



User Guide

© Copyright 2017, 2018 HP Development Company, L.P.

Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries. Windows is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries. NVIDIA is a trademark or registered trademark of NVIDIA Corporation in the U.S. and other countries. Red Hat and Enterprise Linux are registered trademarks of Red Hat, Inc. in the United States and other countries.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Second Edition: February 2018

First Edition: December 2017

Part number: L08677-002

Product notice

This guide describes features that are common to most products. Some features may not be available on your computer.

Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. See <http://www.microsoft.com>.

To access the latest user guides, go to <http://www.hp.com/support>, and follow the instructions to find your product. Then select **User Guides**.

Software terms

By installing, copying, downloading, or otherwise using any software product preinstalled on this computer, you agree to be bound by the terms of the HP End User License Agreement (EULA). If you do not accept these license terms, your sole remedy is to return the entire unused product (hardware and software) within 14 days for a full refund subject to the refund policy of your seller.

For any further information or to request a full refund of the price of the computer, please contact your seller.

About this guide

This guide provides information on computer features, setting up the computer, using the software, and technical specifications.

The following types of alerts may appear in this guide.

-
-  **WARNING!** Indicates a hazardous situation that, if not avoided, **could** result in death or serious injury.
 -  **CAUTION:** Indicates a hazardous situation that, if not avoided, **could** result in minor or moderate injury.
 -  **IMPORTANT:** Indicates information considered important but not hazard-related (for example, messages related to property damage). A notice alerts the user that failure to follow a procedure exactly as described could result in loss of data or in damage to hardware or software. Also contains essential information to explain a concept or to complete a task.
 -  **NOTE:** Contains additional information to emphasize or supplement important points of the main text.
 -  **TIP:** Provides helpful hints for completing a task.
-

Table of contents

1 Locating HP resources	1
Product information	1
Support	1
Product documentation	2
Product diagnostics	2
Product updates	3
2 Computer features	4
Components	4
Front	4
Left	6
Rear	6
Product specifications	8
3 Setting up the computer	9
Ensuring proper ventilation	9
Setup procedures	10
Adding monitors	11
Planning for additional monitors	11
Finding supported graphics cards	12
Matching graphics cards to monitor connectors	13
Identifying monitor connection requirements	13
Connecting and configuring monitors	14
Using a third-party graphics configuration utility	14
Customizing the monitor display (Windows)	15
Installing optional components	15
Security	15
Product recycling	15
4 Backing up, restoring, and recovering	16
Using Windows tools	16
Creating HP Recovery media (select products only)	16
Using HP Recovery Manager to create recovery media	17
Before you begin	17
Creating the recovery media	17
Using the HP Cloud Recovery Download Tool to create recovery media	18

Restoring and recovery	18
Restoring, resetting, and refreshing using Windows tools	18
Restoring using HP Recovery Manager and the HP Recovery partition	18
Recovering using HP Recovery Manager	18
Recovering using the HP Recovery partition (select products only)	19
Recovering using HP Recovery media	19
Changing the computer boot order	20
Removing the HP Recovery partition (select products only)	20

5 Setting up Linux 21

Linux-ready systems	21
HP Linux driver discs	21
Setting up Red Hat Enterprise Linux (RHEL)	22
HP driver disc	22
Installing with the HP Red Hat Linux driver media	22
Setting up SUSE Linux Enterprise Desktop (SLED)	22
Installing SLED with the HP driver disc	23
Setting up Ubuntu	23
Using the HP driver disc	23
Proprietary graphics drivers	23

6 Updating the computer 24

Updating the computer after first boot	24
Updating the BIOS	24
Determining the current BIOS version	24
Upgrading BIOS	24
Upgrading device drivers	25

7 Maintenance, diagnostics, and minor troubleshooting 26

Turning off the computer	26
If you encounter issues	26
For more information	26
Visual inspection	26
At startup	27
During operation	27
Customer Self Repair	28
Blink or beep codes: interpreting POST diagnostic LEDs and audible codes	28
Basic troubleshooting	28
HP Support	29
Online support	29

Customer support for workstations and thin clients	29
Advisories and Bulletins and Notices	29
Calling support	29
Locating warranty information	30
8 Using HP PC Hardware Diagnostics	31
Using HP PC Hardware Diagnostics Windows	31
Downloading HP PC Hardware Diagnostics Windows	31
Downloading the latest HP PC Hardware Diagnostics Windows version	32
Downloading HP Hardware Diagnostics Windows by product name or number (select products only)	32
Installing HP PC Hardware Diagnostics Windows	32
Using HP PC Hardware Diagnostics UEFI	32
Starting HP PC Hardware Diagnostics UEFI	33
Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive	33
Downloading the latest HP PC Hardware Diagnostics UEFI version	33
Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)	33
Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)	34
Downloading Remote HP PC Hardware Diagnostics UEFI	34
Downloading the latest Remote HP PC Hardware Diagnostics UEFI version	34
Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number	34
Customizing Remote HP PC Hardware Diagnostics UEFI settings	34
9 Routine care	36
General cleaning safety precautions	36
Cleaning the chassis	36
Cleaning the keyboard	36
Cleaning the monitor	37
Cleaning the mouse	37
10 Accessibility	38
Supported assistive technologies	38
Contacting support	38
Index	39

1 Locating HP resources

Read this chapter to learn about where to find additional HP resources.

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 box, and then click Go .
<i>Regulatory, Safety and Environmental Notices</i>	Refer to the <i>Regulatory, Safety and Environmental Notices</i> for product regulatory information. You can also refer to the Agency/Environmental label. To access this guide: ▲ Select the Start button, select HP Help and Support, and then select HP Documentation. – or – ▲ Select the Start button, select HP, and then select HP Documentation.
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. Additional information is located in the computer <i>Maintenance and Service Guide</i> on the Web at http://www.hp.com/support .
Serial number, Agency/Environmental, and operating system labels	The serial number, Agency/Environmental, and operating system labels might be on the bottom of the computer, on the rear panel of the computer, or under the service door.

