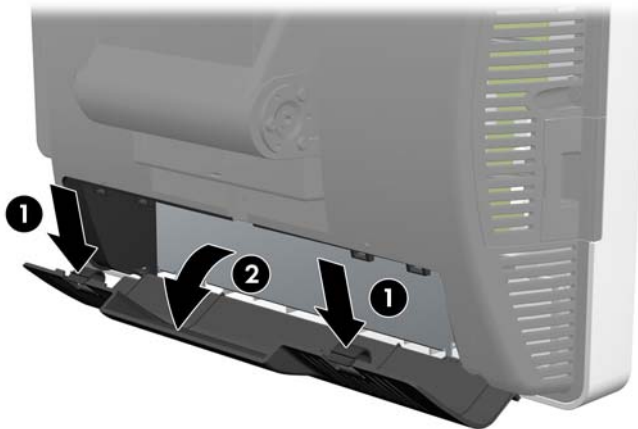
Removing the Side I/O Cover

To remove the side I/O cover, pull out on the center of the cover **(1)** and rotate the cover off **(2)**.

Figure 7-2 Removing the Side I/O Cover
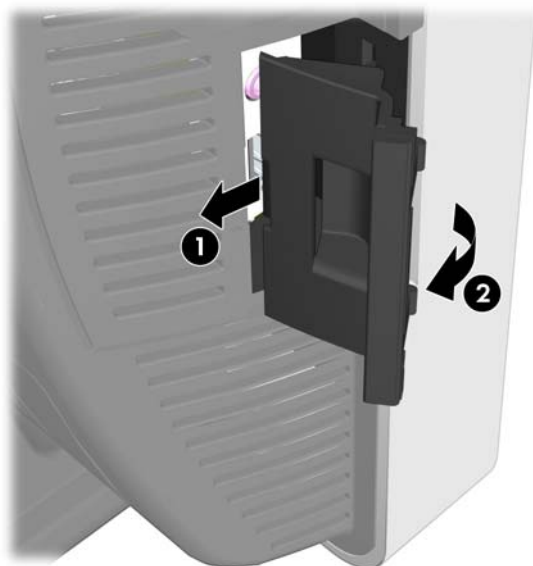
Removing the Drive Cover

To remove the drive cover, loosen the screw that holds the cover in place **(1)**, rotate the cover back **(2)**, and pull the cover off the display head **(3)**.

NOTE: The drive cover screw is captive, therefore it does not disengage from the drive cover when loosened.

Figure 7-3 Removing the Drive Cover
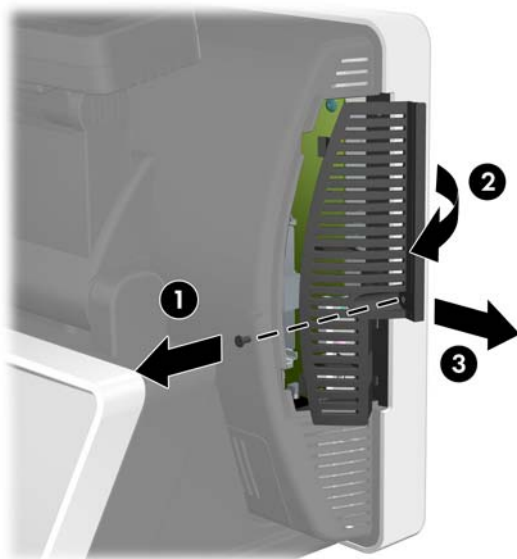
Routing Cables

When connecting peripherals to the bottom I/O panel, route the peripheral cables through the bottom of the base and out the center hole at the top of the base before connecting.

Figure 7-4 Routing Cables
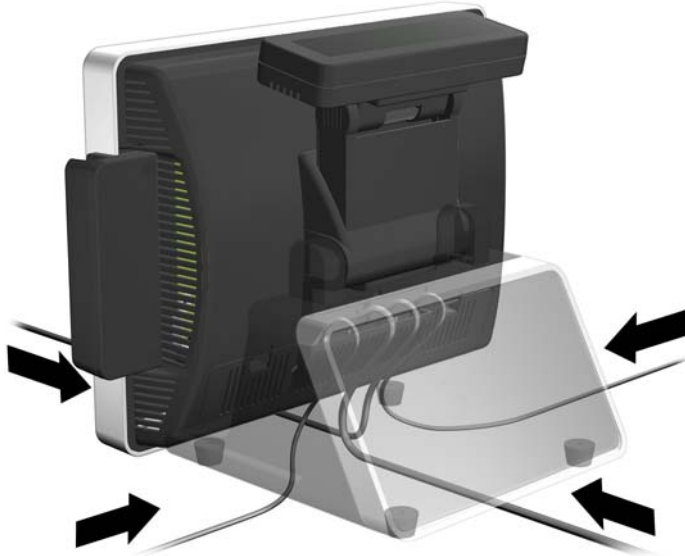
Adjusting the Tilt

The main touch screen display has a 90 degree tilt range. The VFD customer display has an 80 degree tilt range.

Figure 7-5 Adjusting the Touch Screen Display Tilt
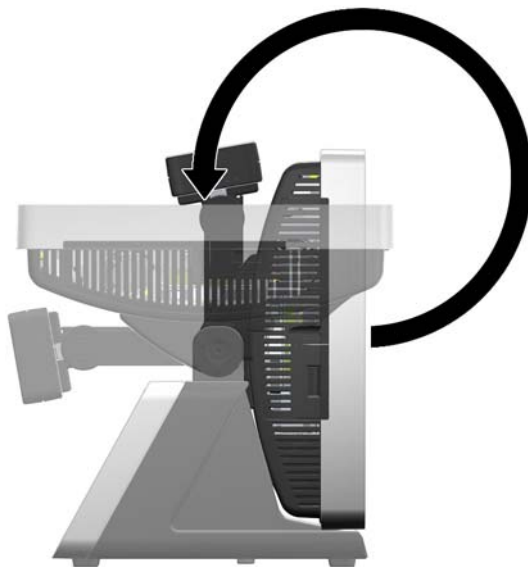
Figure 7-6 Adjusting the VFD Customer Display Tilt
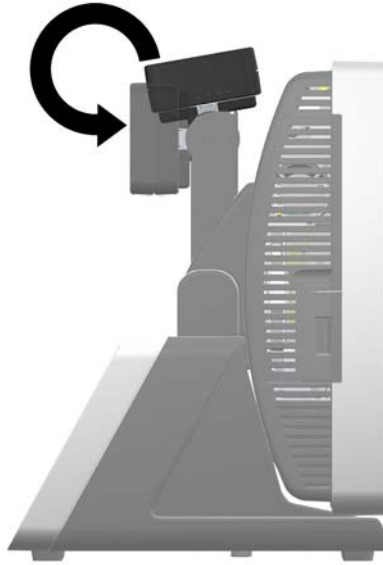
Using the Print Advertising Panel

This is a non-electrical panel.

