HP Z2 Mini G3 Workstation

User Guide

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About this guide

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.

This guide provides setup and basic troubleshooting information for the workstation. It includes these topics:

Guide topics
Locating HP resources on page 1
Workstation features on page 5
Setting up the workstation on page 10
Setting up, backing up, restoring, and recovering Windows 10 on page 19
Setting up, backing up, restoring, and recovering Windows 7 on page 28
Setting up Linux on page 33
Updating the workstation on page 37
Diagnostics and minor troubleshooting on page 39
Using HP PC Hardware Diagnostics (UEFI) on page 44
Routine Care on page 46

TIP: If you do not find what you are looking for in this guide:

- Find technical details in the *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.
- View removal and replacement videos at http://www.hp.com/go/sml.
- Go to http://www.hp.com/go/workstations for additional information on your workstation.

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1 Locating HP resources

This section provides information on the following resources for your HP Workstation:

- Product information
- Support
- Product documentation
- Product diagnostics
- Product updates

Product information

Topic	Location
Technical specifications	To find the QuickSpecs for your product, go to http://www.hp.com/go/quickspecs. Click the link for the HP Inc. QuickSpecs experience. Click **Search all QuickSpecs**, type your model name in the search field, and then click **Go**.
Regulatory, safety and environmental notices	Refer to the *Regulatory, Safety and Environmental Notices* for product regulatory information. You can also refer to the regulatory label on the workstation chassis.
Accessories	For complete and current information on supported accessories and components, go to http://www.hp.com/go/workstations.
System board	A diagram of the system board is located on the inside of the chassis (all-in-one configuration). Additional information is located in the workstation *Maintenance and Service Guide* on the Web at http://www.hp.com/support/workstation_manuals.
Serial number, Agency/ Environmental, and operating system labels	The serial number, Agency/Environmental, and operating system labels are on the rear panel of the workstation.

Support

Topic	Location
Product support	For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. Here you can access the following types of support: • Chat online with an HP technician • Obtain email support • Find support telephone numbers • Locate an HP service center
Warranty information	To locate base warranty information, go to http://www.hp.com/support/warranty-lookuptool. To locate an existing Care Pack, go to http://www.hp.com/go/lookuptool. To extend a standard product warranty, go to http://h20565.www2.hp.com/hpsc/wc/public/home and make your selection from the **Related Links**. HP Care Pack Services offer upgraded service levels to extend and expand a standard product warranty. You can find your HP Limited Warranty located with the user guides on your product and/or on the CD or DVD provided in the box. In some countries or regions, HP may provide a printed warranty in the box. For countries or regions where the warranty is not provided in printed format, you can request a copy from http://www.hp.com/go/orderdocuments. For products purchased in Asia Pacific, you can write to HP Inc. at POD, P.O. Box 161 Kitchener Road Post Office, Singapore 912006 Include your product name, and your name, phone number, and postal address.

Product documentation

Topic	Location
HP user documentation, white papers, and third-party documentation	User documentation is located on your hard drive. On Windows® 10, select **Start**, select **All Apps**, select **HP**, and then select **HP Documentation**. On Windows 7, select **Start**, select **HP Help and Support**, and then select **HP Documentation**. For the latest online documentation, go to http://www.hp.com/support/workstation_manuals. The documentation incudes this user guide and the *Maintenance and Service Guide*.
Removal and replacement videos	To learn how to remove and replace workstation components, go to http://www.hp.com/go/sml.
Product notifications	Subscriber's Choice is an HP program that allows you to sign up to receive driver and software alerts, proactive change notifications (PCNs), the HP newsletter, customer advisories, and more. Sign up at http://www.hp.com/go/subscriberschoice.
Technical specifications	The Product Bulletin contains QuickSpecs for HP Workstations. QuickSpecs include information about the operating system, power supply, memory, CPU, and many other system components. To access the QuickSpecs, go to http://www.hp.com/go/quickspecs/.
Customer Advisories, Security Bulletins, and Notices	To find advisories, bulletins, and notices: 1. Go to http://www.hp.com/go/workstationsupport. 2. Select the desired product. 3. Under the Knowledge Base heading, use the scroll bar to select **Advisories, Bulletins & Notices**.

Product diagnostics

Topic	Location
Windows diagnostics tools	The UEFI Diagnostics utility is preinstalled on select Windows workstations. For additional information, see the workstation *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.
Audible beep and light code definitions	See the workstation *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.
POST error codes	See the workstation *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.

Product updates

Topic	Location
Driver and BIOS updates	Go to http://www.hp.com/go/workstationsupport to verify that you have the latest drivers for the workstation. To determine the current workstation BIOS on your workstation, follow these steps during system startup: 1. Turn on the workstation, and press Esc during startup (boot). 2. Press F10 to enter Computer Setup (F10). 3. Go to **Main**, and then select **System Information**. Note the System BIOS version and date and compare it with the BIOS versions that appear on the HP website. In Windows 7, you can also find the BIOS version number by following these steps: 1. Go to **Start**, select **All Programs**, select **Accessories**, select **System Tools**, and then select **System Information**. 2. In the right pane, find the line with **BIOS Version/Date**. 3. Note the BIOS version and date and compare it with the versions that appear on the HP website.
Operating systems	For information, go to the following locations: • Windows operating systems, go to http://www.support.microsoft.com. • Linux® operating systems, go to http://www.linux.com.

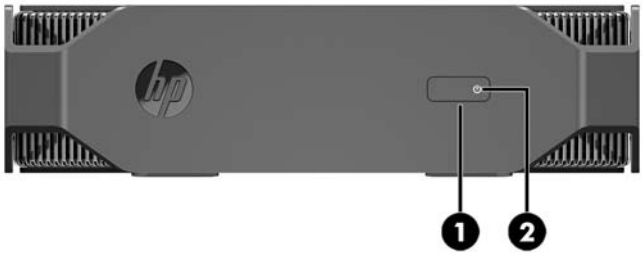
2 Workstation features

For complete and current information on supported accessories and components for the workstation, go to http://partsurfer.hp.com.

- Components
- Product specifications

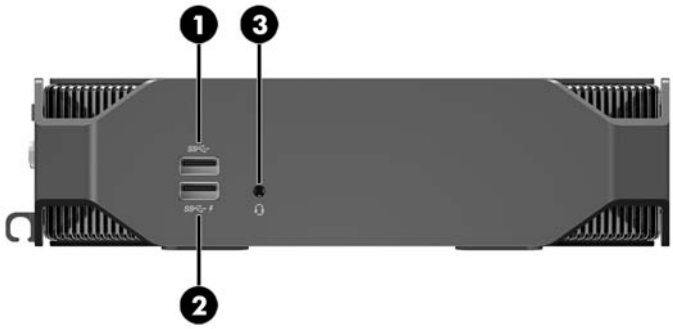
Components

Front



Item	Icon	Component
1		Power button
2		Power on LED

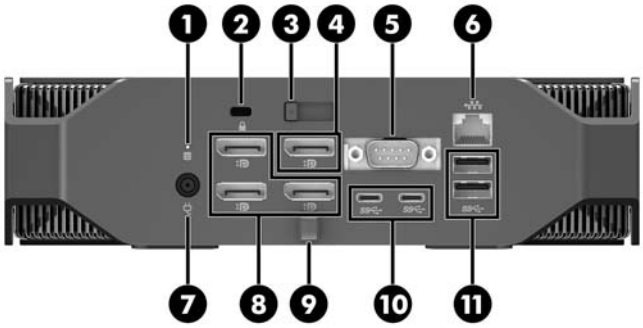
Left



Item	Icon	Component
1	SS	USB 3.0 port
2	SS	USB 3.0 charging port
3		Audio-out (headphone)/Audio-in (microphone) combo jack