Support

Topic	Location
Product support	For HP support, go to http://www.hp.com/support. Here you can access the following types of support: • Online chat with an HP technician • Support telephone numbers • HP service center locations
Warranty information	To access this guide: ▲ Select the Start button, select HP Help and Support, and then select HP Documentation. – or – ▲ Select the Start button, select HP, and then select HP Documentation. – or –

Topic	Location
▲	Go to http://www.hp.com/go/orderdocuments .
IMPORTANT:	You must be connected to the Internet to access the latest version of the warranty.
	You can find your HP Limited Warranty located with the user guides on your product. The warranty may also be provided on a 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 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. Select the Start button, select HP Help and Support , and then select HP Documentation . For the latest online documentation, go to http://www.hp.com/support . The documentation includes this user guide and the <i>Maintenance and Service Guide</i> .
Removal and replacement videos	To learn how to remove and replace computer 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 https://h41369.www4.hp.com/alerts-signup.php .
Technical specifications	The Product Bulletin contains QuickSpecs for HP computers. QuickSpecs include information about the operating system, power supply, memory, processor, and many other system components. To access the QuickSpecs, go to http://www.hp.com/go/quickspecs/ .
Advisories, Bulletins, and Notices	To find advisories, bulletins, and notices: 1. Go to https://support.hp.com/us-en/products/workstations-thin-clients/. 2. Select your product. 3. Select Advisories or Bulletins and Notices.

Product diagnostics

Topic	Location
Windows® diagnostics tools	The HP PC Hardware Diagnostics Windows utility and HP PC Hardware Diagnostics UEFI utility are preinstalled on select Windows computers. See Using HP PC Hardware Diagnostics on page 31 . For additional information, see the computer <i>Maintenance and Service Guide</i> at http://www.hp.com/support .
Audible beep and light code definitions	See Maintenance, diagnostics, and minor troubleshooting on page 26 . For additional information, see the computer <i>Maintenance and Service Guide</i> at http://www.hp.com/support .
POST error codes	See Maintenance, diagnostics, and minor troubleshooting on page 26 .

Topic	Location
	For additional information, see the computer <i>Maintenance and Service Guide</i> at http://www.hp.com/support .

Product updates

Topic	Location
Driver and BIOS updates	Go to https://support.hp.com/us-en/products/workstations-thin-clients/ to verify that you have the latest drivers for the computer. For more information on updating the drivers and BIOS, see Updating the computer on page 24.
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.

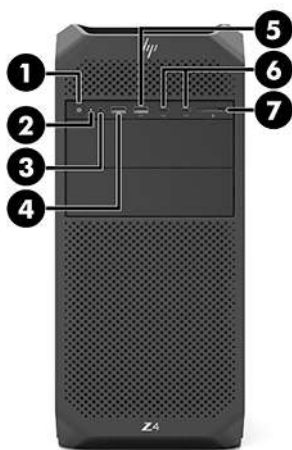
2 Computer features

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

Components

Front

 **NOTE:** Refer to the illustration that most closely matches your computer.

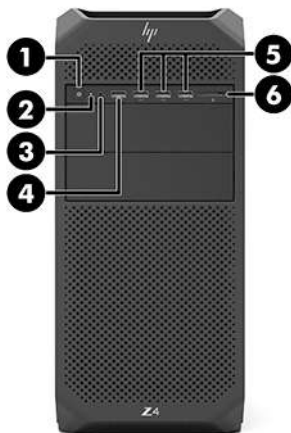


Item	Icon	Component
1		Power button and light*
2		Drive light
3		Audio-out (headphone)/Audio-in (microphone) combo jack
4		USB SuperSpeed port with HP Sleep and Charge
5		USB SuperSpeed port
6		USB Type-C SuperSpeed Plus ports (2)
7		Memory card reader (select products only)

* The power light status is as follows:

- Solid white: The computer is on.
- Blinking white: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.
- Blinking red: The computer is in a fault state. For additional information, see the computer *Maintenance and Service Guide* at <http://www.hp.com/support>.

Item	Icon	Component
•		Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.



Item	Icon	Component
1		Power button and light*
2		Drive light
3		Audio-out (headphone)/Audio-in (microphone) combo jack
4		USB SuperSpeed port with HP Sleep and Charge
5		USB SuperSpeed ports (3)
6		Memory card reader (select products only)

* The power light status is as follows:

- Solid white: The computer is on.
- Blinking white: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.
- Blinking red: The computer is in a fault state. For additional information, see the computer *Maintenance and Service Guide* at <http://www.hp.com/support>.
- Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.

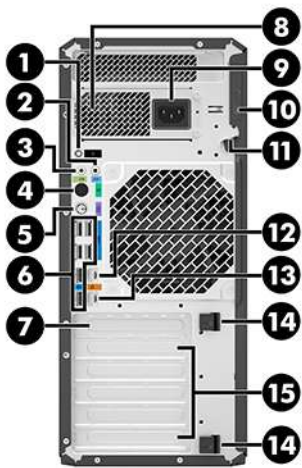
Left



Item	Component
1	Side access panel handle
2	Side access panel lock (select products only)

Rear

 **NOTE:** Refer to the illustration that most closely matches your computer.



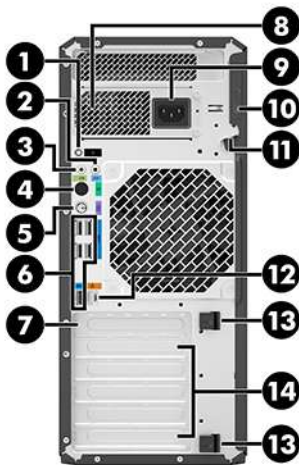
Item	Icon	Component	Item	Icon	Component
1		Power button and light*	9		Power connector
2		Audio-in (microphone) jack	10		Security cable slot

Item	Icon	Component	Item	Icon	Component
3		Audio-out (headphone) jack	11		Security lock loop
4		PS/2 mouse port	12		RJ-45 (network) jack
5		PS/2 keyboard port	13		RJ-45 (network) jack (AMT enabled)
6		USB SuperSpeed ports (6)	14		PCIe card release latches
7		Cable-only slot	15		PCIe card slots (5)
8		Power supply Built-In Self-Test (BIST) light			

NOTE: Appearance may vary.