NOTE: There is a clear protective film on the interior and exterior side of the panel that end-user must remove.

You can insert a print advertisement into the panel on the system's base. A print advertisement template is available on the system's hard drive.

1. Press inward on the two sides of the advertising panel **(1)** and pull the cover of the panel off the system's base **(2)**.

   Figure 7-7 Removing the Print Advertisement Panel Cover
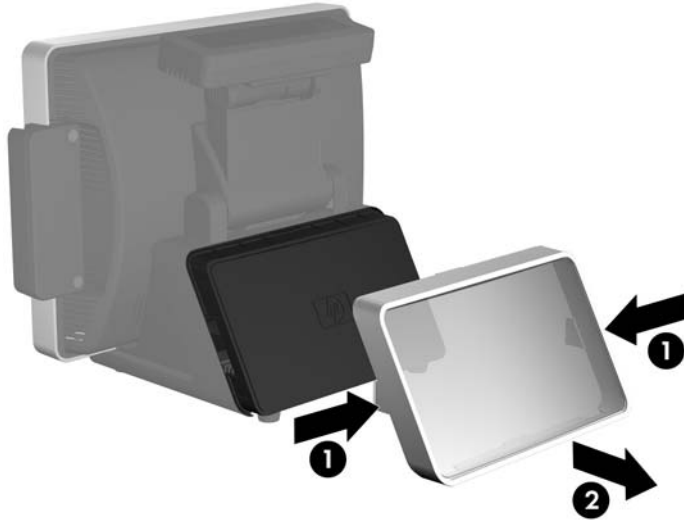
2. Insert a print advertisement behind the panel cover.

   📝 **NOTE:** A print advertisement panel template is available on the system's hard drive. In Windows XP or Windows Embedded POSReady 2009, select **Start** > **All Programs** > **HP Point of Sale Information** to access the template. In Windows 7, select **Start** > **HP Point of Sale Information** to access the template.

3. Replace the panel cover by pressing it straight onto the base.

   Figure 7-8 Replacing the Print Advertisement Panel Cover

Installing an HP/Kensington MicroSaver Security Cable Lock

1. Remove the bottom I/O cover (see).

2. Install the cable lock into the lock slot on the bottom I/O panel.

   Figure 7-9 Installing an HP/Kensington MicroSaver Security Cable Lock
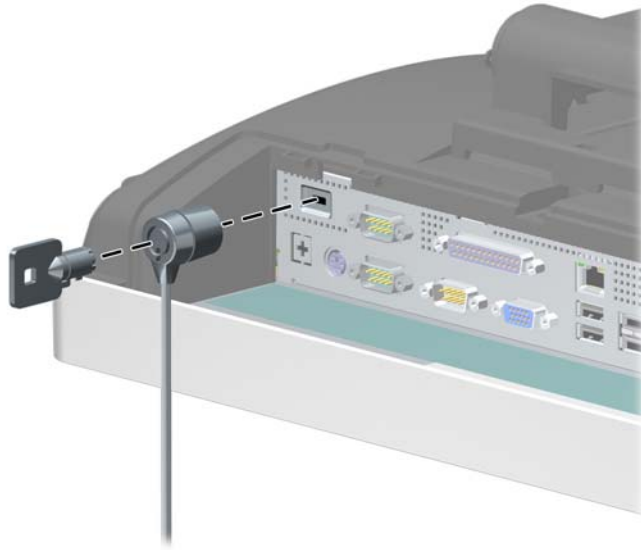
3. Replace the bottom I/O cover.

Removing and Replacing the VFD Customer Display

The VFD is the two-line customer facing vacuum fluorescent display.

NOTE: The VFD default setting is in COM 1. You can use BIOS to configure the VFD to work in COM 2.

If the VFD is not working, make sure it is connected to a working COM port. Use BIOS to determine the correct COM port.

1. Turn off the computer properly through the operating system, then turn off any external devices.

2. Disconnect the power cord from the power outlet.

△ **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. You must disconnect the power cord to avoid damage to the internal components of the computer.

3. Remove the bottom I/O cover (see).

4. Unplug the VFD customer display's serial cable from the I/O panel.

5. Remove the plastic VFD hinge bracket cover by pulling outward on both upper sides of the cover **(1)** then sliding the cover straight back and off the hinge bracket **(2)**.

Figure 7-10 Removing the VFD Hinge Bracket Cover
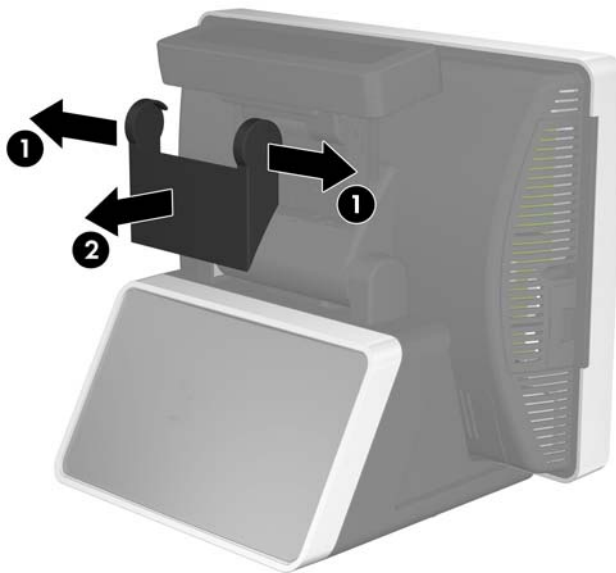
6. Remove the two screws below the display screen **(1)** and slide the display off the system **(2)**.