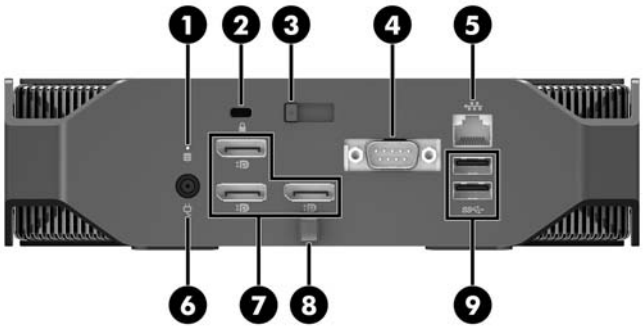
Rear

Performance model



Item	Icon	Component	Item	Icon	Component
1		Hard drive activity light On: The computer is on. Blinking white: The hard drive is being accessed.	7		Power cord connector
2		Cable lock slot	8		DisplayPort 1.2 connectors (3) Driven by NVIDIA GPU
3		Access panel release latch	9		DC-IN cable clip
4		DisplayPort 1.2 connector Enables integrated graphics. NVIDIA® is the default GPU. Intel® GPU can be selected in the BIOS (F10) menu.	10	SS	USB Type-C ports (2)
5		Serial port (optional)	11	SS	USB 3.0 ports (2)
6		RJ-45 (network) jack			

Entry model



Item	Icon	Component	Item	Icon	Component
1		Hard drive activity light On: The computer is on. Blinking white: The hard drive is being accessed.	6		Power cord connector
2		Cable lock slot	7		DisplayPort connectors (3)
3		Access panel release latch	8		DC-IN cable clip
4		Serial port (optional)	9	SS	USB 3.0 ports (2)
5		RJ-45 (network) jack			

Product specifications

Physical characteristics

Weight	Unit only (Performance)	**2.08 kg** (4.58 lbs)
	Unit only (Entry)	**1.87 kg** (4.12 lbs)
Dimensions (unit only)	Height	**58 mm** (2.3 in)
	Width	**216 mm** (8.5 in)
	Depth	**216 mm** (8.5 in)

Environmental specifications

Temperature	Operating	**5°C to 35°C** (40°F to 95°F)
	Non-operating	**40°C to 60°C** (-40°F to 140°F)
	NOTE: The ambient upper limit of 35°C is good up to 1524 m (5000 ft) elevation. Derate by 1°C for every 305 m (1000 ft) above 1524 m (5000 ft). For example, at 3,048 m (10,000 ft), the upper ambient air temperature limit is 30°C.	
Humidity	Operating	8% to 85% relative humidity, non-condensing
	Non-operating	8% to 90% relative humidity, non-condensing
Altitude	Operating	**0 to 3,048 m** (10,000 ft)
	Non-operating	**0 to 9,144 m** (30,000 ft)
Shock	Operating	½-sine: 40g, 2-3ms (~62 cm/sec)
	Non-operating	• ½-sine: 160 cm/s, 2-3ms (~105*g*) • 20*g*, square: 422 cm/s **NOTE:** Values represent individual shock events and do not indicate repetitive shock events.
Vibration	Operating random	0.5*g* (rms), 5-300 Hz, up to 0.0025 g^2/Hz
	Non-operating random	2.0*g* (rms), 5-500 Hz, up to 0.0150 g^2/Hz **NOTE:** Values do not indicate continuous vibration.

3 Setting up the workstation

- Setting up the workstation
- Adding monitors
- Installing optional components
- Security
- Product recycling

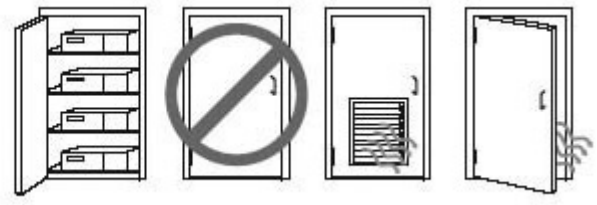
Setting up the workstation

Ensuring proper ventilation

Proper ventilation for the system is important for workstation operation. To be sure that there is adequate ventilation:

- Operate the workstation on a sturdy, level surface.
- Provide at least 15.24 cm (6.00 in) of clearance at the front and back of the workstation. (This is the *minimum* distance for all workstation models.)

- Be sure that the ambient air temperature surrounding the workstation falls within the specified limits (see Environmental specifications on page 9).
- For cabinet installation, ensure adequate cabinet ventilation and ensure that the ambient temperature within the cabinet does not exceed specified limits.
- Never restrict the incoming or outgoing airflow of the workstation by blocking any vents or air intakes.



Setup procedure

WARNING! To reduce the risk of electric shock or damage to your equipment:

- Plug the power cord into an AC outlet that is easily accessible at all times.
- Disconnect power from the workstation by unplugging the power cord from the AC outlet (not by unplugging the power cord from the workstation).
- If your power cord has a 3-pin attachment plug, plug the cord into a grounded (earthed) 3-pin outlet. Do not disable the power cord grounding pin, for example, by attaching a 2-pin adapter. The grounding pin is an important safety feature.

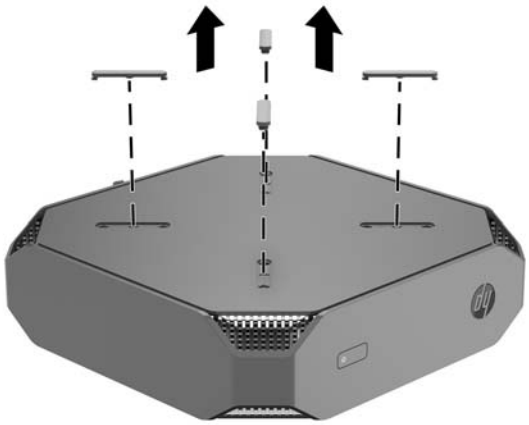
For more safety and regulatory information, refer to the *Regulatory, Safety and Environmental Notices* located with the user guide on your workstation.

Mounting the workstation

The workstation can be attached to a wall, swing arm, or other mounting fixture.

NOTE: This apparatus is intended to be supported by UL or CSA Listed wall mount bracket.

1. Pull off the rubber feet on the bottom of the workstation to expose the VESA mounting holes.



Store the feet on the underside of the workstation top cover.

2. To attach the workstation to a swing arm (sold separately), insert four M4 × 10mm screws through the holes on the swing arm plate and into the mounting holes on the workstation.

CAUTION: This workstation supports the VESA industry standard 100 mm mounting holes. To attach a third-party mounting solution to the workstation, four M4 × 10mm screws are required. These screws should be supplied in the third-party mounting solution kit. Longer screws must not be used because they may damage the workstation. It is important to verify that the manufacturer's mounting solution is compliant with the VESA standard and is rated to support the weight of the workstation. For best performance, it is important to use the power and other cables provided with the workstation.

To attach the workstation to other mounting fixtures, follow the instructions included with the mounting fixture to ensure that the workstation is safely attached.

NOTE: If the workstation is to be mounted horizontally, be sure to position the workstation so that all cords and cables will hang straight down from the connectors.

Connecting the workstation

⚠ **WARNING!** To reduce the risk of electric shock or damage to your equipment, observe these practices:

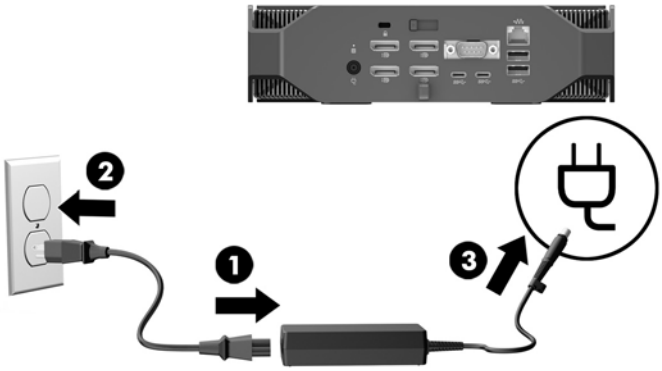
• Plug the power cord into an AC outlet that is easily accessible.

• Disconnect power from the workstation by unplugging the power cord from the AC outlet (not by unplugging the power cord from the workstation).

• Plug the cord into a grounded (earthed) three-pin outlet. Do not disable the power cord grounding pin (for example, by attaching a two-pin adapter). The grounding pin is an important safety feature.

To set up the workstation:

1. Connect the power cord to the workstation.



2. Connect the mouse and keyboard to the workstation.
3. Connect the monitor to the workstation.
4. Connect other peripheral components (such as a printer) according to the instructions included with the device.
5. Connect a network cable to the workstation and to a network router or LAN device.
6. Plug the workstation power cord and monitor power cord into an AC outlet (4).