* The power light status is as follows:

- Solid white: The computer is on.
- Blinking white: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.
- Blinking red: The computer is in a fault state. For additional information, see the computer *Maintenance and Service Guide* at <http://www.hp.com/support>.
- Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.



Item	Icon	Component	Item	Icon	Component
1		Power button and light*	8		Power supply Built-In Self-Test (BIST) light
2		Audio-out (headphone) jack	9		Power connector

NOTE: Appearance may vary.

Item	Icon	Component	Item	Icon	Component
3		Audio-in (microphone) jack	10		Security cable slot
4		PS/2 mouse port	11		Security lock loop
5		PS/2 keyboard port	12		RJ-45 (network) jack
6		USB SuperSpeed ports (5)	13		PCIe card release latches
7		Cable-only slot	14		PCIe card slots (5)

* The power light status is as follows:

- Solid white: The computer is on.
- Blinking white: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.
- Blinking red: The computer is in a fault state. For additional information, see the computer *Maintenance and Service Guide* at <http://www.hp.com/support>.
- Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.

Product 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**.

— or —

Go to <http://www.hp.com/support>, and follow the instructions to find your product. Select **Product Information**, and then select your workstation specifications.

3 Setting up the computer

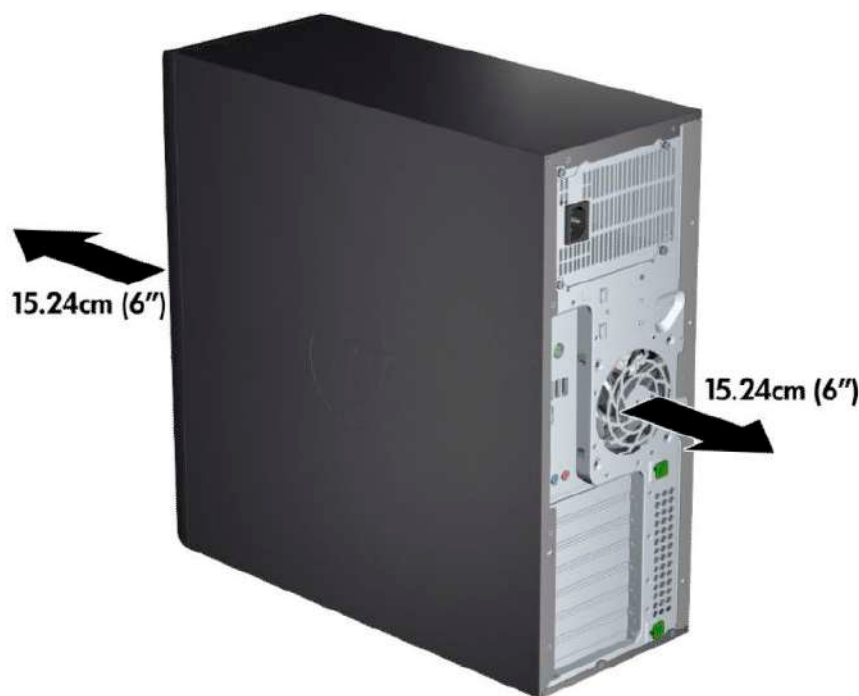
This chapter describes how to set up your computer.

Ensuring proper ventilation

Proper ventilation for the system is important for computer operation. Follow these guidelines:

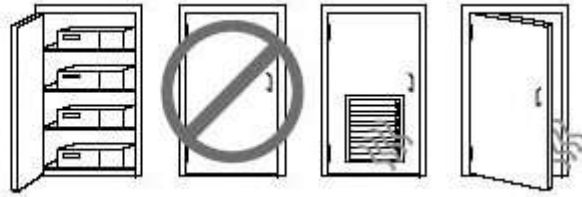
- Operate the computer on a sturdy, level surface.
- Provide at least 15.24 cm (6.00 in) of clearance at the front and back of the computer. (This is the *minimum* distance for all computer models.)

 **NOTE:** Your computer may look slightly different from the illustration in this section.



- Ensure that the ambient air temperature is within specified limits. To locate specifications for your computer, see [Product specifications on page 8](#).

- 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 computer by blocking any vents or air intakes.

Setup procedures

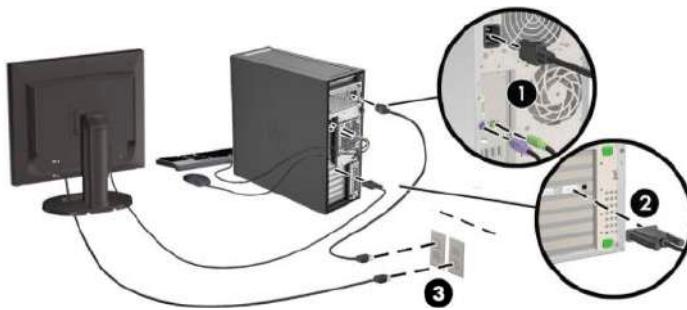
⚠ WARNING! To reduce the risk of electric shock or damage to your equipment, observe these practices:

- Plug the power cord into an AC outlet that is easily accessible at all times.
- Disconnect power from the computer by unplugging the power cord from the AC outlet (not by unplugging the power cord from the computer).
- 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.

📝 NOTE: If your computer has a 1125 W power supply, it might require more power than the typical office environment can supply. For details, see the *Site Preparation Guide* for the computer at <http://www.hp.com/support>.

To set up the computer:

1. Connect the mouse, keyboard, and power cord to the computer (1).
2. Connect the monitor to the computer (2).
3. Connect other peripheral components (such as a printer) according to the instructions included with the device.
4. Connect a network cable to the computer and to a network router or LAN device.
5. Plug the computer power cord and monitor power cord into an AC outlet (3).



Adding monitors

Planning for additional monitors

All graphics cards provided with HP Z-series computers support two simultaneous-display monitors (see [Connecting and configuring monitors on page 14](#)). Cards that support more than two monitors are available. The process for adding monitors depends on your graphics card(s) and the type and number of monitors you add.