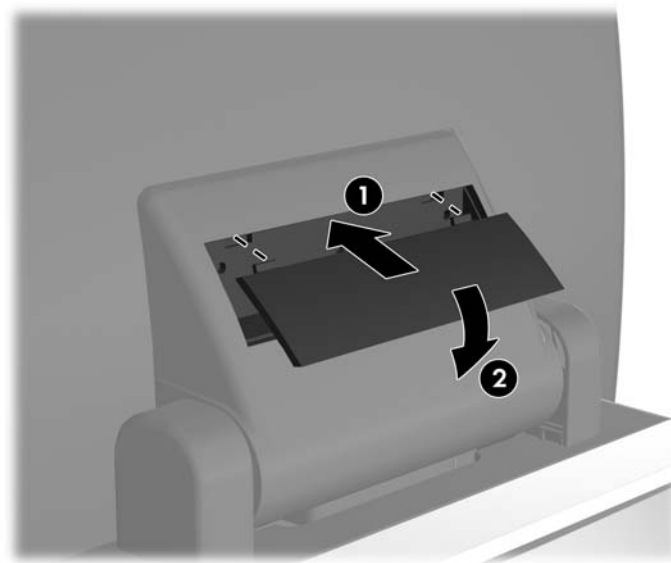**Figure 7-11** Removing the VFD Customer Display
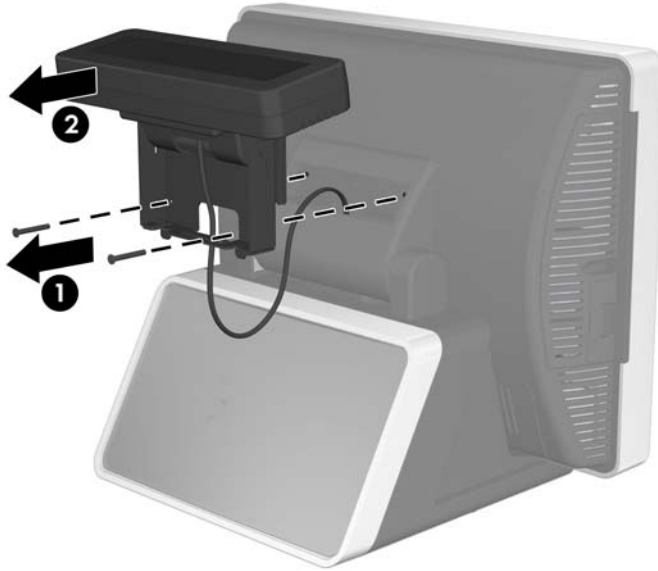
7. Route the serial cable of the new display through the center hole in the hinge area and connect the cable to the same COM port on the I/O panel that was used for the old display.

**NOTE:** If you are replacing the VFD customer display with an LCD customer display, connect the VGA cable of the LCD customer display to the VGA connector on the I/O panel.

8. If you are removing but not replacing the customer display, cover the slot for the display with the customer display cover provided with the system. Slide the top of the cover in first **(1)** then press the bottom of the cover in place **(2)**.

Figure 7-12 Covering the VFD Customer Display Slot

9. If you are replacing the VFD customer display, slide the new customer display into the slot on the hinge **(1)** and insert the two screws that secure it in place **(2)**.

Figure 7-13 Replacing the VFD Customer Display
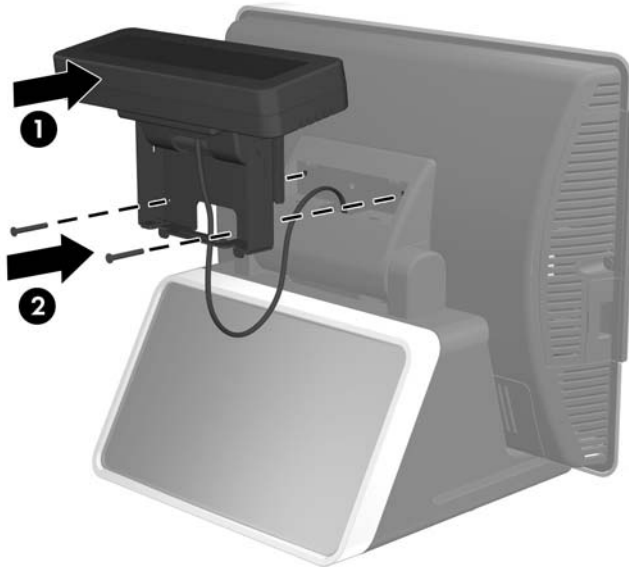
10. Attach the hinge bracket cover by placing the upper sides of the cover over the sides of the bracket **(1)** then pressing the bottom of the cover onto the bracket so that it snaps in place **(2)**.

Figure 7-14 Replacing the VFD Hinge Bracket Cover
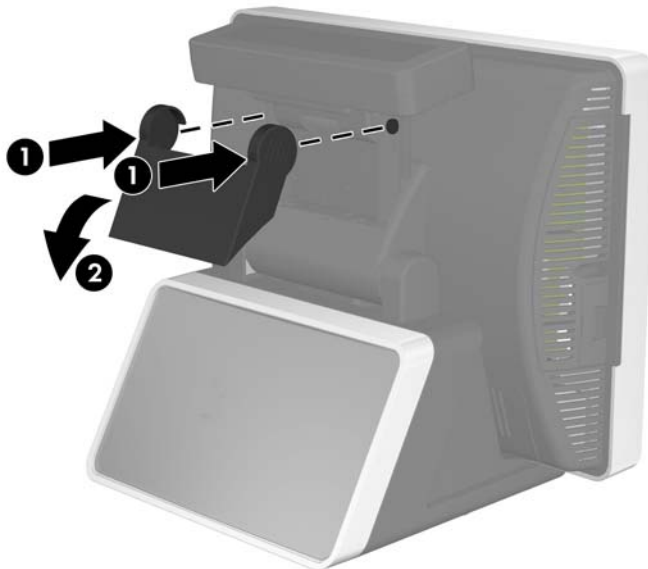
11. Replace the bottom I/O cover.

