User Guide

Product notice

This guide describes features that are common to most models. Some features may not be available on your product. To access the latest user guide, go to http://www.hp.com/support, and follow the instructions to find your product. Then select **User Guides**.

About This Guide

This guide provides technical specifications and information about monitor features, setting up the monitor, and using the software. Depending on the model, your monitor may not have all the features included in this guide.

⚠ WARNING! Indicates a hazardous situation that, if not avoided, **could** result in serious injury or death.

⚠ 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). Warns 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.

This product incorporates HDMI technology.

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1   Getting Started

Important safety information

An AC adapter and AC power cord may be included with the monitor. If another cord is used, use only a power source and connection appropriate for this monitor. For information about the correct AC power cord set to use with the monitor, refer to the *Product Notices* provided in your documentation kit.

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

• 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.

• If the 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, it is an important safety feature.

• When unplugging the power cord from the AC outlet, grasp the cord by the plug.

For your safety, do not place anything on power cords or cables. Care shoulod be taken to route all cords and cables connected to the monitor so that they cannot be stepped on, pulled, grabbed, or tripped over.

To reduce the risk of serious injury, read the *Safety & Comfort Guide* provided with your user guides. It describes proper workstation setup and proper posture, health, and work habits for computer users. The *Safety & Comfort Guide* also provides important electrical and mechanical safety information. The *Safety & Comfort Guide* is also available on the Web at http://www.hp.com/ergo.

📝 **IMPORTANT:** For the protection of the monitor and the computer, connect all power cords for the computer and its peripheral devices (such as a monitor, printer, scanner) to a surge protection device such as a power strip or uninterruptible power supply (UPS). Not all power strips provide surge protection; the power strip must be specifically labeled as having this capability. Use a power strip whose manufacturer offers a damage replacement policy so you can replace the equipment if surge protection fails.

Use the appropriate and correctly sized furniture designed to properly support your monitor.

⚠ **WARNING!** Monitors that are inappropriately situated on dressers, bookcases, shelves, desks, speakers, chests, or carts may fall over and cause personal injury.

📝 **NOTE:** This product is suitable for entertainment purposes. Consider placing the monitor in a controlled luminous environment to avoid interference from surrounding light and bright surfaces that may cause disturbing reflections from the screen.

Product features and components

Features

This product is an AMD FreeSync-qualified monitor, which allows you to enjoy PC gaming with smooth, responsive, tear-free performance whenever a picture changes on the screen. The external source connected to your monitor must have the FreeSync driver installed.

AMD FreeSync technology is designed to eliminate stuttering and tearing in games and videos by locking a monitor's refresh rate to the frame rate of the graphics card. Check with the manufacturer of your component or system for specific capabilities.

IMPORTANT: AMD Radeon Graphics and/or AMD A-Series APU-compliant monitor with DisplayPort/HDMI Adaptive-Sync required. AMD 15.11 Crimson driver (or newer) required to support FreeSync over HDMI.

NOTE: Adaptive refresh rates vary by monitor. More information is available at www.amd.com/freesync. To enable FreeSync on the monitor, press the Menu button on the monitor to open the on-screen display menu. Click **Image**, and then click **FreeSync™**.

This guide describes features of the following monitors:

- 54.61 cm (21.5-inch) diagonal viewable screen area with 1920 x 1080 resolution, plus full-screen support for lower resolutions; includes custom scaling for maximum image size while preserving original aspect ratio

- 60.47 cm (23.8-inch) diagonal viewable screen area with 1920 x 1080 resolution, plus full-screen support for lower resolutions; includes custom scaling for maximum image size while preserving original aspect ratio

The monitors include the following features:

- Anti-Glare panel with an LED backlight
- Wide viewing angle to allow viewing from a sitting or standing position, or when moving from side to side
- Tilt capability
- Pivot capability to rotate the monitor head from landscape to portrait mode (Select Models)
- Swivel and height adjustment capabilities (Select Models)
- VGA video input (Select Models)
- Removable stand for flexible monitor head mounting solutions
- DisplayPort video input (Select Models)
- High-Definition Multimedia Interface (HDMI) video input
- Audio headphone/variable line-out jack (Select Models)
- Plug-and-play capability if supported by your operating system
- Security cable slot provision on rear of monitor for optional security cable
- On-Screen Display (OSD) adjustments in several languages for easy setup and screen optimization
- High-Bandwidth Digital Content Protection (HDCP) copy protection on all digital inputs
- Energy saver feature to meet requirements for reduced power consumption

NOTE: For safety and regulatory information, refer to the *Product Notices* provided in your documentation kit. To access the latest user guide, go to http://www.hp.com/support, and follow the instructions to find your product. Then select **User Guides**.

Rear components

54.61 cm/21.5-inch model

Component		Description
1	Power connector	Connects the power cable to the monitor
2	HDMI connector	Connects the HDMI cable to the monitor
3	VGA connector	Connects the VGA cable to the monitor

60.47 cm/23.8–inch model

Component		Description
1	Power connector	Connects the power cable to the monitor
2	HDMI connector	Connects the HDMI cable to the monitor
3	DisplayPort connector	Connects the DisplayPort cable to the monitor
4	Audio-out (headphone) jack	Connects headphones to the monitor. **CAUTION:** To reduce the risk of personal injury, adjust the volume before using headphones or earbuds. For additional safety information, see the *Product Notices* provided in your documentation kit.