Use this process to plan for adding more monitors.

1. Assess your monitor needs.
 - Determine how many monitors you require.
 - Determine the kind of graphics performance you want.
 - 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 to interface to 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. Determine whether you need additional graphics cards.
 - Consult the graphics card documentation to determine how many monitors you can connect to the card.

You may need to acquire adapters to match the card output to the monitor connector. (See [Matching graphics cards to monitor connectors on page 13](#).)
 - If necessary, plan to acquire a new graphics card to support additional monitors.
 - The maximum number of monitors that a graphics card supports depends on the card. Most cards provide outputs for two monitors. Some provide three or four outputs.



NOTE: Monitors with resolutions above 1920 x 1200 pixels at 60 Hz require a graphics card with either Dual Link DVI (DL-DVI) or DisplayPort output. To get native resolution with DVI, you must use a DL-DVI cable, not standard DVI-I or DVI-D cables.

HP computers do not support all graphics cards. Be sure that a new graphics card is supported before purchasing it. See [Finding supported graphics cards on page 12](#).

Many graphics cards provide more than two monitor outputs but limit you to using only two at a time. Consult the graphics card documentation or look up information on the card according to the procedure in [Finding supported graphics cards on page 12](#).

Some graphics cards support multiple monitors by multiplexing the monitor signal across multiple outputs. This might reduce graphics performance. Consult the graphics card documentation or look up information on the card according to the procedure in [Finding supported graphics cards on page 12](#).

Make sure the card outputs match the input required by the monitors. (See [Identifying monitor connection requirements on page 13](#).)

The different models of HP Z-series computers have different limits on the mechanical size, data speed, and power available for additional graphics cards. Note that the usual practical limit for graphics cards is two per computer. See the *Maintenance and Service Guide* for expansion card slot identification to make sure a new graphics card will work for your computer.

3. If you want to add a new graphics card or cards:

- a. Determine which supported graphics card best fits your needs in terms of number of monitors, compatibility with the monitors you plan to use, and performance. See [Finding supported graphics cards on page 12](#).
- b. Make sure you have the correct drivers for the card. See <http://www.hp.com/support> for HP-qualified drivers.
- c. Install the graphics card according to the video instructions for your computer at <http://www.hp.com/go/sml>.
- d. Configure the monitor. For details, refer to Windows 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.



TIP: To simplify troubleshooting of possible problems, enable the first monitor and make sure it works properly before enabling the next monitor.

Finding supported graphics cards

To find information about graphics cards supported for your computer:

1. Go to <http://www.hp.com/go/quickspecs>.
2. Select **Search active QuickSpecs**, and then select **Desktops & Workstations**.
3. Choose your model to view the specifications.
4. Click the link for **Technical Specifications-Graphics** to display expanded technical information for supported graphics cards, including how many monitors the card supports, connectors, power consumption, drivers, and other details.



NOTE: Not all graphics cards are compatible with all video transceivers and adapters. See the graphics card documentation for specific details.

Matching graphics cards to monitor connectors

The following table describes monitor configuration scenarios.

 **NOTE:** Refer to the illustration that most closely matches your computer.

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
DVI—I (WHITE) 	DVI-to-VGA adapter	DVI cable	DL DVI cable	N/A	N/A
DMS-59* 	DMS-59-to-VGA adapter	DMS-59-to-DVI adapter	N/A	DMS-59-to-DP adapter	N/A

* This interface is a dual-monitor graphics interface card that supports two VGA, two DVI, or two DP monitors.

 **NOTE:** HP graphics cards include monitor cable adapters unless otherwise indicated.

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

Identifying monitor connection requirements

The following are various scenarios for connecting monitors. See [Matching graphics cards to monitor connectors on page 13](#) for more information about the different graphics cards.

- Graphics card with DisplayPort output—If the graphics card has four DisplayPort connectors, you can connect a monitor to each connector. Use the proper adapters if required.
- Graphics card with DVI output—If you have a graphics card with two DVI connectors, you can connect a monitor to each connector. Use the proper adapters if required.

 **NOTE:** Models that have only one DVI port always have a second graphics output option (DisplayPort or VGA).

Many graphics cards provide more than two monitor outputs but limit you to using only two at a time. Consult the graphics card documentation or look up information on the card according to the procedure in [Matching graphics cards to monitor connectors on page 13](#).

On a system with two DVI connections, port number 1 provides the primary display, which is where the BIOS POST screen appears after a system boot. (Only one card is used during BIOS POST unless you change the BIOS setting.)

- Graphics card with VGA and DL-DVI output—If the computer does not have a PCIe graphics card, but has one or more SVGA *and/or* DL-DVI connectors, you can connect a monitor to each output.
- Graphics card with DMS-59 output—If the computer has a PCIe graphics card with a DMS-59 connector, use the appropriate adapter to connect your monitor.

Adapters are available to connect the DMS-59 output to two DVI or two VGA monitors.

Connecting and configuring monitors

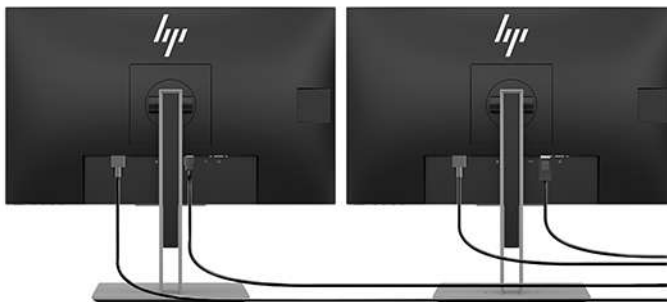


NOTE: The supported graphics cards typically allow at least two monitors, as shown in this section; some supported cards allow more monitors. Refer to the graphics card documentation for details.

1. Connect the monitor cable adapters (if required) to the computer, 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 Windows 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.

Using a third-party graphics configuration utility

Third-party graphics cards may include a monitor configuration utility. Upon installation, this utility is integrated into Windows. You can select the utility and use it to configure multiple monitors with your computer.

Refer to your graphics card documentation for details.