12. Reconnect the power cord and press the power button.

13. Configure the new customer display (refer to Configuring the MSR and VFD Customer Display on page 62).

Removing and Replacing the Hard Drive

△ **CAUTION:** 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.

1. Turn off the computer properly through the operating system, then turn off any external devices.

2. Disconnect the power cord from the power outlet.

   △ **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. You must disconnect the power cord to avoid damage to the internal components of the computer.

3. Remove the drive cover (see Removing the Drive Cover on page 43).

4. Grasp the plastic tab attached to the hard drive and pull the hard drive out of the bay,
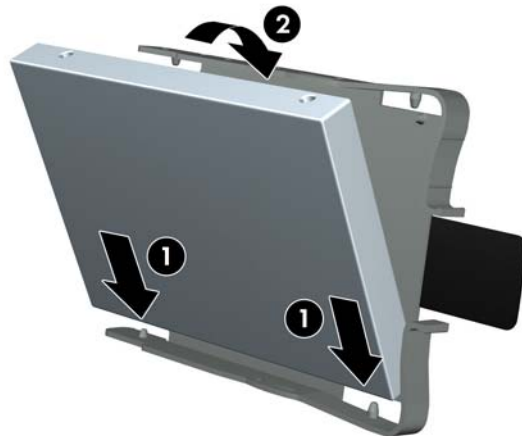
   Figure 7-15 Removing the Hard Drive
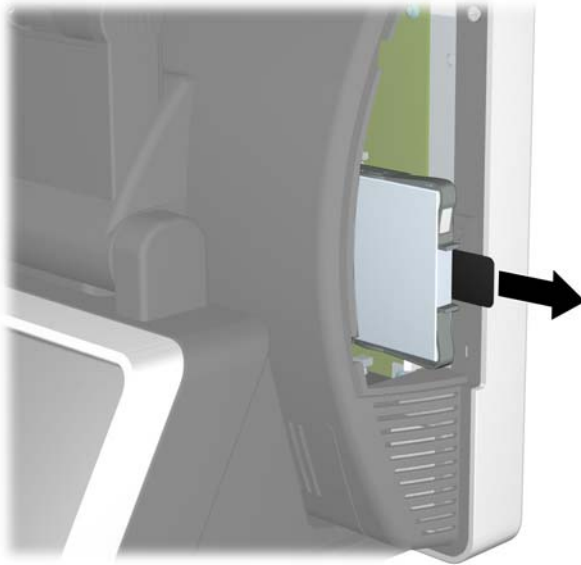
5. To remove the hard drive from the plastic carrier, pull up on the two ends on one side of the carrier **(1)** and rotate the drive out of the carrier **(2)**.

Figure 7-16 Removing the Hard Drive from the Carrier
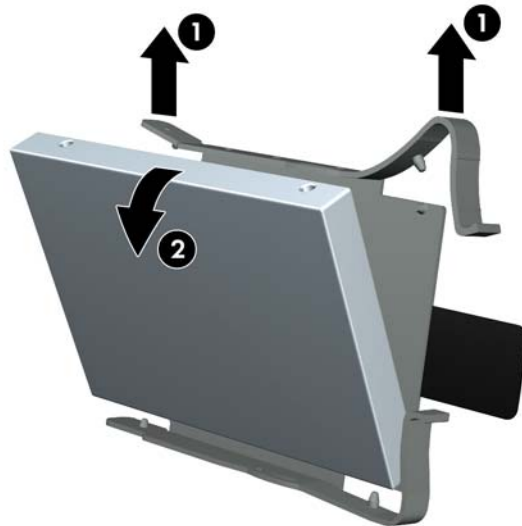
6. To insert the new drive in the carrier, hold the drive at a slight angle and place one side of the hard drive in the carrier **(1)**, then press the other side straight down into the carrier **(2)**.

Figure 7-17 Placing the Hard Drive in the Carrier

7. To replace the hard drive, slide the drive firmly into the bay with the end of the drive that has the connector going in first.

Figure 7-18 Replacing the Hard Drive

8. Replace the drive cover.

9. Reconnect the power cord and press the power button.

Removing and Replacing the Power Supply

1. Turn off the computer properly through the operating system, then turn off any external devices.

2. Disconnect the power cord from the power outlet.

   △ **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. You must disconnect the power cord to avoid damage to the internal components of the computer.

3. Tilt the touch screen all the way back to its horizontal position and lay the unit face down on a soft, clean, dry cloth to avoid scratching the touch screen.

4. Remove the bottom I/O cover (see Removing the Bottom I/O Cover on page 42).

5. Unplug the power cord from the connector on the I/O panel.

6. Loosen the thumbscrew that secures the power supply bracket to the bottom of the unit **(1)**, then slide the bracket to the side and lift the bracket off the unit **(2)**.

   📝 **NOTE:** The power supply bracket screw is captive, therefore it does not disengage from the bracket when loosened.