Front components

Control		Description
1	Menu button	Press to open the OSD menu, select a menu item from the OSD, or close the OSD menu.
2-4	Function buttons	When the OSD menu is open, press the buttons to navigate through the menu. The function light icons indicate the default button functions. For a description of these functions, see Using the function buttons on page 16.
		You can reassign the function buttons to quickly select the most commonly used operations. See Reassigning the function buttons on page 16.
5	Power	Turns the monitor on or off.
6	Power light	White: The monitor is on. Amber: The monitor is in standby mode.

Setting up the monitor

Attaching the monitor stand

⚠ WARNING! To reduce the risk of serious injury, read the *Safety & Comfort Guide*. It describes proper workstation setup and proper posture, health, and work habits for computer users. The *Safety & Comfort Guide* also provides important electrical and mechanical safety information. The *Safety & Comfort Guide* is available on the Web at http://www.hp.com/ergo.

📝 IMPORTANT: To prevent damage to the monitor, do not touch the surface of the LCD panel. Pressure on the panel may cause nonuniformity of color or disorientation of the liquid crystals. If this occurs, the screen will not recover to its normal condition.

📝 IMPORTANT: To prevent the screen from getting scratched, defaced, or broken and prevent damage to the control buttons, position the monitor facedown on a flat surface covered with protective sheet foam or a nonabrasive cloth.

54.61 cm/21.5-inch model

1. Position the monitor head facedown on a flat surface covered by protective sheet made of foam or a clean, dry cloth.
2. Insert stand riser (1) and base (2) into the monitor as shown above.
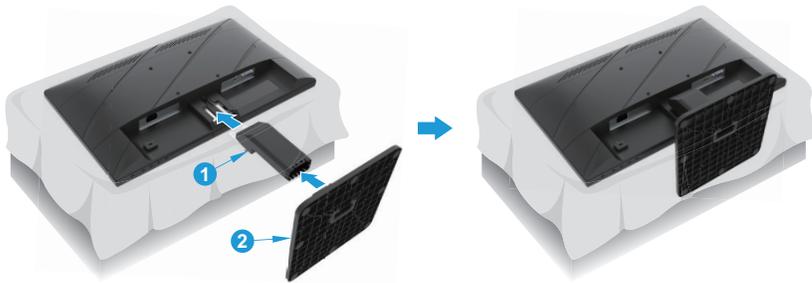
60.47 cm/23.8–inch model

The monitor uses the HP Quick Release 2 for easy mounting of the monitor. To mount the panel onto the stand:

1. Position the monitor head facedown on a flat surface covered by protective sheet made of foam or a clean, dry cloth.
2. Unpack the base, one hand hold the monitor, the other hand to pivot the stand (1).
3. Insert the base (2) into the stand.
4. Turn the screw clockwise (3) to attach the base to the monitor.
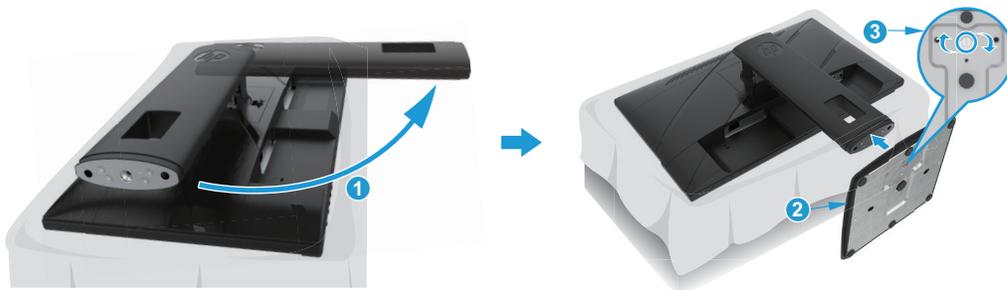
Mounting the monitor head

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

IMPORTANT: This monitor supports the VESA industry-standard 100 mm mounting holes. To attach a third-party mounting solution to the monitor, use four 4 mm, 0.7 pitch, 10 mm-long screws. Longer screws may damage the monitor. 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 monitor head. For best performance, use the power and video cables provided with the monitor.

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

Removing the monitor stand

You can remove the monitor head from the stand to install the monitor head on a wall, a swing arm, or other mounting fixture.

IMPORTANT: Before beginning to disassemble the monitor, be sure that the monitor is turned off and all cables are disconnected.

54.61 cm/21.5-inch model

1. Disconnect and remove all cables from the monitor.
2. Position the monitor head facedown on a flat surface covered by protective sheet made of foam or a clean, dry cloth.
3. Push release button (1) and pull stand (2) away from monitor.
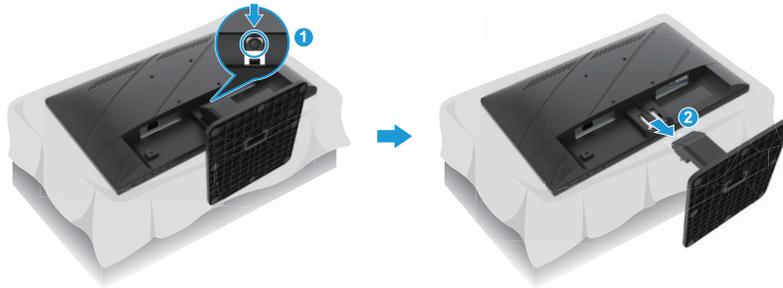
60.47 cm/23.8–inch model

1. Disconnect and remove all cables from the monitor.
2. Position the monitor head facedown on a flat surface covered by protective sheet made of foam or a clean, dry cloth.
3. Push up the latch near the bottom center of the stand's mounting plate (1).
4. Swing the bottom of the stand up until the mounting plate clears the recess in the panel (2).
5. Slide the stand out of the recess (3).