Connecting Bluetooth devices

The workstation is Bluetooth-enabled. To connect a Bluetooth® wireless device:

1. Make your Bluetooth device send out a radio signal so that it is discoverable by the workstation (refer to the device documentation for instructions).
2. In the Windows **Control Panel**, go to **Hardware and Sound**, and then to **Devices and Printers**.
   - If your Bluetooth device is a printer, select **Add a printer**, select **Add a network, wireless or Bluetooth printer**, and follow the on-screen instructions.
   - For all other devices, select **Add a device**, select **Bluetooth devices**, and then follow the on-screen instructions.

Disabling Bluetooth devices

The Bluetooth features can be disabled through the system BIOS, through the operating system, or by removing the wireless modules from the system.

NOTE: Disabling the Bluetooth features through the system BIOS or by removing the wireless modules from the system will also disable the WLAN functionality.

To disable the Bluetooth features using the system BIOS, do the following:

1. During system boot, press F10 to enter the BIOS setup.
2. Locate and select the **Advanced** menu from the available menu selections displayed near the top of the screen.
3. Select **System Options**.
4. Select **M.2 WLAN/BT**.
5. Use the arrow keys to change **Enabled** to **Disabled**, and then press **F10** to accept the change.
6. Select **File** from the header menus, and then select **Save Changes and Exit**.

To disable the Bluetooth features in Windows 10, do the following:

1. In **Control Panel**, change **View By** from **Category** to either **Large Icon** or **Small Icon**.
2. Go to **Device Manager**.
3. Expand **Bluetooth**.
4. Select **Intel® Wireless Bluetooth® 4.0 + HS Adapter** to open the menu.
5. Go to the **Driver** menu and select **Disable**.
6. Select **Yes**.
7. To re-enable, select **Enable**.

To disable the Bluetooth features in Windows 7, do the following:

1. In **Control Panel**, change **View By** from **Category** to either **Large Icon** or **Small Icon**.
2. Go to **Device Manager**.
3. Expand **Bluetooth Radios**.
4. Find **Intel® Wireless Bluetooth® 4.0 Adapter**.
5. Select **Disable**.
6. Select **Yes**.
7. To re-enable, select **Enable**.

To remove the wireless modules, see one of the following for information on removal and replacement of components:

- The *Maintenance and Service Guide* for your workstation at http://www.hp.com/support/workstation_manuals
- Videos for your workstation at http://www.hp.com/go/sml

Disabling WLAN

NOTE: The workstation is WLAN-enabled by default.

NOTE: Disabling the WLAN functionality through the system BIOS or by removing the wireless modules from the system will also disable the Bluetooth features.

The WLAN can be disabled through the system BIOS, through the operating system, or by removing the wireless modules from the system.

To disable the WLAN using the system BIOS, do the following:

1. During system boot, press F10 to enter the BIOS setup.
2. Locate and select the **Advanced** menu from the available menu selections displayed near the top of the screen.
3. Select **System Options**.
4. Select **M.2 WLAN/BT**.
5. Select **Disabled**, and then press F10 to accept the change.
6. Select **File** from the header menus, and then select **Save Changes and Exit**.

To disable the WLAN in Windows 10, do the following:

1. In **Control Panel**, change **View By** from **Category** to either **Large Icon** or **Small Icon**.
2. Go to **Device Manager**.
3. Expand **Network Adapters**.
4. Select **Intel® Dual Band Wireless-AC 8265**.
5. Go to **Driver** menu.
6. Select **Disable**.
7. Select **Yes**.
8. To re-enable, select **Enable**.

To disable the WLAN in Windows 7, do the following:

1. In **Control Panel**, change **View By** from **Category** to either **Large Icon** or **Small Icon**.
2. Go to **Device Manager**.
3. Expand **Network Adapters**.
4. Select **Intel® Dual Band Wireless-AC 8265**.
5. Select **Disable**.
6. Select **Yes**.
7. To re-enable, select **Enable**.

To remove the wireless modules, see one of the following for information on removal and replacement of components:

- The *Maintenance and Service Guide* for your workstation at http://www.hp.com/support/workstation_manuals
- Videos for your workstation at http://www.hp.com/go/sml

Adding monitors

Planning for additional monitors

Entry model

The HP Z2 Mini G3 Entry system supports up to three simultaneous displays running on the Intel integrated GPU. Each display is capable of resolutions up to 4096 × 2160 @ 60 Hz.

It is also possible to drive a panel at a resolution of 5120 × 2880 @60 Hz by using two of the DisplayPort 1.2 outputs together. The panel must support this method of achieving this resolution for this to be possible.

Performance model

The HP Z2 Mini G3 Performance model is capable of operating in two distinct modes: NVIDIA GPU–only mode or NVIDIA GPU + Intel GPU mode. The NVIDIA GPU–only mode offers the best performance, while the NVIDIA GPU + Intel GPU mode allows the system to drive an additional two displays.

NVIDIA GPU–only mode:

- The default configuration.
- Offers the best performance because every DisplayPort 1.2 port is driven directly by the NVIDIA Quadro GPU.
- By combining DisplayPort outputs, capable of driving up to four independent displays at a maximum resolution of 4096 × 2160 @ 60 Hz or two independent displays at a maximum resolution of 5120 × 2880 @ 60 Hz. The display must support this method of achieving this resolution.

NVIDIA GPU + Intel GPU mode:

- The NVIDIA GPU can support a maximum of four independent displays. To support an additional two displays, the system can be configured to simultaneously use both the NVIDIA Quadro GPU and the Intel integrated GPU.
- This mode is configured in the system BIOS.

  1. Press the power button on the system, and then repeatedly press the F10 key until you've reached the system BIOS GUI.
  2. Navigate to the **Advanced** tab.
  3. Select **Built-In Device Options**.
  4. Select **Enable Intel graphics on DisplayPort port #4**.
  5. Press Enter to accept the prompt notifying you that the Intel GPU will be output on DisplayPort #4.
  6. Press F10 to save your changes and exit.

- This mode is capable of driving up to six independent displays.
  - Because the system has only four DisplayPort 1.2 ports, two of the DisplayPort 1.2 ports must each drive two displays in a daisy-chained configuration. This is accomplished by using DisplayPort

1.2 Multi-Stream Transport (MST) and requires displays which support MST or DisplayPort hubs capable of MST.

  - To achieve a six-display configuration, one of the daisy chains must be driven by the Intel GPU on DisplayPort #4. Refer to Performance model on page 7 to identify specific DisplayPorts. The other daisy chain can be driven by the NVIDIA Quadro GPU on any of the remaining DisplayPort 1.2 ports.
  - Each DisplayPort 1.2 output on the system is capable of driving a display at a resolution of 4096 × 2160 @ 60 Hz. When two displays are daisy-chained together from a single DisplayPort 1.2 port, each display in the daisy chain is bandwidth-limited to a maximum resolution of 2560 × 1600 @ 60 Hz.

- Performance is dependent upon which GPU is running the application. For the best performance of a particular application, ensure that the application is running on the NVIDIA Quadro GPU.

Planning process

The process for adding monitors depends on the type and number of monitors you add.

Use the following process to plan for adding more monitors:

1. Assess your monitor needs.
   a. Determine how many monitors you require.
   b. Determine the kind of graphics performance you want. For maximum performance, ensure that your display is driven by the NVIDIA Quadro GPU.
   c. Note the type of graphics connector used by each monitor. HP provides graphics cards with DisplayPort (DP) and DVI interfaces, but you can use adapters and third-party cards for other graphics formats, including DVI-I, HDMI, or VGA.

   TIP: Some adapters for older legacy hardware may cost more than others. You may want to compare the cost of acquiring adapters with the cost of getting a newer monitor that doesn't need adapters.

2. Install drivers and configure resolutions.
   a. Be sure that you have the correct drivers for the card. See http://www.hp.com for HP-qualified drivers.
   b. Configure each monitor's resolution, orientation, and placement through Windows Display Settings. For details, refer to Windows Help or to http://www.microsoft.com.
   c. For monitor setup in Linux, you can often use the settings tool for the graphics cards (e.g., NVIDIA® nvidia-settings). In some recent Linux releases, the window manager system (e.g., Gnome 3) preferences must also be modified.