 **NOTE:** Some third-party configuration utilities require that you enable the monitors in Windows before using the configuration tool. Refer to your graphics card documentation for more information.

 **NOTE:** Monitor configuration utilities are also often available on the HP support website.

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:

- ▲ Type `control panel` in the taskbar search box, and then select **Control Panel**. Select **Appearance and Personalization**, and then select **Display**.

– or –

- ▲ Right-click anywhere on the desktop, and then select **Display settings**.

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

Depending on the computer model, additional components (such as memory, hard drives, optical drives, PCIe cards, or a second processor) can be installed on your computer.

- To view component installation videos, go to <http://www.hp.com/go/sml>.
- For installation guidelines and technical information, see the *Maintenance and Service Guide* for your computer at <http://www.hp.com/support>.

Security

Some HP computers have a lock on the side access panel. The key for this lock is shipped attached to the back panel of the computer chassis.

Additional security features reduce the risk of theft and alert you when there has been a chassis intrusion. For information about additional hardware and software security features available for your system, see *Maintenance and Service Guide* for your computer at <http://www.hp.com/support>.

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 Backing up, restoring, and recovering

This chapter provides information about the following processes, which are standard procedure for most products:

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see [Using Windows tools on page 16](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 16](#)).
- **Creating recovery media** (select products only)—You can use HP Recovery Manager or HP Cloud Recovery Download Tool (select products only) to create recovery media (see [Creating HP Recovery media \(select products only\) on page 16](#)).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see [Using Windows tools on page 16](#)).
- **Removing the Recovery Partition**—To remove the Recovery partition to reclaim hard drive space (select products only), select the **Remove Recovery Partition** option of HP Recovery Manager. For more information, see [Removing the HP Recovery partition \(select products only\) on page 20](#).

Using Windows tools



IMPORTANT: Windows is the only option that allows you to back up your personal information. Schedule regular backups to avoid information loss.

You can use Windows tools to back up personal information and create system restore points and recovery media, allowing you to restore from backup, refresh the computer, and reset the computer to its original state.



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

For more information and steps, see the Get Help app.

- ▲ Select the **Start** button, and then select the **Get Help** app.



NOTE: You must be connected to the Internet to access the Get Help app.

Creating HP Recovery media (select products only)

After you have successfully set up the computer, use HP Recovery Manager to create a backup of the HP Recovery partition on the computer. This backup is called HP Recovery media. In cases where the hard drive is corrupted or has been replaced, the HP Recovery media can be used to reinstall the original operating system.

To check for the presence of the Recovery partition in addition to the Windows partition, right-click the **Start** button, select **File Explorer**, and then select **This PC**.



NOTE: If your computer does not list the Recovery partition in addition to the Windows partition, contact support to obtain recovery discs. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

On select products, you can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive. For more information, see [Using the HP Cloud Recovery Download Tool to create recovery media on page 18](#).

Using HP Recovery Manager to create recovery media



NOTE: If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

Before you begin

Before you begin, note the following:

- 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 computer and determines the required media storage capacity.
- To create recovery media, use one of the following options:



NOTE: If the computer does not have a recovery partition, HP Recovery Manager displays the Windows Create a Recovery Drive feature. Follow the on-screen instructions to create a recovery image on a blank USB flash drive or hard drive.

- If your computer has an optical drive with DVD writer capability, be sure to 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, which are not compatible with HP Recovery Manager software.
- If your computer does not include an integrated optical drive with DVD writer capability, you can use an external optical drive (purchased separately) to create recovery discs, as described above. If an external optical drive is used, you must connect it directly to a USB port on the computer. It cannot be connected to a USB port on an external device, such as a USB hub.
- To create a recovery flash drive, use a high-quality blank USB flash drive.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take an hour or more. Do not interrupt this process.
- If necessary, you can exit the program before you have finished creating all of the recovery media. HP Recovery Manager will finish the current DVD or flash drive. The next time you start HP Recovery Manager, you will be prompted to continue.

Creating the recovery media

To create HP Recovery media using HP Recovery Manager:



IMPORTANT: For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

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

If you need to recover the system, see [Recovering using HP Recovery Manager on page 18](#).

Using the HP Cloud Recovery Download Tool to create recovery media

To create HP Recovery media using the HP Cloud Recovery Download Tool:

1. Go to <http://www.hp.com/support>.
2. Select **Software and Drivers**, and then follow the on-screen instructions.

Restoring and recovery

Restoring and recovery can be performed using one or more of the following options: Windows tools, HP Recovery Manager, or the HP Recovery partition.

 **IMPORTANT:** Not all methods are available on all products.

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see [Using Windows tools on page 16](#).

Restoring using HP Recovery Manager and the HP Recovery partition

You can use HP Recovery Manager and the HP Recovery partition (select products only) to restore the computer to the original factory state:

- **Resolving problems with preinstalled applications or drivers**—To correct a problem with a preinstalled application or driver:
 1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
 2. Select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.
- **Using System Recovery**—To recover the Windows partition to original factory content, select 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 18](#). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 16](#).
- **Using Factory Reset** (select products only)—Restores the computer to its original factory state by deleting all information from the hard drive and recreating the partitions and then reinstalling the operating system and the software that was installed at the factory (select products only). To use the **Factory Reset** option, you must use HP Recovery media. If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 16](#).

 **NOTE:** If you have replaced the hard drive in the computer, you can use the Factory Reset option to install the operating system and the software that was installed at the factory.

Recovering using HP Recovery Manager

You can use HP Recovery Manager software to recover the computer 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 HP Recovery media, see [Creating HP Recovery media \(select products only\) on page 16](#).

 **IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data that you want to retain. See [Using Windows tools on page 16](#).

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

 **NOTE:** When you start the recovery process, only the options available for your computer are displayed.

Before you begin, note the following:

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.
- If the computer hard drive fails, HP Recovery media must be used. This media is created using HP Recovery Manager. See [Creating HP Recovery media \(select products only\) on page 16](#).
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, contact support to obtain recovery media. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

Recovering using the HP Recovery partition (select products only)

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

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

To start HP Recovery Manager from the HP Recovery partition:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps (select products only).