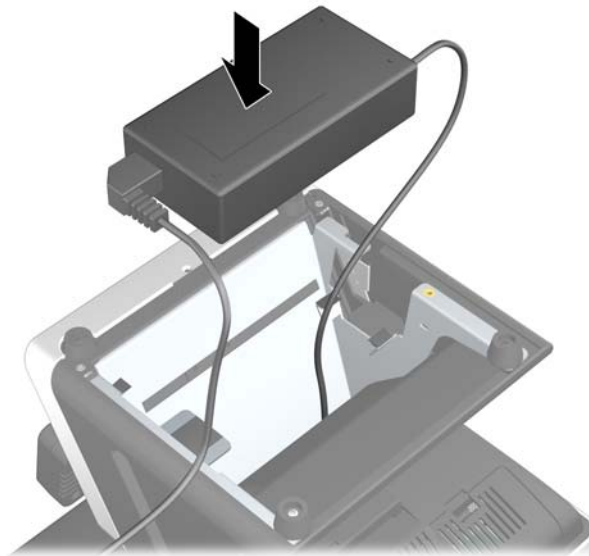   **Figure 7-19** Removing the Power Supply Bracket
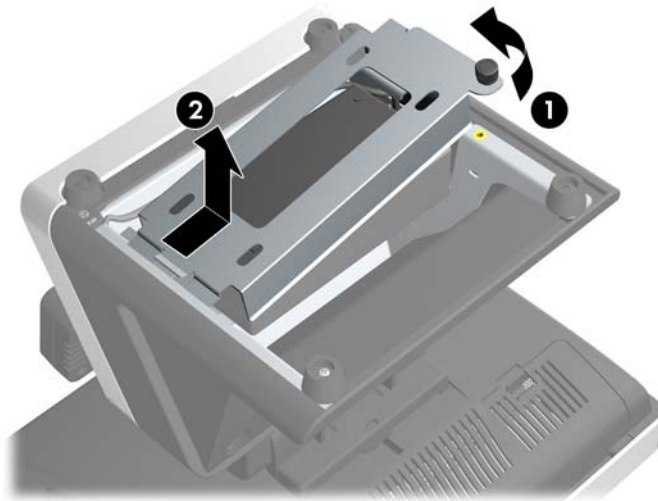
7.   Lift the power supply and its cables out of the base of the unit.

**Figure 7-20** Removing the Power Supply
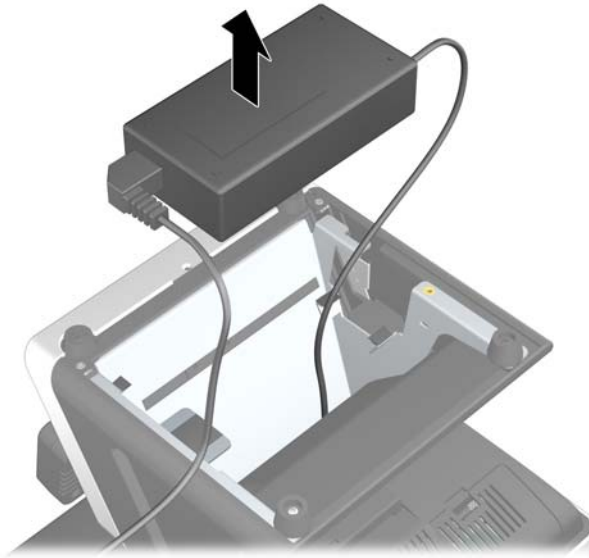
8.   Connect the external power cord to the power supply.

9.   Route the circular end of the power cord through the hole at the top of the base and connect the power cord to the power connector on the bottom I/O panel.

10.   Place the power supply into the base so that it is sitting on the metal tabs inside the base.

Figure 7-21 Replacing the Power Supply

11. Replace the power supply bracket by sliding the slotted end into frame **(1)** and tightening the thumbscrew **(2)**.

Figure 7-22 Replacing the Power Supply Bracket
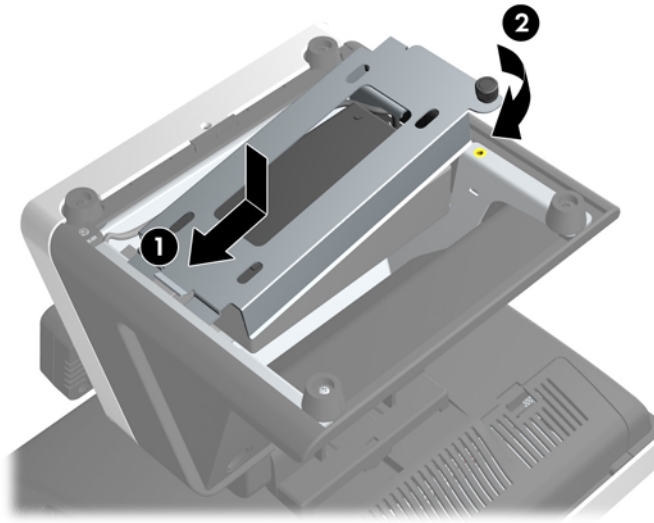
12. Replace the bottom I/O cover.

13. Turn the unit over and onto its base.

14. Plug the power cord into an electrical outlet and press the power button.

Removing the Magnetic Strip Reader (MSR)

The MSR is located on the side of the display head.

1. Turn off the computer properly through the operating system, then turn off any external devices.

2. Disconnect the power cord from the power outlet.

△ **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.

3. Unplug all peripherals from the side I/O panel.

4. Remove the drive cover (see Removing the Drive Cover on page 43).

5. Remove the bottom I/O cover (see Removing the Bottom I/O Cover on page 42).

6. Unplug the power cord and all peripherals from the bottom I/O panel.

7. Tilt the touch screen all the way back to its horizontal position and lay the unit face down on a soft, clean, dry cloth to avoid scratching the touch screen.

8. To remove the MSR, remove the two screws covers and screws that attach the MSR to the display head **(1)**, lift the MSR off the display head **(2)**, and unplug the cable attached to the underside of the MSR **(3)**.

Figure 7-23 Removing the MSR
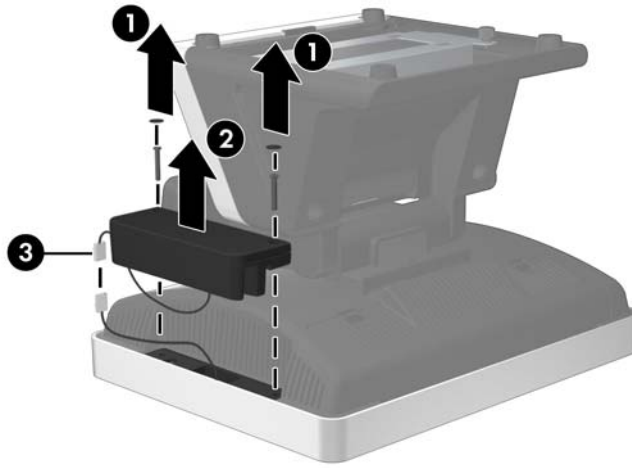
Reverse these procedures to install the MSR.

NOTE: Be sure to replace the screw covers when replacing the MSR.