TIP: To simplify troubleshooting of possible problems, enable the monitors one at a time: enable the first monitor and be sure that it works properly before enabling the next monitor.

Matching graphics card connector to monitor connectors

The following table describes monitor configuration scenarios.

Graphics card interface connector	Monitor connector				
	VGA	DVI	Dual Link DVI	DisplayPort (DP)	HDMI
DisplayPort	DisplayPort to VGA adapter (sold separately)	DP to DVI adapter	DP to DL DVI adapter	DP cable	DP to HDMI adapter

NOTE: DisplayPort connections have the highest performance; VGA connections have the lowest.

Identifying monitor connection requirements

Graphics card with DisplayPort output —The system has four DisplayPort 1.2 outputs. You can connect a monitor to each connector. Use the proper adapters, if required.

Connecting and configuring monitors

1. Connect the monitor cable adapters (if required) to the workstation, then connect the appropriate monitor cables to the adapters or directly to the graphics card.
2. Connect the other ends of the monitor cables to the monitors.
3. Connect one end of the monitor power cord to the monitor and the other end to an AC outlet.
4. Configure the monitor. For details, refer to Microsoft Help or to http://www.microsoft.com.

   For monitor setup in Linux, you can often use the settings tool for the graphics cards (e.g., NVIDIA nvidia-settings or AMD Catalyst Control Center). In some recent Linux releases, the window manager system (e.g., Gnome 3) preferences must also be modified.

Customizing the monitor display (Windows)

You can manually select or change the monitor model, refresh rates, screen resolution, color settings, font sizes, and power management settings.

- To change display settings for Windows 10, type `control panel` in the taskbar search box, and then select **Control Panel**. Select **Appearance and Personalization**, then **Display**.
- To change display settings in Windows 7, right-click a blank area on the desktop, and then click **Screen Resolution**.

For more information about customizing your monitor display, see the following resources:

- Online documentation provided with the graphics controller utility
- Documentation included with your monitor

Installing optional components

You can install additional components such as memory, hard drives, and wireless modules in your workstation.

- To view component installation videos, go to http://www.hp.com/go/sml.
- For installation guidelines and technical information, refer to the *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.

Security

You can secure your workstation by attaching a lock to the security cable slot. The workstation includes several security features to reduce the risk of theft and to warn of chassis intrusion. Refer to the *Maintenance and Service Guide* for information about additional hardware and software security features available for your system.

Product recycling

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries.

For information about recycling HP components or products, go to http://www.hp.com/go/recycle.

4 Setting up, backing up, restoring, and recovering Windows 10

This chapter provides setup and update information for the Windows 10 operating system. It includes these topics:

- Activating and customizing the software
- Turning off the workstation
- Finding more information
- If you encounter issues
- Backing up, restoring, and recovering in Windows 10

Activating and customizing the software

Additional information is available in online help after you activate the operating system.

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

Initial Windows operating system setup

The first time you turn on the workstation, the operating system is set up and activated automatically. This process takes about 5 to 10 minutes. Carefully read and follow the instructions on the screen to complete the initial Windows setup.

We recommend that you register your workstation with HP during operating system setup so you can receive important software updates, facilitate support questions, and sign up for special offers.

CAUTION: After the setup process has begun, DO NOT TURN OFF THE WORKSTATION UNTIL THE PROCESS IS COMPLETE. Turning off the workstation during the setup process may damage the software that runs the workstation or prevent its proper installation.

Customizing the monitor display

If you wish, you can select or change the monitor refresh rates, screen resolution, color settings, font sizes, and power management settings.

For more information, see the online documentation provided with the graphics controller utility or the documentation that came with your monitor.

- Right-click on the Windows desktop, then click **Personalize** or **Screen resolution** to change display settings.

  – or –

  Click the **Start** icon, click **Settings**, and then click **Personalization**.

Turning off the workstation

To properly turn off the workstation, shut down the operating system software.

CAUTION: HP does not recommended holding down the power button to shut off the system. Doing so can cause loss of user data and may damage the storage device. If the system becomes unstable and no other alternative is available, please give the system sufficient time to wake up completely after you reboot the workstation. This may take up to several minutes, especially on larger-capacity or solid state devices. For more information, see *Risks of unexpected power loss on solid state drives* at http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA6-1470ENW.pdf. HP Workstation white papers may also be accessed through HP Performance Advisor.

- Click the **Start** icon, click the **Power** icon, and then select **Shut down**.

  – or –

  From the taskbar, type `settings`, select **Settings**, type `shut`, and then click **Turn off your PC**.

Finding more information

NOTE: Some or all of the following documents are available on the workstation hard drive.

- *Getting Started*—Helps you connect the workstation and peripheral devices and set up factory-provided software; also includes basic troubleshooting information should you encounter any problems during initial startup.
- *Hardware Reference Guide*—Provides an overview of the product hardware, as well as instructions for upgrading this series of workstation; includes information on RTC batteries, memory, and power supply.
- *Maintenance and Service Guide* (English only)—Provides information on parts removal and replacement, troubleshooting, Desktop Management, setup utilities, safety, routine care, connector pin assignments, POST error messages, diagnostic indicator lights and error codes.
- *Regulatory, Safety and Environmental Notices*—Provides safety and regulatory information that ensures compliance with U.S., Canadian, and various international regulations.

If you encounter issues

There are several means to diagnose and resolve potential issues. HP provides several proprietary diagnostics tools but recommends a sequential troubleshooting approach that addresses the most basic root cause to the more complex. Steps include:

- Visual inspection
- Blink or beep codes
- HP PC Hardware Diagnostics
- HP Support
- System restore
- System recovery

Performing basic troubleshooting

You can find troubleshooting information in the comprehensive *Maintenance and Service Guide* (English only) available under the reference library at http://www.hp.com/support. Select your country and language, select **Product Support & Troubleshooting**, enter the model number of the workstation, and click Search.

Blink or beep codes: interpreting POST diagnostic LEDs and audible codes

If power LED on the left side of the workstation is flashing or if you hear beeps, see the *Maintenance and Service Guide* (English only) for interpretation and recommended action.

Using HP PC Hardware Diagnostics

The HP PC Hardware Diagnostic tools simplify the process of diagnosing hardware issues and expedite the support process when issues are found. The tools save time by pinpointing the component that needs to be replaced.

- **Isolate true hardware failures**: The diagnostics run outside of the operating system so they effectively isolate hardware failures from issues that may be caused by the operating system or other software components.
- **Failure ID**: When a failure is detected that requires hardware replacement, a 24-digit Failure ID is generated. This ID can then be provided to the call agent, who will either schedule support or provide replacement parts.

How to access and run HP PC Hardware Diagnostics

You can run the diagnostics from one of three places, depending on your preference and the health of the workstation.

1. Turn on the workstation and press Esc repeatedly until the BIOS Startup Menu appears.
2. Press F2 or select **System Diagnostics (F2)**.

   Pressing F2 signals the system to search for the diagnostics in the following sequence:

   a. A connected USB drive

   b. The hard disk drive

   c. A core set of diagnostics in the BIOS (for memory and hard disk drive) that are accessible only if the USB or hard disk drive versions are not detected

Downloading HP PC Hardware Diagnostics to a USB device

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

There are two options to download HP PC Hardware Diagnostics to a USB device:

Option 1: HP PC Diagnostics homepage— Provides access to the latest UEFI version

1. Go to http://hp.com/go/techcenter/pcdiags.
2. Click the **UEFI Download** link, and then select **Run**.

Option 2: Support and Drivers pages—Provide downloads for a specific product for earlier and later versions

1. Go to http://www.hp.com.
2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.

3. In the text box, type the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.

4. Select your workstation model, and then select your operating system.
5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

   – or –

   Click **Download**, and then select **Run**.

Before you call for technical support

⚠ **WARNING!** When the workstation 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 you touch them.

If you are having problems with the workstation, try the appropriate solutions as described in the previous sections and summarized below to try to isolate the exact problem before calling for technical support.