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

– or –

For computers or tablets with keyboards attached:

- ▲ Press **f11** while the computer boots, or press and hold **f11** as you press the power button.

For tablets without keyboards:

- ▲ Turn on or restart the tablet, quickly hold down the volume up button, and then select **f11**.

2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

 **NOTE:** If your computer does not automatically restart in HP Recovery Manager, change the computer boot order, and then follow the on-screen instructions. See [Changing the computer boot order on page 20](#).

Recovering using HP Recovery media

If your computer does not have an HP Recovery partition or if the hard drive is not working properly, you can use HP Recovery media to recover the original operating system and software programs that were installed at the factory.

- ▲ Insert the HP Recovery media, and then restart the computer.

 **NOTE:** If your computer does not automatically restart in HP Recovery Manager, change the computer boot order, and then follow the on-screen instructions. See [Changing the computer boot order on page 20](#).

Changing the computer boot order

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

To change the boot order:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

For computers or tablets with keyboards attached:

- ▲ Turn on or restart the computer or tablet, quickly press **esc**, and then press **f9** for boot options.

For tablets without keyboards:

- ▲ Turn on or restart the tablet, quickly hold down the volume up button, and then select **f9**.

– or –

Turn on or restart the tablet, quickly hold down the volume down button, and then select **f9**.

3. Select the optical drive or USB flash drive from which you want to boot, and then 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 (select products only) 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. Before removing the Recovery partition, create HP Recovery media. See [Creating HP Recovery media \(select products only\) on page 16](#).

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 Linux

This chapter describes how to set up and restore the Linux operating system.

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

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

 **CAUTION:** Do not add optional hardware or third-party devices to the computer 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 computer on page 24](#).

 **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 computers 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 computer 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. This disc is your *HP driver disc*.



NOTE: 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.

Setting up Red Hat Enterprise Linux (RHEL)

HP Z-series computers 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 computers, go to <https://access.redhat.com/ecosystem>, select **Certified Hardware**, and then follow the on-screen instructions.

HP driver disc

Recent versions of Red Hat Linux typically require only driver updates with minor fixes to support HP computers. 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 21](#).

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 the /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 21](#)).
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 USB flash drive or optical disc in the drive, and select the appropriate `drive:hd[abcd]`. Continue the normal installation.
5. After successfully installing the operating system, reboot the computer.
 - RHEL 6 or RHEL 7: Insert your HP driver USB flash drive or optical disc. 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 computers.

Various versions of SLED are certified and supported by SUSE on HP computers. 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 computer, create one (see [HP Linux driver discs on page 21](#)).
2. Install the operating system using the discs included in the SUSE box set.
3. After successfully installing the operating system, reboot the computer.
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 computers and supports 64-bit Ubuntu 14.04 on other computers.

Various versions of Ubuntu are certified and supported by Canonical on HP computers. For more information, go to the Ubuntu Desktop certified hardware search page at <http://www.ubuntu.com/certification/desktop> and search for your computer 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 may be all that are 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 <http://www.ubuntu.com>.
2. Restart the computer.
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 on-screen instructions to install the drivers appropriate to your hardware configuration.

Proprietary graphics drivers

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



NOTE: Not all graphics cards are supported on every computer. Limitations generally occur for cards that consume large amounts of power in lower-power computers.

Third-party proprietary graphics drivers are supported by HP. The list of graphics vendors is available with the SLED 11 and Ubuntu preloads on Z-series computers, and from HP support at <https://support.hp.com/us-en/products/workstations-thin-clients/>.

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.

6 Updating the computer

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

Updating the computer after first boot

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

- Be sure that you have the latest system BIOS version loaded. See [Updating the BIOS on page 24](#).
- Be sure that you have the latest drivers for your system. See [Upgrading device drivers on page 25](#).
- Become familiar with your available HP resources. See [Locating HP resources on page 1](#).
- Consider a subscription to Driver Alerts at <https://h41369.www4.hp.com/alerts-signup.php>.

Updating the BIOS

For optimum performance, determine the BIOS version on the computer, 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 Computer 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>.

Upgrading BIOS

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

1. Go to <https://support.hp.com/us-en/products/workstations-thin-clients/>.
2. Select your product.
3. Select **Software and Drivers**.
4. Follow the instructions to locate the latest BIOS version available for the computer.
5. Compare the BIOS version on your computer to the BIOS versions on the website (see [Determining the current BIOS version on page 24](#)). If the BIOS version on the website is the same as the version on your system, no further action is required.
6. If the BIOS version on the website is a version later than the one on your system, download the appropriate version for the computer. 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 computer.

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 computer 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 <https://support.hp.com/us-en/products/workstations-thin-clients/> and select your product.
2. Follow the instructions to find the latest drivers available for the computer.

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

7 Maintenance, diagnostics, and minor troubleshooting

Turning off the computer

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

 **CAUTION:** HP does not recommend 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 computer. This may take 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 computer 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**.

If you encounter issues

To diagnose and resolve issues, HP recommends a sequential troubleshooting approach:

- Visual inspection
- Blink or beep codes
- Basic troubleshooting, including HP PC Hardware Diagnostics
- HP support
- System restore and recovery

For more information, see [Backing up, restoring, and recovering on page 16](#).

These troubleshooting strategies are explained in the following sections.

For more information

You can find more troubleshooting information in the comprehensive *Maintenance and Service Guide* (English only) available at <http://www.hp.com/support>.

Visual inspection

If you encounter a problem with the computer, 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 computer is plugged into a functional AC outlet.
- Remove all optical discs and USB flash drives before starting the computer.
- Verify that the computer 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 computer 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 computer.
- Press and hold any key. If the system beeps, your keyboard is operating correctly.
- Check all cables for loose or incorrect connections.
- Wake the computer by pressing the power button or any key on the keyboard. If the system remains in standby, 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 computer 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 computer functions properly.
- If you recently installed new software, uninstall the software to see whether the computer functions properly.
- If the display panel on an all-in-one computer is blank, open the computer 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>.

Customer Self Repair

Under the Customer Self Repair program, 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.