Attaching the VESA mounting bracket

54.61 cm/21.5-inch model

Install the monitor to the wall or swing arm of your choice using the four screws.
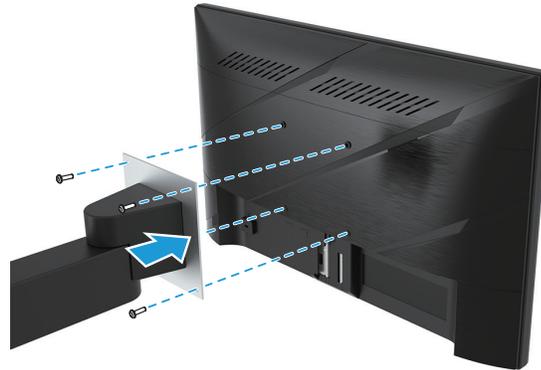
60.47 cm/23.8–inch model

Install the monitor to the wall or swing arm of your choice using the four screws that were removed from the VESA holes on the rear of the monitor head.
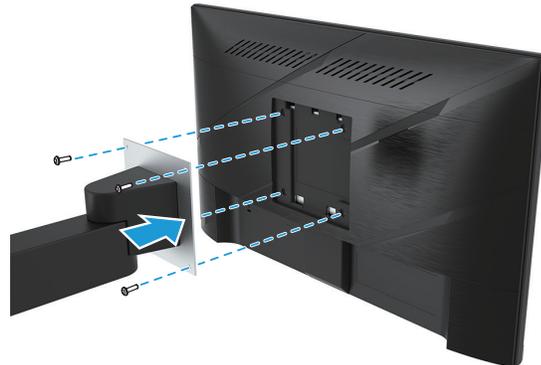
IMPORTANT: If these instructions do not apply to your device, then follow the mounting device manufacturer's instructions when mounting the monitor to a wall or swing arm.

Connecting the cables

1. Place the monitor in a convenient, well-ventilated location near the computer.

2. Before connecting the cables, route the cables through the cable routing hole in the center of the stand. (Select Models)

3. Connect a video cable.

- Connect one end of a VGA cable to the VGA connector on the rear of the monitor and the other end to the VGA connector on the source device. (Select Models)
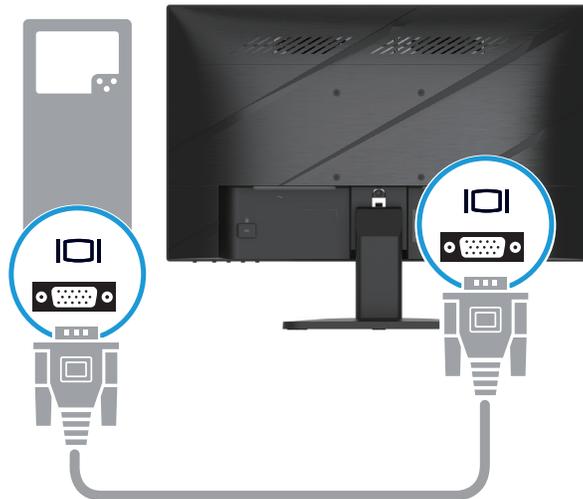
- Connect one end of an HDMI cable to the HDMI connector on the rear of the monitor and the other end to a HDMI connector on the source device.

or
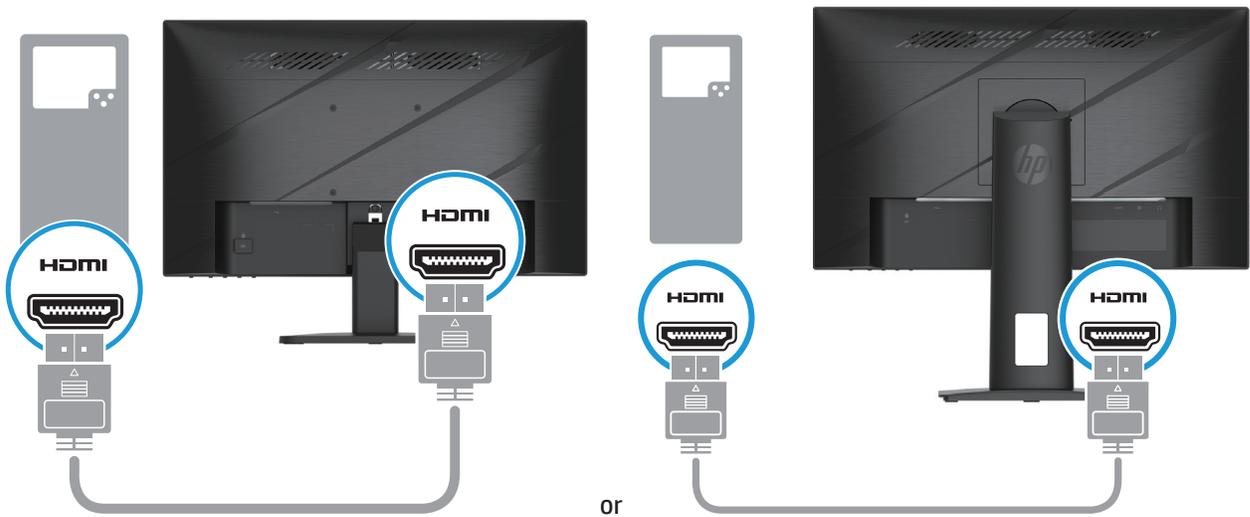
NOTE: Connector locations may vary.