- Check the power LED on the left side of the workstation to see if it is flashing and listen for a series of beeps emanating from the workstation. The flashing lights and/or beeps are error codes that will help you diagnose the problem. See the *Maintenance and Service Guide* (English only) for details.
- If the screen is blank, plug the monitor into a different video port on the workstation if one is available. Or, replace the monitor with a monitor that you know is functioning properly.
- If you are working on a network:
  - Use a different network cable to connect your workstation to the network.
  - Connect a different workstation with a different cable to the network.

  If your problem is not resolved, the network jack on your workstation or the network wall jack might be faulty.
- If you recently added new hardware, remove the hardware.
- If you recently installed new software, uninstall the software.
- Comprehensive online technical support is also available at http://www.hp.com/support.
- If the workstation will turn on but will not boot into the operating system, you may run the “pre-boot” diagnostics utility, HP PC Hardware Diagnostics.
- If the workstation will boot into the operating system and internet access is available, you may access HP Instant Support Professional Edition at http://www.hp.com/go/ispe.

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

Comprehensive online technical support is also available at http://www.hp.com/support.

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 workstation when you call.
- Before calling, write down the product ID number, workstation and monitor serial numbers, and the failure ID produced by running the diagnostics if applicable.
- Spend time troubleshooting the problem with the service technician.

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

Backing up, restoring, and recovering in Windows 10

This section provides information about the following processes. The information in the section is standard procedure for most products.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, see Help and Support.

▲ Type `help` in the taskbar search box, and then select **Help and Support**.

NOTE: To create recovery media, you must have either a high-quality blank USB flash drive or an external optical drive with DVD writer capability. If you use an optical drive, you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. A compatible external optical drive may be purchased from HP.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your workstation model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the workstation. This step creates a backup of the HP Recovery partition on the workstation. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select products only) on page 23. For information on the recovery options that are available using the recovery media, see Using Windows tools on page 24.
- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Recovering using HP Recovery Manager on page 25.

NOTE: If storage is 32 GB or less, Microsoft® System Restore is disabled by default.

Creating HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. From the Start menu, select **File Explorer**.

- If your workstation does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the workstation. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

You can use Windows tools to create system restore points and create backups of personal information, see Using Windows tools on page 24.

- If your workstation does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the workstation. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.
  - Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
  - HP Recovery Manager examines the workstation and determines the required storage capacity for the media that will be required.
  - To create recovery media, you must have either a high-quality blank USB flash drive or an external optical drive with DVD writer capability. If you use an optical drive, you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software.

    NOTE: A compatible external optical drive may be purchased from HP.

  - The USB flash drive or external optical drive must be connected directly to a USB port on the workstation; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create recovery media yourself, you can obtain USB recovery media for your workstation from HP. See the *Worldwide Telephone Numbers* booklet included with the workstation. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.
  - Be sure that the workstation is connected to AC power before you begin creating the recovery media.
  - The creation process can take an hour or more. Do not interrupt the creation process.
  - If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. If prompted, click **Yes** to allow the program to continue.
3. Select **Create recovery media**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 25.

Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see Help and Support.

- Type `help` in the taskbar search box, and then select **Help and Support**.

Restore and recovery

NOTE: Microsoft Windows 10 recovery restores to a recent system restore point. HP Recovery Manager is the only method of restoring the original factory image. For more information, go to http://windows.microsoft.com/en-us/windows-10/windows-10-recovery-options.

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

IMPORTANT: Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the workstation, and resetting the workstation to its original state. For more information, see Help and Support.

  ▲ Type `help` in the taskbar search box, and then select **Help and Support**.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/ or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.

  ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 25. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 23.

- On select products, if you want to recover the workstation's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 25.

- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select products only) on page 27.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the workstation to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 23.

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this workstation, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

  IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct workstation issues.

- HP Recovery media must be used if the workstation hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 23.

- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 23.
- If your workstation does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the workstation. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

NOTE: Only the options available for your workstation display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Factory Reset—Restores the workstation to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

Using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

1. Type `recovery` in the taskbar search box, select **Recovery Manager**, and then select **HP Recovery Environment**.

   - or -

   Press f11 while the workstation boots, or press and hold f11 as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, select **System Recovery**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.
2. Insert the HP Recovery USB flash drive, and then restart the workstation.

   NOTE: If the workstation does not automatically restart in HP Recovery Manager, change the workstation boot order. See Changing the workstation boot order on page 27.
3. Follow the on-screen instructions.

Changing the workstation boot order

If your workstation does not restart in HP Recovery Manager, you can change the workstation boot order, which is the order of devices listed in BIOS where the workstation looks for startup information. You can change the selection to an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media.
2. Access BIOS.

   Restart the workstation, quickly press F9 for boot options.
3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select products only) on page 23.

NOTE: The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

5 Setting up, backing up, restoring, and recovering Windows 7

This chapter provides setup and update information for the Windows 7 operating system. It includes these topics:

- Setting up the Windows 7 operating system
- Backing up, restoring, and recovering Windows 7

CAUTION: Do not add optional hardware or third-party devices to the HP Workstation until the operating system is successfully installed. Adding hardware might cause errors and prevent the operating system from installing correctly.

NOTE: After you set up the operating system, be sure that the latest BIOS, drivers, and software updates are installed on the workstation. See Updating the workstation on page 37.

Setting up the Windows 7 operating system

CAUTION: After installation has started, do *not* turn off the workstation until the process is complete. Turning off the workstation during installation can damage the installation and operation of the software.

For complete installation and configuration instructions, go to http://windows.microsoft.com/en-US/windows7/help. Additional information is available in the Windows 7 online Help after you successfully install the operating system.

Installing or upgrading device drivers

You must install the appropriate device drivers before you install hardware devices. Follow the installation instructions that came with each device. For optimum performance, your operating system must have the most recent updates, patches, and service packs. See http://www.hp.com for HP-qualified drivers. For additional driver and software update information, see Updating the workstation on page 37.

Transferring files and settings

The Windows operating system offers data migration tools that help you select and transfer files and data from one Windows-based workstation to another.

For information about these tools, go to http://www.microsoft.com.

Backing up, restoring, and recovering Windows 7

Your workstation includes tools provided by HP and Windows to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your workstation to a proper working state or even back to the original factory state, all with simple steps.

This section provides information about the following processes:

- Creating backups
- Restoring and recovering your system

To create recovery media, you must have either a high-quality blank USB flash drive or an external optical drive with DVD writer capability. If you use an optical drive, you must use only high-quality blank DVD-R, DVD +R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD ±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. A compatible external optical drive may be purchased from HP.

NOTE: For more details about the Windows Backup and Restore tools provided, see Help and Support. To access Help and Support: select **Start**, and then select **Help and Support**.

Recovery after a system failure is only as good as your most recent backup.

1. After you successfully set up the workstation, use Windows tools to create recovery media. In Windows 7, select **Start**, select **Control Panel**, select **System and Security**, select **Backup and Restore**, and then select **Create a system image**.
2. As you add hardware and software programs, create system restore points. A system restore point is a snapshot of certain hard drive contents saved by Windows System Restore at a specific time. A system restore point contains information that Windows uses, such as registry settings. Windows creates a system restore point for you automatically during a Windows update and during other system maintenance activities (such as a software update, security scanning, or system diagnostics). You can also manually create a system restore point at any time. For more information and steps for creating specific system restore points, see Help and Support. To access Help and Support: select **Start**, and then select **Help and Support**.
3. As you add photos, video, music, and other personal files, create a backup of your personal information. If files are accidentally deleted from the hard drive and they can no longer be restored from the Recycle Bin, or if files become corrupted, you can restore the files that you backed up. In case of system failure, you can use the backup files to restore the contents of your workstation. See Backing up your information on page 30.

NOTE: HP recommends that you print the recovery procedures and save them for later use, in case of system instability.

Backing up your information

NOTE: Windows includes the User Account Control feature to improve the security of your workstation. You may be prompted by User Account Control for your permission or password when you perform certain tasks. To continue a task, select the appropriate option. For information about User Account Control, see Help and Support: select **Start** and then select **Help and Support**.

You should create your initial backup immediately after initial system 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. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

NOTE: For detailed instructions on various backup and restore options, perform a search for these topics in Help and Support. To access Help and Support: select **Start** and then select **Help and Support**.

You can back up your information to a USB flash drive, a network drive, an optional external hard drive, or discs.