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

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

Basic troubleshooting



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 you touch them.

If you are having problems with the computer, 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.

- If the screen is blank, plug the monitor into a different video port on the computer if one is available. Or, replace the monitor with a monitor that you know is functioning properly.
- If you are working on a network:
 - Use a different network cable to connect your computer to the network.
 - Connect a different computer with a different cable to the network.

If your problem is not resolved, the network jack on your computer 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.
- If the computer will turn on but will not boot into the operating system, run the preboot diagnostics utility, HP PC Hardware Diagnostics. See [Using HP PC Hardware Diagnostics UEFI on page 32](#).
- If the computer 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>.

HP Support

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>—Provides the latest online documentation and worldwide technical support.
- <https://support.hp.com/us-en/products/workstations-thin-clients/>—Provides technical support information for computers.
- http://www.hp.com/support/workstation_swdrivers—Provides access to software and drivers for computers.

Customer support for workstations and thin clients

1. Go to <https://support.hp.com/us-en/products/workstations-thin-clients/>.
2. Search for your product.
3. Select **Troubleshooting**.
4. Select the problem that you are troubleshooting.

Advisories and Bulletins and Notices

To find advisories and bulletins and notices:

1. Go to <https://support.hp.com/us-en/products/workstations-thin-clients/>.
2. Select your product.
3. Select **Advisories** or **Bulletins and 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 you advance notice of changes to your product, such as an updated BIOS version that you might decide to download before the product change is required. To view a list of PCNs, go to the **Bulletins and Notices** page for your product.

Calling support

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

- Have the computer readily accessible.
- Write down the computer serial number, product number, model name, and model number and have them in front of you. This information is provided on labels. For label locations, see [Product information on page 1](#).
- 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 computer (tower and desktop configurations) or on the side of the computer (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 computer. If the computer has a product number, it is generally located next to the 10- or 12-digit serial number of the computer.



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

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

Locating warranty information

To locate warranty information, go to <http://www.hp.com/support>. HP Care Pack Services offer upgraded service levels to extend and expand a standard product warranty.



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

8 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows

HP PC Hardware Diagnostics Windows is a Windows-based utility that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs within the Windows operating system in order to diagnose hardware failures.

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 31](#).

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Help and Support or HP Support Assistant.

1. To access HP PC Hardware Diagnostics Windows from HP Help and Support:
 - a. Select the **Start** button, and then select **HP Help and Support**.
 - b. Right-click **HP PC Hardware Diagnostics Windows**, select **More**, and then select **Run as administrator**.

– or –

To access HP PC Hardware Diagnostics Windows from HP Support Assistant:

- a. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
 - or –
Select the question mark icon in the taskbar.
 - b. Select **Troubleshooting and fixes**.
 - c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.
2. When the 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 at any time, select **Cancel**.

3. When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and then provide the Failure ID code.

Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows download instructions are provided in English only.
- You must use a Windows computer to download this tool because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics Windows version

To download HP PC Hardware Diagnostics Windows, follow these steps:

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 **Download**, and then select the installation location:
To run the tool on your computer, download it to the computer desktop.
– or –
To run the tool from a USB flash drive, download it to a USB flash drive.
3. Select **Run**.

Downloading HP Hardware Diagnostics Windows by product name or number (select products only)



NOTE: For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics Windows by product name or number (select products only), follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, and then enter the product name or number.
3. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select the installation location:
To run the tool on your computer, download it to the computer desktop.
– or –
To run the tool from a USB flash drive, download it to a USB flash drive.
4. Select **Run**.

Installing HP PC Hardware Diagnostics Windows

To install HP PC Hardware Diagnostics Windows, follow these steps:

- ▲ Navigate to the folder on your computer or the flash drive where the .exe file was downloaded, double-click the .exe file, and then follow the on-screen instructions.

Using HP PC Hardware Diagnostics UEFI

HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface) 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.

If your PC will not boot into Windows, you can use HP PC Hardware Diagnostics UEFI to diagnose hardware issues.

When HP PC Hardware Diagnostics UEFI detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and provide the Failure ID code.



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

 **NOTE:** If you need to stop a diagnostic test, press [esc](#).

Starting HP PC Hardware Diagnostics UEFI

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 flash drive



NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see [Downloading the latest HP PC Hardware Diagnostics UEFI version on page 33](#).

- 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.

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in the following situations:

- HP PC Hardware Diagnostics UEFI is not included in the preinstall image.
- HP PC Hardware Diagnostics UEFI is not included in the HP Tool partition.
- The hard drive is damaged.



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 provided.

Downloading the latest HP PC Hardware Diagnostics UEFI version

To download the latest HP PC Hardware Diagnostics UEFI version to a USB flash drive:

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 UEFI** section, select **Download UEFI Diagnostics**, and then select **Run**.

Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)



NOTE: For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics UEFI by product name or number (select products only) to a USB flash drive:

1. Go to <http://www.hp.com/support>.
2. Enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it may upload results to a preconfigured server. For more information on Remote HP PC Hardware Diagnostics UEFI, go to <http://www.hp.com/go/techcenter/pcdiags>, and then select **Find out more**.

Downloading Remote HP PC Hardware Diagnostics UEFI



NOTE: HP Remote PC Hardware Diagnostics UEFI is also available as a Softpaq that can be downloaded to a server.

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

To download the latest Remote HP PC Hardware Diagnostics UEFI version, follow these steps:

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 UEFI** section, select **Download Remote Diagnostics**, and then select **Run**.

Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number



NOTE: For some products, it may be necessary to download the software by using the product name or number.

To download HP Remote PC Hardware Diagnostics UEFI by product name or number, follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

Customizing Remote HP PC Hardware Diagnostics UEFI settings

Using the Remote HP PC Hardware Diagnostics setting in Computer Setup (BIOS), you can perform the following customizations:

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.
- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

To customize Remote HP PC Hardware Diagnostics UEFI settings, follow these steps:

1. Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.
2. Select **Advanced**, and then select **Settings**.