- Connect one end of a DisplayPort cable to the DisplayPort connector on the rear of the monitor and the other end to the DisplayPort connector on the source device. (Select Models)
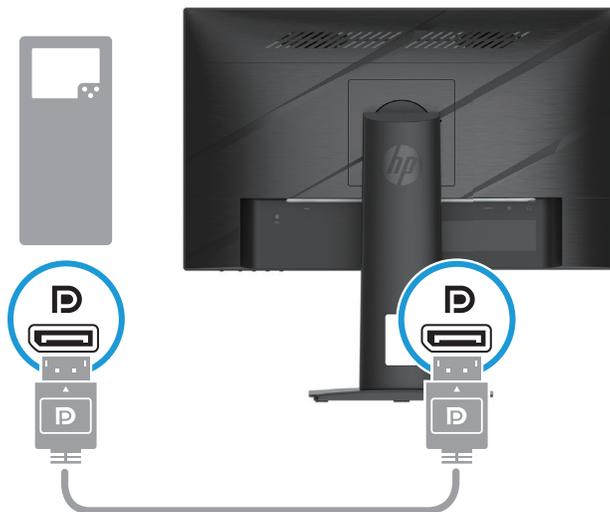
NOTE: When the system wakes up from the Sleep state, the monitor automatically scans to find an active input video signal.

4. Connect the round end of the power supply cord to the monitor (1), and then connect one end of the power cord to the power supply (2) and the other end to a grounded AC outlet (3).

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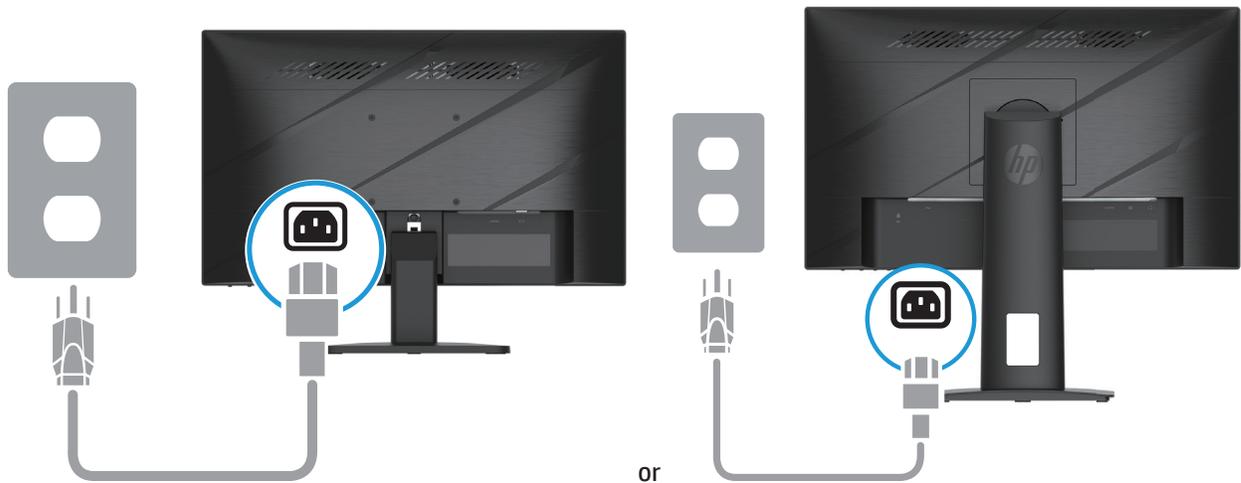
⚠ WARNING! To reduce the risk of electric shock or damage to the equipment:

Do not disable the power cord grounding plug. The grounding plug is an important safety feature.

Plug the power cord into a grounded (earthed) AC outlet that is easily accessible at all times.

Disconnect power from the equipment by unplugging the power cord from the AC outlet.

For your safety, do not place anything on power cords or cables. Arrange them so that no one may accidentally step on or trip over them. Do not pull on a cord or cable. When unplugging the power cord from the AC outlet, grasp the cord by the plug.

📝 NOTE: Connector locations may vary.

Adjusting the monitor

⚠ WARNING! To reduce the risk of serious injury, read the *Safety & Comfort Guide*. It describes proper workstation setup and proper posture, health, and work habits for computer users. The *Safety & Comfort Guide* also provides important electrical and mechanical safety information. The *Safety & Comfort Guide* is available on the Web at http://www.hp.com/ergo.

1. Tilt the monitor head forward or backward to set it to a comfortable eye level.

or

2. Adjust the monitor's height to a comfortable position for your individual workstation. The monitor's top bezel edge should not exceed a height that is parallel to your eye height. A monitor that is positioned low and reclined may be more comfortable for users with corrective lenses. The monitor should be repositioned as you adjust your working posture throughout the work day. (Select Models)
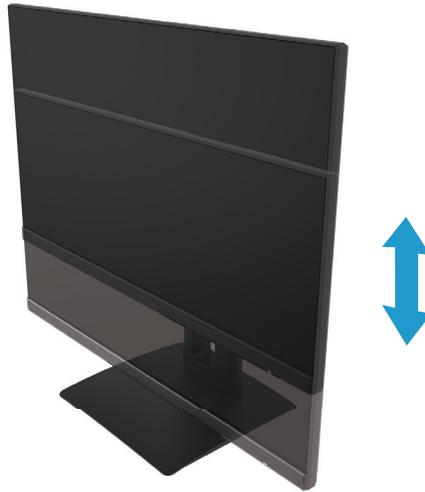
(Select Models)