Note the following when backing up your information:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated directories.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.
- When backing up to USB flash drives or discs, number each flash drive or disc after removing it.

To create a backup using Windows Backup and Restore:

NOTE: The backup process may take over an hour, depending on file size and the speed of the workstation.

1. Select **Start**, select **All Programs**, select **Maintenance**, and then select **Backup and Restore**.
2. Follow the on-screen instructions to set up your backup.

System Restore

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

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

To start System Restore:

1. Close all open programs.
2. Select **Start**, select **Computer**, and then select **Properties**.
3. Select **System protection**, select **System Restore**, select **Next**, and then follow the on-screen instructions.

System Recovery

CAUTION: This procedure will delete all user information. To prevent loss of information, be sure to back up all user information so you can restore it after recovery.

Always use the System Restore procedure before you use the System Recovery program. See System Restore on page 30.

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

You can order a recovery media set from support. For U.S. support, go to http://www.hp.com/support. For worldwide support, go to http://www8.hp.com/us/en/contact-hp/ww-contact-us.html. You can also order the recovery media set by calling support.

NOTE: Some features might not be available on systems that are shipped without a Windows operating system.

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

- Recovery image — Run System Recovery from a recovery image stored on your hard disk drive. The recovery image is a file that contains a copy of the original factory-shipped software. To perform a System Recovery from a recovery image, see System Recovery from a recovery partition image on page 31.
- Recovery media — Run System Recovery from recovery media that you have purchased separately.

System Recovery from a recovery partition image

CAUTION: System Recovery deletes all data and programs that you have created or installed.

A Windows system from the HP factory ships with a recovery partition. You can use the recovery partition to recover the factory operating system.

1. Turn off the workstation. If necessary, press and hold the power button until the workstation turns off.
2. Disconnect all peripheral devices from the workstation except the monitor, keyboard, and mouse.
3. Press the power button to turn on the workstation.
4. As soon as you see the HP logo screen, repeatedly press the F11 key on your keyboard until the *Windows is Loading Files...* message appears on the screen.
5. At the HP Recovery Manager screen, follow the on-screen instructions to continue.
6. When Windows has loaded, shut down the workstation, reconnect all peripheral devices, and then turn the workstation back on.

Using HP Recovery operating system media

CAUTION: Using a Windows 7 operating system USB flash drive completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the workstation are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as the original drivers. Software that came with the system can be downloaded at http://www.hp.com.

Use the steps provided in this section if you ordered a Windows 7 operating system and Driver USB flash drive.

To order a Windows 7 operating system and Driver USB flash drive, go to the HP website. For U.S. support, go to http://www.hp.com/cgi-bin/hpsupport/index.pl. For worldwide support, go to http://www8.hp.com/us/en/contact-hp/ww-contact-us.html. You can also order the recovery USB flash drive by calling support.

To initiate recovery using a Windows 7 operating system and driver USB flash drive:

NOTE: This recovery process takes several minutes.

1. Back up all personal files.
2. Restart the workstation, and then insert the Windows 7 operating system and driver USB flash drive into a USB port.

   NOTE: If the workstation does not boot to the USB flash drive, restart the workstation and press Esc as the workstation is powering on to see the startup menu. Use the arrow keys to select the boot menu and press Enter. Use the arrow keys to select the location of the USB flash drive to boot from that device. Booting the USB flash drive from UEFI Boot sources will result in a GPT boot partition. Booting from Legacy Boot sources will result in an MBR boot partition.

3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.

   NOTE: After the operating system installation has completed, you will be allowed to load drivers.

5. Install the Hardware Enabling Drivers. HP recommends installing all available drivers.
6. You can download applications that came with the workstation at http://www.hp.com.

6 Setting up Linux

HP offers a variety of Linux solutions for HP Workstation customers:

- HP certifies and supports Red Hat® Enterprise Linux (RHEL) on HP Workstations.
- HP certifies and supports SUSE Linux Enterprise Desktop (SLED) on HP Workstations.
- HP certifies and supports Canonical Ubuntu on some HP Workstations.
- HP offers a SLED 11 preload on some Z series Workstations.
- HP offers an Ubuntu preload on some Z series Workstations.

This chapter describes how to set up and restore the Linux operating system. It includes these topics:

- Linux-ready systems
- HP Linux driver discs
- Setting up Red Hat Enterprise Linux (RHEL)
- Setting up SUSE Linux Enterprise Desktop (SLED)
- Setting up Ubuntu
- Proprietary graphics drivers

⚠ **CAUTION:** Do not add optional hardware or third-party devices to the workstation until the operating system is successfully installed. Adding hardware might cause errors and prevent the operating system from installing correctly.

NOTE: After you set up the operating system, be sure that the latest BIOS, drivers, and software updates are installed. See Updating the workstation on page 37.

NOTE: To create recovery media, you must have either a high-quality blank USB flash drive or an external optical drive with DVD writer capability. If you use an optical drive, you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. A compatible external optical drive may be purchased from HP.

Linux-ready systems

The Linux-ready option provides a system with a minimally-functional OS preload (for example, FreeDOS). It is intended for situations where the customer is going to install an OS when the system arrives. The option does not include a license for any operating system.

The Linux-ready option does not include the Linux operating system, which the user must supply. Commercial Linux distributions are available for purchase from vendors such as Red Hat and SUSE. A variety of other Linux distributions are available for free (e.g., Ubuntu). To view supported configurations and operating systems, go to http://www.hp.com/support/linux_hardware_matrix.

HP Linux driver discs

Driver ISO images that support proper use and behavior of some Linux OSes on HP Workstations may be available on the HP website. Such images include tested drivers that augment and/or replace those found in RHEL, SLED, Ubuntu, or other OSes. Each image is specific to a particular Linux OS release.

These images also can be downloaded using the following steps:

1. Go to http://www.hp.com/support/workstation_swdrivers.
2. Select your workstation model.
3. Select the desired operating system.
4. Select the **Obtain Software** link for the appropriate package (typically the most recent revision).
5. Click **I Accept** to accept the terms of the license agreement.
6. Download the software ISO image and burn it to a high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD +R DL disc using an external optical drive with DVD writer capability. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. A compatible external optical drive may be purchased from HP.

   This disc is your *HP driver disc*.

Setting up Red Hat Enterprise Linux (RHEL)

HP Z series Workstations are certified and supported on RHEL streams appropriate to the hardware technology.

- For details of RHEL support for a particular platform, see the *Linux Hardware Matrix for HP Workstations* at http://www.hp.com/support/linux_hardware_matrix.
- For information about Red Hat certifications on HP Workstations, go to https://hardware.redhat.com.

HP driver disc

Recent versions of Red Hat Linux typically require only driver updates with minor fixes to support HP Workstations. These releases can usually be supported with the appropriate driver USB flash drive or optical disc from the HP website, which can be used as a post-installation utility for the standard Red Hat Linux install. For more information, see HP Linux driver discs on page 34.

After you complete the standard Red Hat install and restart the system, a Red Hat *first-boot* utility runs. After you specify a number of settings (such as the security level, time and date, ‘root’ password, and user accounts), the utility lets you load an additional USB flash drive or optical disc.

The driver media is used during this phase. All content added by HP is in the **/HP** directory on the media. You can use it to build your own image or to browse the HP content.

Please see /HP directory on the media for any last-minute README pointers for elements on the disc.

Installing with the HP Red Hat Linux driver media

1. If you do not have the appropriate HP driver media for a supported stream, create one (see HP Linux driver discs on page 34.)
2. Install the operating system using the media included in the Red Hat Linux box-set.
3. If you have a Red Hat driver USB flash drive or optical disc for the OS version you are installing, type `linux dd` when the initial install splash screen appears, and then press **Enter**.
4. When asked if you have a driver disc, select **Yes**. Place the Red Hat driver disc in the drive, and select the appropriate `drive:hd[abcd]`. Continue the normal installation.
5. After successfully installing the operating system, reboot the workstation.
   - RHEL 6 or RHEL 7: Insert your HP driver USB fladisc. The driver installation software automatically starts. Follow the on-screen instructions to install the contents.

Setting up SUSE Linux Enterprise Desktop (SLED)

HP supports 64-bit SLED on some workstations.