Installing Additional Memory

The computer comes with double data rate 2 synchronous dynamic random access memory (DDR2-SDRAM) dual inline memory modules (DIMMs).

DIMMs

The memory sockets on the system board can be populated with up to two 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 4-GB of memory.

DDR2-SDRAM DIMMs

For proper system operation, the DDR2-SDRAM DIMMs must be:

● industry-standard 240-pin

● unbuffered PC2-5300 667 MHz-compliant or PC2-6400 800 MHz-compliant

● 1.8 volt DDR2-SDRAM DIMMs

The DDR2-SDRAM DIMMs must also:

● support CAS latency 5 DDR2 667 Mhz (5-5-5 timing), CAS latency 5 DDR2 800 Mhz (5-5-5 timing), and CAS latency 6 DDR2 800 Mhz (6-6-6 timing)

● contain the mandatory JEDEC SPD information

In addition, the computer supports:

- 512Mbit and 1Gbit 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 start if you install unsupported DIMMs.

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.

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. For more information, refer to Electrostatic Discharge Information on page 35.

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

The memory modules are located on the system board behind the touch screen. You must remove the drive cover, remove the MSR, and disassemble the touch screen display head to access the memory.

1. Turn off the computer properly through the operating system, then turn off any external devices.

2. Disconnect the power cord from the power outlet.

   ⚠ **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.

3. Unplug all peripherals from the side I/O panel.

4. Remove the drive cover (see Removing the Drive Cover on page 43).

5. Remove the bottom I/O cover (see Removing the Bottom I/O Cover on page 42).

6. Unplug the power cord and all peripherals from the bottom I/O panel.

7. Remove the MSR (see Removing the Magnetic Strip Reader (MSR) on page 56).

8. Tilt the touch screen all the way back to its horizontal position and lay the unit face down on a soft, clean, dry cloth to avoid scratching the touch screen.

9. Remove the five screws that secure the display head to the display head housing. Two of the screws are located under the bottom I/O cover. The third screw is located under the drive cover. The fourth screw is located under the MSR. The fifth screw is located below the touch screen hinge.

NOTE: Some models may have only four screws. The center screw shown below may not be included.

Figure 7-24 Removing the Display Head Screws
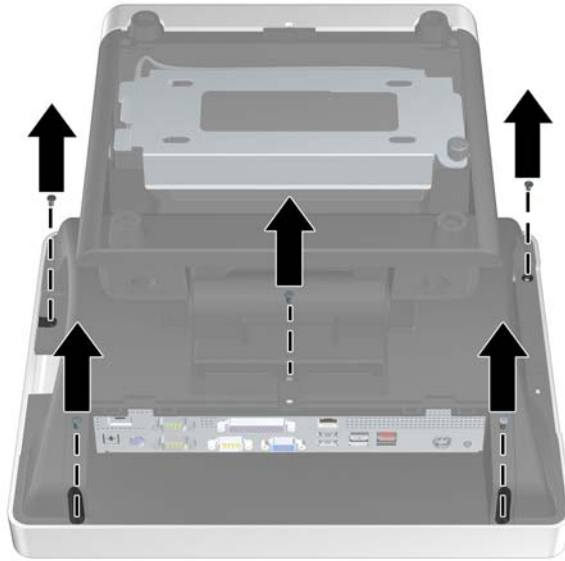
10. Lift the bottom side of the display head housing (where the two screws were removed) off the touch screen **(1)**, then lift the top side off the housing off the touch screen **(2)**.

Figure 7-25 Removing the Display Head

11. 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.

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

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

13. 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)**.

    Figure 7-26 Installing a DIMM
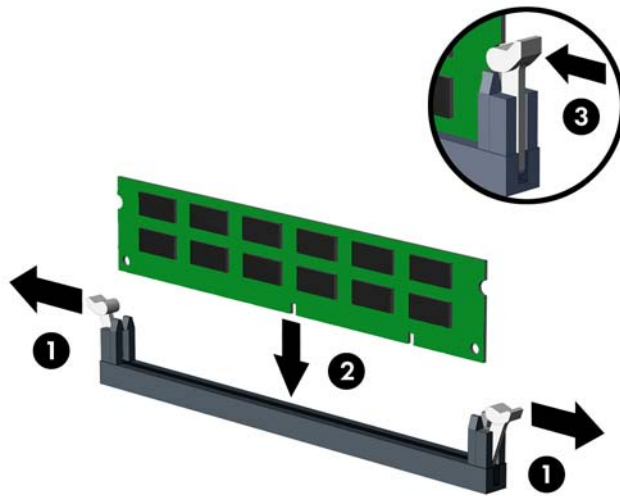
14. Repeat steps 12 and 13 to install any additional modules.

15. Reassemble the unit.

8 Configuring the Software

Calibrating the Touch Screen

After the operating system is installed, you will need to calibrate the touch screen.

NOTE: You may want to connect a mouse (not included) to the system for this procedure.

1. Launch the TouchMon utility by right-clicking on the TouchMon icon in the system tray and selecting **4 points calibration** or selecting **Start** > **All Programs** > **HP Touch** > **HP TouchMon Calibration**.

2. When you see a red circle in the corner of the screen, touch the center of the circle with your finger and continue touching it until the progress counter changes to **OK**. A new red circle will then appear in another corner of the screen.

3. Repeat Step 2 for each corner of the screen. When the process is complete, the utility will close and return you to the Windows desktop.

Configuring the COM Port for the VFD Customer Display

You can connect the VFD customer display to either the COM1 port or the COM2 port. The COM port must be configured for 5 volts in the Computer Setup utility for the VFD customer display to function properly. The VFD is connected to the COM2 port from the factory and the COM2 port is already configured for 5 volts.

NOTE: Do not connect the VFD customer display to the COM3 port.

1. Press the power button to turn off the computer.

2. Press the power button again to turn on the computer and press the F10 key before the system boots to the operating system to enter the Computer Setup utility.

3. Note which COM port (COM1 or COM2) on the rear panel is connected to the VFD customer display.

4. In the Computer Setup utility, go to **Advanced** > **Super IO Configuration** > **Serial Port1 Standard Mode/5V** or **Serial Port2 Standard Mode/5V** and change the setting to **5 V**.