3. Swivel the monitor to the left or right for the best viewing angle.
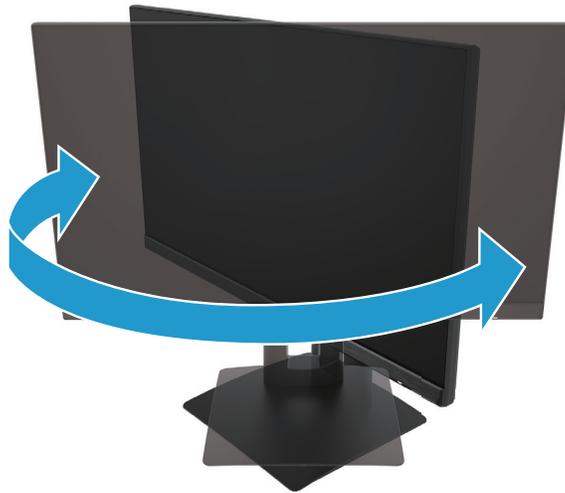
(Select Models)

4. You can pivot the monitor from landscape to portrait orientation viewing to adapt to your application.

    a. Adjust the monitor to full height position and tilt the monitor back to full tilt position (1).

    b. Pivot the monitor clockwise 90° from landscape to portrait orientation (2).

IMPORTANT: If the monitor is not in full height and full tilt position when pivoting, the bottom right corner of the monitor panel will come in contact with the base and potentially cause damage to the monitor.

(Select Models)

NOTE: Use the operating system's monitor settings to rotate the image on the screen from portrait to landscape. To rotate the OSD from portrait to landscape, open the OSD menu and select **Image Adjustment**, select **On-Screen Menu Rotation**, and then select **Portrait**.

Turning on the monitor

1. Press the Power button on the computer to turn it on.

2. Press the Power button on the bottom of the monitor to turn it on.

When the power is on, the power LED indicator turns white; when in Sleep mode, the power LED indicator turns amber.

or
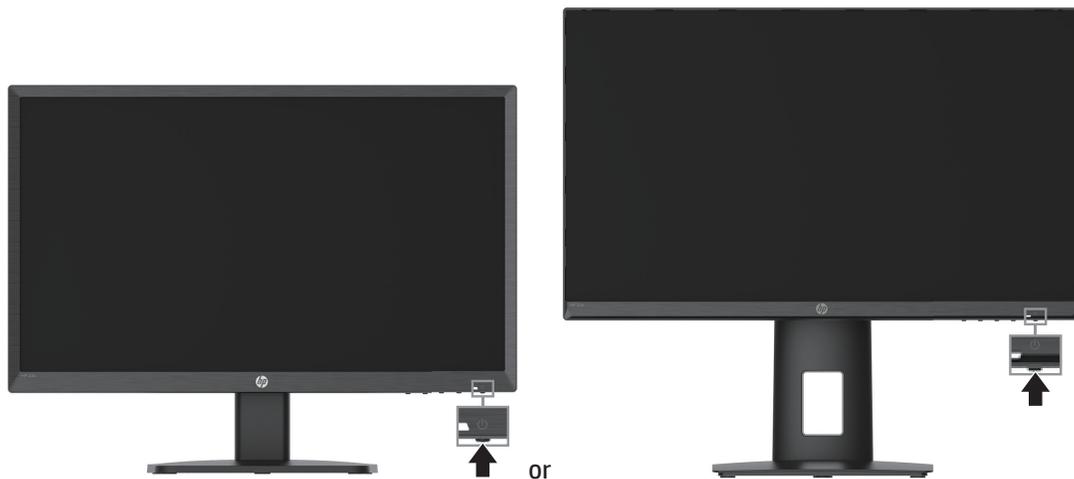
When the monitor is first turned on, a monitor status message displays for five seconds. The message shows which input is the current active signal, the status of the auto-switch source setting (On or Off; default setting is On), the current preset display resolution, and the recommended preset display resolution.

The monitor automatically scans the signal inputs for an active input and uses that input for the display.

IMPORTANT: Burn-in image damage may occur on monitors that display the same static image on the screen for 12 or more hours. To avoid burn-in image damage, you should always activate a screen saver application or turn off the monitor when it will not be in use for a prolonged period of time. Image retention is a condition that may occur on all LCD screens. Burn-in damage on the monitor is not covered under the HP warranty.

NOTE: If pressing the power button has no effect, the Power Button Lockout feature may be enabled. To disable this feature, press and hold the monitor power button for 10 seconds.

NOTE: You can disable the power light in the OSD menu. Press the Menu button to open the OSD, and then select **Power**, select **Power LED**, and then select **Off**.

Installing a security cable

You can secure the monitor to a fixed object with an optional cable lock available from HP.

or
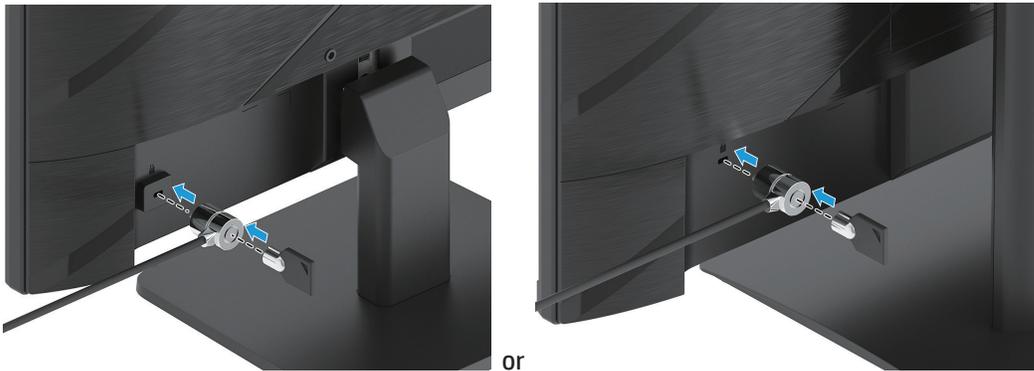
HP watermark and image retention policy