3. Make your customization selections.
4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.

9 Routine care

General cleaning safety precautions

- Never use solvents or flammable solutions to clean the computer.
- 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 computer 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 computer before cleaning the computer.
- 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 the computer 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 computer 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

 **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 computer before cleaning the computer.
- 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.
- To remove a key, use a specially designed key remover to prevent damage to the keys. This tool is available from many electronics 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 computer before cleaning the monitor.
- 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 computer before cleaning the mouse.
2. If the mouse has an on/off switch, turn it off.
3. Wipe the body of the mouse with a damp cloth.
4. Clean the following components as directed:
 - Laser or LED—Use a cotton swab dampened with cleaning solution to gently brush out any dust around the laser or LED, and then wipe again with a dry swab. Do not wipe the laser or LED directly with the swab.
 - Scroll wheel—Spray canned, pressurized air into 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.

10 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. To access the latest information on HP accessibility, go to <http://www.hp.com/accessibility>.

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 +1 (888) 259-5707, Monday through Friday, 6 a.m. to 9 p.m. North American 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 +1 (877) 656-7058, Monday through Friday, 6 a.m. to 9 p.m. North American Mountain Time.



NOTE: Support is in English only.

Index

A

accessibility 38
audio-in (microphone) jack,
 identifying 6, 8
audio-out (headphone) jack,
 identifying 7
audio-out (headphone)/audio-in
 (microphone) combo jack,
 identifying 4, 5

B

backup, creating 16
backups 16
BIOS
 determining version 24
 updating 24
 upgrading 24
blink or beep codes 28
boot order, changing 20
buttons
 power 4, 5, 6, 7

C

care, routine 36
computer components 4
 front 4
 left side 6
 rear 6
computer features 4
computer setup 9
 connecting monitors 11
 customizing the display 15
 ensuring proper ventilation 9
 security 15
 setup procedures 10
computer, updating 24
connector, power 6, 7
Customer Self Repair 28

D

drive light, identifying 4, 5
drivers, updating 25

G

graphics cards, types 13

H

headphone (audio-out) jack 7
HP driver disc
 RHEL setup 22
 SLED setup 23
 Ubuntu setup 23
HP PC Hardware Diagnostics UEFI
 downloading 33
 starting 33
 using 32
HP PC Hardware Diagnostics Windows
 downloading 31
 installing 32
 using 31
HP Recovery Manager
 correcting boot problems 20
 starting 19
HP Recovery media
 recovery 19
 using 17
HP Recovery partition
 recovery 19
 removing 20
HP resources 1

J

jacks
 audio-in (microphone) 6, 8
 audio-out (headphone) 7
 audio-out (headphone)/audio-in
 (microphone) combo 4, 5

L

lights
 hard drive 4, 5
links
 contact information for HP US
 29
 HP Customer Self Repair 28
 Linux Hardware Matrix for HP
 computers 21
 Red Hat Certification 22
 Software & driver downloads 21

SUSE certification bulletin search
 page 22
Ubuntu 23

Linux

HP Linux driver discs 21
proprietary graphics drivers 23
RHEL 22
 setup 21
 solutions 21
Linux-ready systems
 creating a disc 21
 Linux versions 21

M

memory card reader, identifying 4,
 5
microphone (audio-in) jack 6, 8
minimized image recovery 19
minimized image, creating 18
monitors
 adjusting display 15
 connecting 14
 graphics cards 13

O

original system recovery 18

P

ports
 USB SuperSpeed 4, 5, 7, 8
 USB SuperSpeed port with HP
 Sleep and Charge 4, 5
 USB Type-C SuperSpeed Plus 4
power button, identifying 4, 5, 6, 7
power connector, identifying 6, 7
product
 diagnostics 2
 documentation 2
 information 1
 updates 3
product change notifications 29

R

recovery 16
 discs 17, 19

- HP Recovery Manager 18
- HP Recovery partition 18
- media 19
- starting 19
- supported discs 17
- system 18
- USB flash drive 19
- using HP Recovery media 17
- recovery media
 - creating using HP Cloud Recovery Download Tool 18
 - creating using HP Recovery Manager 17
 - creating using Windows tools 16
 - discs 17
 - HP Recovery partition 16
 - USB flash drive 17
 - using 17
- recovery partition, removing 20
- Red Hat Linux driver media, RHEL setup 22
- Remote HP PC Hardware Diagnostics UEFI settings
 - customizing 34
 - using 34
- restoring 16
- RHEL
 - HP driver disc 22
 - Linux 22
 - Red Hat Linux driver media 22
 - setup 22
- routine care 36
 - cleaning chassis 36
 - cleaning keyboard 36
 - cleaning monitor 37
 - cleaning mouse 37
 - cleaning safety 36
- S**
 - security cable slot, identifying 6, 8
 - setup
 - Linux 21
 - RHEL 22
 - SLED 22
 - Ubuntu 23
 - SLED
 - HP driver disc 23
 - setup 22
 - slots
 - security cable 6, 8
 - specifications, product 8
 - support 1, 29
 - advisories 29
 - bulletins 29
 - notices 29
 - online 29
 - supported discs, recovery 17
 - system recovery 18
 - system restore point, creating 16
 - recovery media 16
 - system restore point 16
 - Windows tools, using 16
- T**
 - technical support 28
 - troubleshooting 26
 - at startup 27
 - Customer Self Repair 28
 - during operation 27
 - turning off computer 26
- U**
 - Ubuntu
 - HP driver disc 23
 - setup 23
 - updating the computer 24
 - determining BIOS version 24
 - first boot update 24
 - updating device drivers 25
 - updating the BIOS 24
 - upgrading the BIOS 24
 - URLs
 - contact information for HP US 29
 - HP Customer Self Repair 28
 - Linux Hardware Matrix for HP computers 21
 - Red Hat Certification 22
 - Software & driver downloads 21
 - SUSE certification bulletin search page 22
 - Ubuntu 23
 - USB SuperSpeed port with HP Sleep and Charge, identifying 4, 5
 - USB SuperSpeed port, identifying 4, 5, 7, 8
 - USB Type-C SuperSpeed Plus port, identifying 4
- W**
 - warranty information 30
 - Windows
 - backup 16