Various versions of SLED are certified and supported by SUSE on HP Workstations. For more information, go to the SUSE certification bulletin search page at https://www.suse.com/yessearch/Search.jsp.

Installing SLED with the HP driver disc

1. If an HP driver disc did not come with your workstation, create one (see HP Linux driver discs on page 34).
2. Install the operating system using the discs included in the SUSE box-set.
3. After successfully installing the operating system, reboot the workstation.
4. Insert your HP driver disc. The driver installation software automatically starts. Follow the on-screen instructions to install the contents.

Setting up Ubuntu

HP offers a 64-bit Ubuntu 14.04 LTS preload on some Z series Workstations and supports 64-bit Ubuntu 14.04 on other workstations.

Various versions of Ubuntu are certified and supported by Canonical on HP Workstations. For more information, go to the Ubuntu Desktop certified hardware search page at http://www.ubuntu.com/certification/desktop and search for your workstation product.

Using the HP driver disc

Ubuntu does not require registration to obtain software package updates. Updates can be obtained from various “repositories” on the web using a variety of tools built into the OS. An internet connection and proxy are all that may be required.

The HP-provided Linux driver disc for Ubuntu relies on the same mechanisms in order to satisfy dependencies during installation. So the same internet access is needed, as well as capability to elevate from the current user session to administrator privileges.

In some cases, HP-tested proprietary graphics drivers may be the only “payload” delivered by the driver disc.

1. Install the operating system from your own installation media.

   Ubuntu is available at no cost from www.ubuntu.com.

2. Restart the workstation.
3. Insert your HP driver disc. The driver installation software automatically starts.
4. When prompted for the administrator password, type the password in the field.
5. Follow the onscreen instructions to install the drivers appropriate to your hardware configuration.

Proprietary graphics drivers

Most HP Workstations can be ordered with graphics cards that have been through extensive verification by HP. See the *Linux Hardware Matrix for HP Workstations* at http://www.hp.com/support/linux_hardware_matrix for a list of supported cards.

NOTE: Not all graphics cards are available on every workstation. Limitations generally occur for cards that consume large amounts of power in lower-power workstations.

Third-party proprietary graphics drivers supported by HP and the graphics vendors are available with the SLED 11 and Ubuntu preloads on Z series Workstations, and from HP Workstation Support at http://www.hp.com/go/workstationsupport.

These proprietary drivers are not a standard part of the RHEL, SLED, or Ubuntu distributions because they are not open source. Driver revisions more recent than those at the HP support website are supported directly by the vendor.

7 Updating the workstation

- Updating the workstation after first boot
- Updating the BIOS
- Upgrading device drivers

HP is constantly working on improving your total workstation experience. To ensure that the workstation leverages the latest enhancements, HP recommends that you install the latest BIOS, driver, and software updates on a regular basis.

Updating the workstation after first boot

After successfully booting the workstation for the first time, follow these guidelines to be sure that the workstation is up-to-date:

- Be sure that you have the latest system BIOS version loaded. See Updating the BIOS on page 37.
- Be sure that you have the latest drivers for your system. See Upgrading device drivers on page 38.
- Become familiar with your available HP resources.
- Consider a subscription to Driver Alerts at http://www.hp.com/go/subscriberschoice.

Updating the BIOS

For optimum performance, determine the BIOS version on the workstation, and upgrade it if necessary.

Determining the current BIOS version

To determine the current BIOS version:

1. Press Esc during startup (boot).
2. Press F10 to enter Computer Setup (F10).
3. Select **Main**, and then select **System Information**. Note the workstation System BIOS version.

NOTE: For procedures for upgrading the BIOS as well as the Computer Setup (F10) BIOS Menu settings, see the *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.

Upgrading BIOS

To find and download the latest available BIOS version, which includes the latest enhancements:

1. Go to http://www.hp.com/go/workstationsupport.
2. In the **Download options** tab, select **drivers, software & firmware**.
3. Follow the instructions to locate the latest BIOS version available for the workstation.
4. Compare the BIOS version on your workstation to the BIOS versions on the website (see Determining the current BIOS version on page 37). If the BIOS version on the website is the same as the version on your system, no further action is required.
5. If the BIOS version on the website is a version later than the one on your system, download the appropriate version for the workstation. Follow the instructions in the release notes to complete the installation.

Upgrading device drivers

If you install a peripheral device (such as a printer, display adapter, or network adapter), confirm that you have the latest device drivers loaded. If you purchased your device through HP, go to the HP website to download the latest drivers for your device. These drivers have been tested to ensure the best compatibility between your device and your HP Workstation.

If you did not purchase your device from HP, HP recommends that you go to the HP website first to see if your device and its drivers have been tested for HP Workstation compatibility. If no driver is available, go to the device manufacturer's website to download the latest drivers.

To upgrade device drivers:

1. Go to http://www.hp.com/go/workstationsupport and specify your product.
2. Follow the instructions to find the latest drivers available for the workstation.

If a required driver is not found, see the website of the manufacturer of the peripheral device.

8 Diagnostics and minor troubleshooting

- Calling support
- Locating ID labels
- Locating warranty information
- HP troubleshooting resources and tools

Calling support

At times you might encounter an issue that requires support. Before you call support:

- Have the workstation readily accessible.
- Write down the workstation serial numbers, product numbers, model names, and model numbers and have them in front of you.
- Note any applicable error messages.
- Note any add-on options.
- Note the operating system.
- Note any third-party hardware or software.
- Note the details of any blinking lights on the front of the workstation (tower and desktop configurations) or on the side of the workstation (all-in-one configurations).
- Note the applications you were using when you encountered the problem.

NOTE: When calling in for service or support, you might be asked for the product number (example: PS988AV) of the workstation. If the workstation has a product number, it is generally located next to the 10- or 12-digit serial number of the workstation.

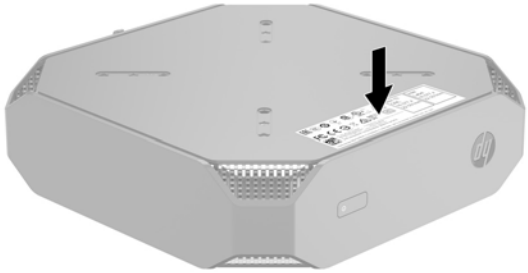
NOTE: The serial number and product number labels can be found on the rear panel of the workstation.

For a support phone number, go to http://www.hp.com/support, select your region, and then, under **Customer Support**, select **Contact Support**.

Locating ID labels

Agency/Environmental labels, an operating system label, and a serial number label are available on each workstation.

1. Agency/Environmental and OS labels
2. Serial number (unique for each workstation). Have this number available when you contact support.



Locating warranty information

To locate base warranty information, go to http://www.hp.com/support/warranty-lookuptool.

To locate an existing Care Pack, go to http://www.hp.com/go/lookuptool.

To extend a standard product warranty, go to http://h20565.www2.hp.com/hpsc/wc/public/home. HP Care Pack Services offer upgraded service levels to extend and expand a standard product warranty.

HP troubleshooting resources and tools

This section provides information to guide you in troubleshooting your system.

Online support

Online support resources include web-based troubleshooting tools, technical knowledge databases, driver and patch downloads, online communities, and product change notification services.

The following websites are also available to you:

- http://www.hp.com—Provides useful product information.
- http://www.hp.com/support/workstation_manuals—Provides the latest online documentation.
- http://www.hp.com/go/workstationsupport—Provides technical support information for workstations.
- http://www8.hp.com/us/en/contact-hp/phone-assist.html—Provides a listing of the worldwide technical support telephone numbers. Select your region.
- http://www.hp.com/support/workstation_swdrivers—Provides access to software and drivers for workstations.

HP Support Center

To help you troubleshoot problems yourself, HP provides the HP Support Center. The HP Support Center is a portal to an extensive selection of online tools. To access the HP Support Center, complete the following steps:

1. Go to http://www.hp.com/go/workstationsupport.
2. Search for your product.
3. In the **Top issues & solutions** tab, under **Other solution options**, select **Troubleshoot a problem**.
4. Select the problem that you are troubleshooting.

HP Chat Support

HP Chat Support is a set of web-based support tools that automate and speed up the resolution of problems concerning desktop computing, tape storage, and printing.