The IPS monitor models are designed with IPS (In-Plane Switching) display technology, which provides ultra-wide viewing angles and advanced image quality. IPS monitors are suitable for a wide variety of advanced image quality applications. This panel technology, however, is not suitable for applications that exhibit static, stationary, or fixed images for long periods of time without the use of screen savers. These types of applications may include camera surveillance, video games, marketing logos, and templates. Static images may cause image retention damage that could look like stains or watermarks on the monitor's screen.

Image retention damage on monitors that are in use 24 hours per day is not covered under the HP warranty. To avoid image retention damage, always turn off the monitor when it is not in use or use the power management setting, if supported on your system, to turn off the monitor when the system is idle.

2   Using the Monitor

Software and utilities

You can download and install the following files from http://www.hp.com/support:

- INF (Information) file
- ICM (Image Color Matching) files
- HP Display Assistant: Adjusts the monitor settings and enables theft deterrence features

To download the files:

1. Go to http://www.hp.com/support.
2. Select **Software and Drivers**.
3. Select your product type.
4. Enter your HP monitor model in the search field and follow the on-screen instructions.

The Information file

The INF file defines monitor resources used by Windows® operating systems to ensure monitor compatibility with the computer's graphics adapter.

This monitor is Windows Plug and Play–compatible and the monitor will work correctly without installing the INF file. Monitor Plug and Play–compatibility requires that the computer's graphic card is VESA DDC2 compliant and that the monitor connects directly to the graphics card. Plug and Play does not work through separate BNC-type connectors or through distribution buffers/boxes.

The Image Color Matching file

The ICM files are data files that are used in conjunction with graphics programs to provide consistent color matching from monitor screen to printer, or from scanner to monitor screen. This file is activated from within graphics programs that support this feature.

NOTE: The ICM color profile is written in accordance with the International Color Consortium (ICC) Profile Format specification.

Using the OSD menu

Use the OSD menu to adjust the screen image based on your viewing preferences. You can access and make adjustments in the OSD using the buttons at the bottom of the monitor's front bezel.

To access the OSD menu and make adjustments, do the following:

1. If the monitor is not already on, press the power button to turn on the monitor.

2. Press the Menu button.

3. Use the three function buttons to navigate, select, and adjust the menu choices. The on-screen button labels vary depending on which menu or submenu is active.

The following table lists the menu selections in the OSD menu.

Main Menu	Description
Brightness +	Adjusts the brightness and contrast level of the screen.
Color	Selects and adjusts the screen color.
Image	Adjusts the screen image.
Input	Selects the video input signal.
Power	Adjusts the power settings.
Menu	Adjusts the on-screen display (OSD) and Function button controls.
Management	Adjusts the DDC/CI settings, selects the language in which the OSD menu is displayed (the factory default is English), adjusts the audio settings, and returns all OSD menu settings to the factory default settings.
Information	Displays important information about the monitor.
Exit	Exits the OSD menu screen.

Using the function buttons

Pressing one of the function buttons activates the buttons and lights the icons above the buttons.

NOTE: The actions of the function buttons vary among monitor models.

For information about changing the function of the buttons, see Reassigning the function buttons on page 16.
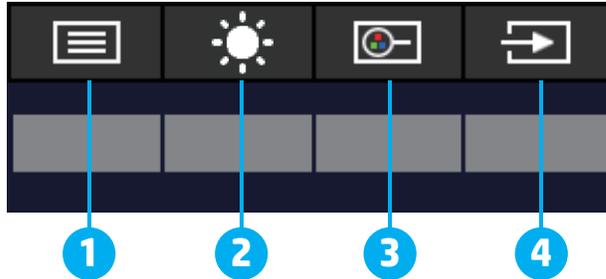
Button		Description
1	Menu button	Opens the OSD main menu, selects a menu item from the OSD, or closes the OSD menu.
2	Brightness button (Assignable function button)	Opens the Brightness adjustment scale.
3	Viewing Modes button (Assignable function button)	Opens the Viewing Modes menu where you can adjust the monitor screen to a comfortable viewing light or select a preset view mode.
4	Next Active Input button (Assignable function button)	Switches the monitor's input source to the next active input.

Reassigning the function buttons

You can change the assignable function buttons from their default values so that when the buttons are activated you can quickly access commonly used menu items. You cannot reassign the Menu button.

To reassign the function buttons:

1. Press the Menu button to open the OSD menu.

2. Select **Menu**, select **Assign Buttons**, and then select one of the available options for the button you want to assign.

NOTE: To view an OSD menu simulator, visit the HP Customer Self Repair Services Media Library at http://www.hp.com/go/sml.

Adjusting to Low Blue Light Mode

Decreasing the blue light emitted by the monitor reduces the blue light exposure to your eyes. This monitor allows you to select a setting to reduce blue light output and create a more relaxing and less stimulating image while you read content on the screen.

To adjust the blue light output from the monitor:

1. Press one of the rear panel OSD buttons to activate the buttons, and then press the Menu button to open the OSD. Select **Color** and **Viewing Modes**.