    NOTE: If you set the **Serial Port2 Standard Mode/5V** port to **5 V**, you must set the **Serial Port1 Standard Mode/5V** to **Standard Mode**. Likewise, if you set the **Serial Port1 Standard Mode/5V** port to **5 V**, you must set the **Serial Port2 Standard Mode/5V** to **Standard Mode**.

5. In the Computer Setup **Exit** menu, select **Save Changes & Exit**.

Configuring the MSR and VFD Customer Display

To configure the MSR and VFD, refer to the *HP Point of Sale Configuration Guide* (available in English only). The guide is available on the system's hard drive. In Windows XP or Windows Embedded POSReady 2009, select **Start** > **All Programs** > **HP Point of Sale Information** to access the guide. In Windows 7, select **Start** > **HP Point of Sale Information** to access the guide.

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.

Keyboard

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

Ethernet RJ-45

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

Serial Interface, Powered and Non-Powered

Connector and Icon	Pin	Signal
	1	Carrier Detect (5V or 12V if powered)
	2	
		Receive Data
	3	
		Transmit Data
	4	Data Terminal Ready
	5	Signal Ground
	6	Data Set Ready
	7	Request to Send
	8	Clear to Send
	9	Ring Indicator (5V or 12V if powered)

Parallel Interface

Connector and Icon

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

USB

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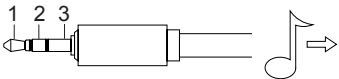
Powered USB

Connector and Icon		Pin	Signal
		Left side	
		1	+5 VDC
		2	- Data
		3	+ Data
		4	Ground
		Right side	
		24V	2A, 48W

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

Monitor

Connector and Icon
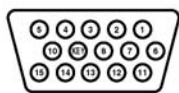
Pin	Signal	Pin	Signal
1	Red Analog	9	+5V (fused)
2	Green Analog	10	Ground
3	Blue Analog	11	19V when the 10.4" LCD is detected, 0V when a standard monitor is detected
4	19V when the 10.4" LCD is detected, 0V when a standard monitor is detected	12	DDC Serial Data
5	Ground	13	Horizontal Sync
6	Ground	14	Vertical Sync
7	Ground	15	DDC Serial Clock
8	Ground		

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   Passwords and CMOS

Clearing CMOS

You cannot clear the CMOS on the HP ap5000 POS because you cannot remove the battery. However, can change default settings in the F10 Setup Utility.

To reset all the Setup options to default values, including options for Ctrl+F10, press F9, or enter F10 Setup mode and select **Load Defaults** from the **Exit** menu.

NOTE: This does not include updates to system date, system time, supervisor password, or user password.

Clearing passwords

If a user has configured a power-on or setup password using the BIOS and then loses the password, the user cannot access the BIOS in order to change or clear the password.

In this event, to clear the power-on or setup passwords—or to disable the power-on or setup password feature—the user needs to perform the following action:

▲   Before the HP logo displays, press Ctrl+Alt+P at the start of the POST stage.

D   POST Diagnostic Front Panel LEDs and Audible Codes

Many pre-video conditions on the HP ap5000 POS System can easiliy be diagnosed through various beep and LED codes. The beep and LED blinks repeat for five cycles. Thereafter, only the LED blinks will continue repeating.

⚠ **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 D-1 Diagnostic Front Panel LEDs and Audible Codes

Activity	Beeps	Possible Cause	Recommended Action	
Green Power LED On.	None	Computer on.	None	
Red Power LED flashes two times, once every second, followed by a two second pause.	2	Processor thermal protection activated: A fan may be blocked or not turning. OR The heatsink/fan assembly is not properly attached to the processor.	1.	Ensure that the computer air vents are not blocked and the processor cooling fan is running.
			2.	Open hood, press power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header.
			3.	If fan is plugged in, but is not spinning, then replace heatsink/fan assembly.
			4.	Contact an authorized reseller or service provider.
Red Power LED flashes three times, once every second, followed by a two second pause.	3	Processor not installed (not an indicator of bad processor).	1.	Check to see that the processor is present.
			2.	Reseat the processor.

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes four times, once every second, followed by a two second pause.	4	Power failure (power supply is overloaded).	1. Open the hood and ensure the 4 or 6-wire power supply cable is seated into the connector on the system board. 2. Check if a device is causing the problem by removing ALL attached devices (such as hard, diskette, or optical drives, and expansion cards). Power on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly. 3. Replace the power supply. 4. Replace the system board.
Red Power LED flashes five times, once every second, followed by a two second pause.	5	Pre-video memory 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. Make sure a DIMM is installed in the black DIMM connector first if there is only one DIMM in the system. 3. Replace third-party memory with HP memory. 4. Replace the system board.
Red Power LED flashes six times, once every second, followed by a two second pause.	6	Pre-video graphics error.	For systems with a graphics card: 1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board. For systems with integrated graphics, replace the system board.
Red Power LED flashes seven times, once every second, followed by a two second pause.	7	System board failure (ROM detected failure prior to video).	Replace the system board.

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes eight times, once every second, followed by a two second pause.	8	Invalid ROM based on bad checksum.	1. Reflash the system ROM with the latest BIOS image. 2. Replace the system board.
Red Power LED flashes nine times, once every second, followed by a two second pause.	9	System powers on but is unable to boot.	1. Check that the voltage selector, located on the rear of the power supply (some models), is set to the appropriate voltage. Proper voltage setting depends on your region. 2. Unplug the AC power cord from the computer, wait 30 seconds, then plug the power cord back in to the computer. 3. Replace the system board. 4. Replace the processor.

E   Backup and Recovery

Recovery after a system failure is as complete as your most current backup. You should create your initial backup immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

The backup and recovery tool used depends on which Microsoft Windows operating system is installed on your computer. Systems shipped without a Microsoft operating system may not include backup and recovery tools.

NOTE: For more detailed information on backup and recovery, refer to the *Troubleshooting Guide*.