HP Chat Support enables you to electronically submit a support ticket to HP over the web. When you submit a support ticket, HP Chat Support collects information about the workstation and passes it to an online support specialist. The collection of information might take up to 30 seconds, depending on the workstation configuration. When you submit a support ticket, you receive a confirmation message containing your case ID, the support hours for your location, and the estimated time of response.

For more information about HP Chat Support, go to http://h20565.www2.hp.com/portal/site/hpsc.

NOTE: This feature is not available for Linux.

Customer Advisories, Customer and Security Bulletins, and Customer Notices

To find advisories, bulletins, and notices:

1. Go to http://www.hp.com/go/workstationsupport.
2. Search for your product.
3. In the **Top issues & solutions** tab, under **Other solution options**, select **Advisories, bulletins & notices**.
4. Select an item for viewing.

Product Change Notifications

Product Change Notifications (PCNs) are proactive notifications for product changes occurring within a 30- to 60-day window of the effective date of the change in the manufacturing process. PCNs give customers advance notice of changes to their product, such as an updated BIOS version that they might need to decide whether to download prior to the change taking place. To view a list of PCNs, go to the **Advisories, Bulletins & Notices** page for your product.

Helpful hints

If you encounter a problem with the workstation, monitor, or software, the following general suggestions might help you isolate and focus on the problem before taking further action.

At startup

- Verify that the workstation is plugged into a functional AC outlet.
- Remove all optical discs and USB flash drives before starting the workstation.
- Verify that the workstation is on and the power light is on.
- If you have installed an operating system other than the factory-installed operating system, confirm that it is supported on your system by going to http://www.hp.com/go/quickspecs.
- Verify that the display panel is lit.
- If you have an optional external monitor:
  - Verify that the monitor is plugged into a functional AC outlet.
  - Verify that the monitor is on and the green monitor light is on.
  - If the monitor is dim, turn up the brightness and contrast controls.

During operation

- Beeps and blinking lights on the workstation are error codes that can help you diagnose problems. For more information on interpreting these codes, see the *Diagnostic LED and audible (beep) codes* section in the *Maintenance and Service Guide* for your workstation.
- Press and hold any key. If the system beeps, your keyboard is operating correctly.
- Check all cables for loose or incorrect connections.
- Wake the workstation by pressing the power button or any key on the keyboard. If the system remains in suspend mode, shut down the system by pressing and holding the power button for at least four seconds. Then press the power button again to restart the system.

  If the system does not shut down, unplug the power cord, wait a few seconds, and then plug it in again. If the system does not restart, press the power button.
- Be sure that all required device drivers have been installed. For example, if you have connected a printer, you must install a printer driver.
- If you are working on a network, use another cable to plug your workstation into the network connection. If you still cannot connect, there might be a problem with the network plug.
- If you recently added new hardware, remove the hardware to see whether the workstation functions properly.
- If you recently installed new software, uninstall the software to see whether the workstation functions properly.
- If the display panel on an all-in-one workstation is blank, open the workstation and be sure that both ends of the cable between the system board and the display panel are connected. If you are using a graphics card, verify that the card is properly installed.
- Upgrade the BIOS. A new release of the BIOS might have been released that supports new features or fixes your problem.
- For more detailed information, see the troubleshooting chapter in the *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals.

Customer Self Repair

Under the Customer Self Repair programs, you can order a replacement part and install the part without on-site HP technical assistance. Customer Self Repair might be required for some components. For more information, go to http://www.hp.com/go/selfrepair and select your product.

NOTE: Some components are not eligible for Customer Self Repair and must be returned to HP for service. Call support for further instructions before attempting to remove or repair these components.

More troubleshooting options

The following additional information about troubleshooting techniques and tools is provided in the *Maintenance and Service Guide* at http://www.hp.com/support/workstation_manuals:

- POST Error Codes.
- Diagnostic lights and audible (beep) codes.
- Troubleshooting scenarios and solutions.
- HP PC Hardware Diagnostics (UEFI) — A set of diagnostic tests that helps determine whether the hardware is functioning properly.

9 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

When HP PC Hardware Diagnostics (UEFI) detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. This ID code can then be provided to support to help determine how to correct the problem.

NOTE: To start diagnostics on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached.

To start HP PC Hardware Diagnostics (UEFI), follow these steps:

1. Turn on or restart the computer, and quickly press esc.
2. Press f2.

   The BIOS searches three places for the diagnostic tools, in the following order:

   a. Connected USB drive

      NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 44.

   b. Hard drive

   c. BIOS
3. When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are offered.

There are two options to download HP PC Hardware Diagnostics to a USB device.

Download the latest UEFI version

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, select the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product

1. Go to http://www.hp.com/support.
2. Select **Get software and drivers**.

3. Enter the product name or number.

   – or –

   Select **Identify now** to let HP automatically detect your product.

4. Select your computer, and then select your operating system.

5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

10 Routine Care

General cleaning safety precautions

- Never use solvents or flammable solutions to clean the workstation.
- Never immerse any component in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
- Always unplug the workstation before cleaning the keyboard, mouse, or air vents.
- Always disconnect the keyboard before cleaning it.
- Wear safety glasses equipped with side shields when cleaning the keyboard.

Cleaning the chassis

- Follow the safety precautions in the *Maintenance and Service Guide* for your workstation before cleaning the workstation.
- To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.
- For stronger stains, use a mild dish washing 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 required because the alcohol evaporates quickly and does not leave a residue.
- After cleaning, always wipe the workstation with a clean, lint-free cloth.
- Occasionally, clean the air vents on the workstation. Lint and other foreign matter can block the vents and limit the airflow.

Cleaning the keyboard

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

- If the keyboard has an on/off switch, turn it off.
- Follow the safety precautions in the *Maintenance and Service Guide* for your workstation before cleaning the workstation.
- Visible debris underneath or between the keys can be removed by vacuuming or shaking.
- Canned, pressurized air can be used to clean debris from under the keys. Use caution because too much air pressure can dislodge lubricants applied under the wide keys.
- If you remove a key, use a specially designed key remover to prevent damage to the keys. This tool is available from many electronic supply outlets.

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

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

Cleaning the monitor

- Follow the safety precautions in the *Maintenance and Service Guide* for your workstation before cleaning the workstation.
- To clean the monitor, wipe the monitor screen with a towelette designed for cleaning monitors or a clean cloth moistened with water.

  ⚠ **CAUTION:** Do not use sprays or aerosols directly on the screen—the liquid might seep into the housing and damage a component.

  Never use solvents or flammable liquids on the monitor because display or housing damage may result.

Cleaning the mouse

1. Follow the safety precautions in the *Maintenance and Service Guide* for your workstation before cleaning the workstation.
2. If the mouse has an on/off switch, turn it off.
3. Wipe the body of the mouse with a damp cloth.
4. If the mouse has a:
   - Laser or LED: use a cotton swab dampened with cleaning solution to gently brush out any dust around the laser or LED, then wipe again with a dry swab. Do not wipe the laser or LED directly with the swab.
   - Scroll wheel: spray canned, pressurized air in the gap between the scroll wheel and the click buttons. Do not blow air directly on one spot for very long or condensation can form.
   - Roller ball: remove and clean the roller ball, remove any debris from the ball socket, wipe out the socket with a dry cloth, and reassemble the mouse.

11 Accessibility

HP designs, produces, and markets products and services that can be used by everyone, including people with disabilities, either on a stand-alone basis or with appropriate assistive devices.

Supported assistive technologies

HP products support a wide variety of operating system assistive technologies and can be configured to work with additional assistive technologies. Use the Search feature on your device to locate more information about assistive features.

NOTE: For additional information about a particular assistive technology product, contact customer support for that product.

Contacting support

We are constantly refining the accessibility of our products and services and welcome feedback from users. If you have an issue with a product or would like to tell us about accessibility features that have helped you, please contact us at (888) 259-5707, Monday through Friday, 6 a.m. to 9 p.m. Mountain Time. If you are deaf or hard-of-hearing and use TRS/VRS/WebCapTel, contact us if you require technical support or have accessibility questions by calling (877) 656-7058, Monday through Friday, 6 a.m. to 9 p.m. Mountain Time.

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