2. Select your desired setting:
   - **Low Blue Light:** TUV certified. Reduces the blue light for improved eye comfort
   - **Night:** Adjusts to the lowest blue light and reduces the impact on sleep
   - **Reading:** Optimizes blue light and brightness for indoor viewing

3. Select **Save and Return** to save your setting and close the menu. Select **Cancel** if you don't want to save the setting.

4. In the Main menu, select **Exit**.

Using Auto-Sleep Mode

The monitor supports an OSD menu option called Auto-Sleep Mode that allows you to enable or disable a reduced power state for the monitor. When Auto-Sleep Mode is enabled (enabled by default), the monitor enters a reduced power state when the computer signals low power mode (absence of either horizontal or vertical sync signal).

Upon entering this reduced power state (sleep mode), the monitor screen is blanked, the backlight is turned off, and the power light turns amber. The monitor draws less than 0.5 W of power when in this reduced power state. The monitor wakes from sleep mode when the computer sends an active signal to the monitor (for example, if you activate the mouse or keyboard).

You can disable Auto-Sleep Mode in the OSD. Press the Menu button on the monitor's rear panel to open the OSD. In the OSD select **Power**, select **Auto-Sleep Mode**, and then select **Off**.

3 Support and troubleshooting

Solving common problems

The following table lists possible problems, the possible cause of each problem, and the recommended solutions.

Problem	Possible cause	Solution
Screen is blank or video is flashing.	Power cord is disconnected.	Connect the power cord.
	Monitor is turned off.	Press the monitor power button. **NOTE:** If pressing the power button has no effect, press and hold the power button for 10 seconds to disable the Power Button Lockout feature.
	Video cable is improperly connected.	Connect the video cable properly. For more information, see Connecting the cables on page 8.
	System is in sleep mode.	Press any key on the keyboard or move the mouse to inactivate the screen blanking utility.
	Video card is incompatible.	Open the OSD menu and select the **Input** menu. **Set Auto-Switch Input** to **Off** and manually select the input. or Replace the video card or connect the video cable to one of the computer's on-board video sources.
Image appears blurred, indistinct, or too dark.	Brightness setting is too low.	Open the OSD menu and select **Brightness** to adjust the brightness scale as needed.
"Check Video Cable" is displayed on the screen.	Monitor video cable is disconnected.	Connect the appropriate video signal cable between the computer and monitor. Be sure that the computer power is off while connecting the video cable.
"Input Signal Out of Range" is displayed on screen.	Video resolution and/or refresh rate are set higher than the monitor supports.	Change the settings to a supported setting (see Preset display resolutions on page 25).
The monitor does not enter into a low-power sleep state.	The monitor's power saving control is disabled.	Open the OSD menu and select **Power**, select **Auto-Sleep Mode**, and then set auto-sleep to **On**.
"OSD Lockout" is displayed.	The monitor's OSD Lockout function is enabled.	Press and hold the Menu button for 10 seconds to disable the OSD Lockout function.
"Power Button Lockout" is displayed.	The monitor's Power Button Lockout feature is enabled.	Press and hold the Power button for 10 seconds to unlock the power button function.

Button lockouts

Holding down the power button or Menu button for ten seconds disables that button. You can re-enable the button by holding the button down again for ten seconds. The button lockout function is available only when the monitor is on, an active signal is displayed, and the OSD menu is closed.

Using the auto-adjustment function (analog input)

The auto-adjustment feature automatically engages and attempts to optimize your screen under the following conditions:

- Monitor setup
- Factory reset of the computer
- Changing monitor resolution

You can manually optimize the screen performance for the VGA (analog) input at any time from the Auto Adjustment menu in the OSD. You can download the auto-adjustment pattern software utility from http://www.hp.com/support.

Do not use this procedure if the monitor is using an input other than VGA. If the monitor is using a VGA (analog) input, this procedure can correct the following image quality conditions:

- Fuzzy or unclear focus
- Ghosting, streaking, or shadowing effects
- Faint vertical bars
- Thin, horizontal scrolling lines
- An off-center picture

To use the auto-adjustment feature:

1. Turn the monitor on, and then wait for for 20 minutes before adjusting.

2. Press the Menu button to open the OSD menu, select **Image**, and then select **Auto-Adjustment**. If the result is not satisfactory, continue with the procedure.

3. Open the auto-adjustment utility. (You can download this utility from http://www.hp.com/support.) The setup test pattern is displayed.
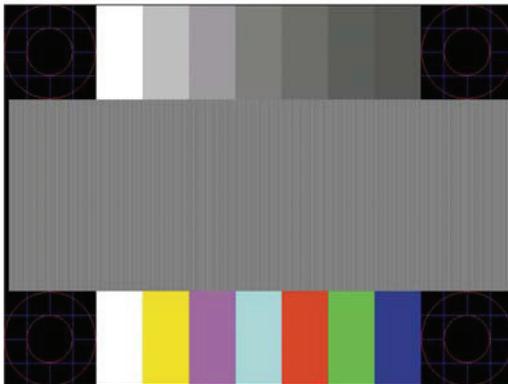
4. Press the Esc key or any other key on the keyboard to exit the test pattern.

Optimizing image performance (analog input)

Two controls in the on-screen display can be adjusted to improve image performance: Clock and Phase (available in the OSD menu). Use these controls only when the auto-adjustment function does not provide a satisfactory image.

NOTE: The Clock and Phase controls are adjustable only when using an analog (VGA) input. These controls are not adjustable for digital inputs.

The Clock must first be set correctly since the Phase settings are dependent on the main Clock setting.