Microsoft Windows 7 Backup and Recovery

In Microsoft Windows 7, use Windows Backup and Restore to back up individual files and folders, back up your entire hard drive (select models only), create system repair discs (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

To create a backup using Backup and Restore or to recover information you previously backed up, follow these steps:

1.   Select **Start > All Programs > Maintenance > Backup and Restore**.

2.   Follow the on-screen instructions to set up your backup, create a system image (select models only), create a system repair disc (select models only), or to do a recovery of your system settings, computer image, or files that were previously backed up.

You can also use the F11 recovery tool to restore your original factory hard drive image. Refer to .

Microsoft Windows Vista Backup and Recovery

In Microsoft Windows Vista, use the Backup and Restore Center to back up individual files and folders, back up your entire hard drive (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

To create a backup using the Backup and Restore Center or to recover information you previously backed up, follow these steps:

1.   Select **Start > All Programs > Maintenance > Backup and Restore Center**.

2.   Follow the on-screen instructions to back up your entire computer (select models only) or your files, or to recover your entire computer or your files.

You can also use the F11 recovery tool to restore your original factory hard drive image. Refer to Using F11 Recovery on page 74.

Microsoft Windows XP Backup and Recovery

In Microsoft Windows XP, use HP Backup and Recovery Manager to back up individual files and folders, back up the entire hard drive, create recovery points, or create a recovery disc set. In case of system failure, you can use the backup files to restore the contents of your computer.

NOTE: HP Backup and Recovery is only available on some models with Windows XP. It is not included with all Windows XP systems.

To create a backup using HP Backup and Recovery Manager or to recover information you previously backed up, follow these steps:

1. Select **Start > HP Backup and Recovery > HP Backup and Recovery Manager**.

2. Follow the on-screen instructions to create a recovery disc set, back up your entire computer or your files, or to recover your entire computer or your files.

The HP Backup and Recovery provides two basic recovery methods. The first, recovery of files and folders, operates in Windows. The second, PC Recovery, requires a reboot to the recovery partition or from the recovery disc set. To reboot to the recovery partition, press F11 at startup when you see the message **Press F11 for Emergency Recovery**.

Using F11 Recovery

NOTE: The F11 recovery feature is only available for Microsoft Windows XP, Windows Vista, and Windows 7 operating systems. It is not available for POSReady or FreeDOS operating systems.

CAUTION: Using F11 completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The F11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using F11, follow these steps:

1. If possible, back up all personal files.

2. If possible, check for the presence of the HP Recovery partition: select **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

    NOTE: If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7, Windows Vista, or Windows XP operating system DVD and the *Driver Recovery* disc (both purchased separately on some models).

3. If the HP Recovery partition is listed, restart the computer, and then press F11 as soon as the "Press <F11> for recovery" message is displayed on the screen.

4. Follow the on-screen instructions.

F   Hewlett-Packard Vision Diagnostics (Windows systems)

> **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 diskette or 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 (Windows systems)

To access HP Vision Diagnostics, you must burn the utility onto a CD or copy it onto a USB flash drive then boot to the CD or USB flash drive. 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 77 for more information.

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

If you have already downloaded HP Vision Diagnostics to either a CD or USB Flash drive, then begin the following procedure at step 4.

1. Connect a keyboard (not included) and mouse (not included) to the system.

2. Connect an external optical drive (not included) to the system or insert a USB flash drive (not included) to the system.

3. In Windows Explorer, go to **C:\SWSetup\ISOs** and burn the file **Vision Diagnostics.ISO** to a CD or copy it to a USB flash drive.

4. While the computer is on, insert the CD in the Optical Drive or USB flash drive in a USB port on the computer.

5. Shut down the operating system and turn off the computer.

6. 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 or to the USB flash drive, you may need to change the boot order in the Computer Setup (F10) utility. Refer to the *Maintenance and Service Guide* (available in English only) for more information.

7. 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.

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

9. 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.

Downloading the Latest Version of HP Vision Diagnostics

1. Go to http://www.hp.com.

2. Select the **Support & 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. Select the **Diagnostic** link.

8. Select the **Hewlett-Packard Vision Diagnostics** link.

9. Select the **Download** button.

NOTE: The download includes instructions on how to create the bootable CD or the bootable USB flash drive.

G Specifications

Table G-1 Specifications

Desktop Dimensions (in the desktop position)		
Height	17.16 in	43.6 cm
Width	13.86 in	35.2 cm
Depth	18.98 in	48.2 cm
(depth will increase if the computer is equipped with a port security bracket)		
Approximate Weight	24.36 lb	11.05 kg
Temperature Range (values subject to change with increasing altitude above sea level)		
Operating	50° to 104° F	10° to 40° C
Nonoperating	-22° to 140° F	-30° to 60° C
Relative Humidity (at noncondensing ambient temperature)		
Operating	20-85%	20-85%
Nonoperating	5-90%	5-90%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3,048 m
Nonoperating	30,000 ft	9,144 m
Electrical Ratings	90 to 264 V ac	90 to 264 V ac
	47 to 63 Hz	47 to 63 Hz

Standard Operating Power	230 V/50 Hz	230 V/50 Hz
	Idle (Monitor on)–47.3 W	Idle (Monitor on)–47.3 W
	Idle (Monitor off)–36.7 W	Idle (Monitor off)–36.7 W
	Burnin Test V5.3–77.82 W	Burnin Test V5.3–77.82 W
	3DMark06–80.34 W	3DMark06–80.34 W
	115 V/50 Hz	**115 V/50 Hz**
	Idle (Monitor on)–46.93 W	Idle (Monitor on)–46.93 W
	Idle (Monitor off)–31.97 W	Idle (Monitor off)–31.97 W
	Burnin Test V5.3–74.51 W	Burnin Test V5.3–74.51 W
	3DMark06–80.82 W	3DMark06–80.82 W
Power Supply	130 W	
NOTE: An HP high-efficiency power supply—in conjunction with a select range of processors and modules—is a requirement for ENERGY STAR qualification.	Active PFC power supply; no line switching required	

[1] This system utilizes an active power factor corrected external power supply. This allows the system to pass the CE mark requirements for use in the countries of the European Union. The active power factor corrected power supply also has the added benefit of not requiring an input voltage range select switch.

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