- **Clock:** Increases/decreases the value to minimize any vertical bars or stripes visible on the screen background.

- **Phase:** Increases/decreases the value to minimize video flickering or blurring.

NOTE: When using the controls, you will obtain the best results by using the auto-adjustment pattern software utility. You can download this utility from http://www.hp.com/go/sml.

When adjusting the Clock and Phase values, if the monitor images become distorted, continue adjusting the values until the distortion disappears. To restore the factory settings, press the Menu button to open the OSD menu, and then select **Management**, select **Factory Reset**, and then select **Yes**.

To eliminate vertical bars (Clock):

1. Press the Menu button to open the OSD menu, select **Image**, and then select **Clock and Phase**.

2. Select **Clock**, and then use the OSD buttons on the monitor that display up and down arrow icons to eliminate vertical bars. Press the buttons slowly so that you do not miss the optimum adjustment point.

3. After adjusting the Clock, if flickering, blurring, or bars appear on the screen, proceed to adjust the Phase.

To remove flickering or blurring (Phase):

1. Press the Menu button to open the OSD menu, select **Image**, and then select **Clock and Phase**.

2. Select **Phase**, and then use the OSD buttons on the monitor that display up and down arrow icons to eliminate flickering or blurring. Flickering or blurring may not be eliminated, depending on the computer or graphics controller card installed.
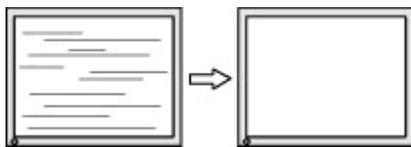
To correct screen position (Horizontal Position or Vertical Position):

1. Press the Menu button to open the OSD menu, select **Image**, and then select **Image Position.**

2. Press the OSD buttons on the monitor that display up and down arrow icons to properly adjust the position of the image in the display area of the monitor. The **Horizontal Position** shifts the image left or right; the **Vertical Position** shifts the image up or down.
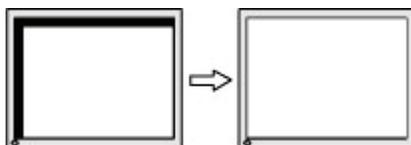
Contacting support

To resolve a hardware or software problem, go to http://www.hp.com/support. Use this site to get more information about your product, including links to discussion forums and instructions on troubleshooting. You can also find information about how to contact HP and open a support case.

Preparing to call technical support

If you cannot solve a problem using the troubleshooting tips in this section, you may need to call technical support. Have the following information available when you call:

- Monitor model number
- Monitor serial number
- Purchase date on invoice
- Conditions under which the problem occurred
- Error messages received
- Hardware configuration
- Name and version of the hardware and software you are using

Locating the serial number and product number

Depending on the product, the serial number and product number are located on a label on the rear of the monitor or on a label under the front bezel of the monitor head. You might need these numbers when contacting HP about the monitor.

NOTE: You may need to partially pivot the monitor head to read the label.

or

4 Maintaining the monitor

Maintenance guidelines

To enhance the performance and extend the life of the monitor:

- Do not open the monitor cabinet or attempt to service this product yourself. Adjust only those controls that are covered in the operating instructions. If the monitor is not operating properly or has been dropped or damaged, contact an authorized HP dealer, reseller, or service provider.
- Use only a power source and connection appropriate for this monitor, as indicated on the label/back plate of the monitor.
- Be sure that the total ampere rating of the products connected to the outlet does not exceed the current rating of the AC outlet and that the total ampere rating of the products connected to the cord does not exceed the rating of the cord. Look on the power label to determine the ampere rating (AMPS or A) for each device.
- Install the monitor near an outlet that you can easily reach. Disconnect the monitor by grasping the plug firmly and pulling it from the outlet. Never disconnect the monitor by pulling the cord.
- Turn the monitor off when it is not in use and use a screen saver program. Doing this can substantially increase the life expectancy of the monitor.

NOTE: A burned-in image on the monitor is not covered under the HP warranty.

- Never block the slots and openings of the cabinet or push objects into them. These openings provide ventilation.
- Do not drop the monitor or place it on an unstable surface.
- Do not allow anything to rest on the AC power cord. Do not walk on the cord.
- Keep the monitor in a well-ventilated area, away from excessive light, heat, or moisture.

Cleaning the monitor

1. Turn off the monitor and unplug the power cord from the AC outlet.
2. Disconnect any external devices.
3. Dust the monitor by wiping the screen and the cabinet with a soft, clean antistatic cloth.
4. For more difficult cleaning situations, use a 50/50 mix of water and isopropyl alcohol.

IMPORTANT: Do not use cleaners that contain any petroleum-based materials such as benzene, thinner, or any volatile substance to clean the monitor screen or cabinet. These chemicals may damage the monitor.

IMPORTANT: Spray the cleaner onto a cloth and use the damp cloth to gently wipe the screen surface. Never spray the cleaner directly on the screen surface. It may run behind the bezel and damage the electronics. The cloth should be moist, but not wet. Water dripping into the ventilation openings or other points of entry can cause damage to the monitor. Allow the monitor to air-dry before use.

Shipping the monitor

Keep the original packing box in a storage area. You may need it later if you ship the monitor or move.

Appendix A   Technical specifications

📝 **NOTE:** All specifications represent the typical specifications provided by HP component manufacturers; actual performance may vary either higher or lower.

For the latest specifications or additional specifications on this product, go to http://www.hp.com/go/quickspecs/ and search for your specific monitor model to find the model-specific QuickSpecs.

54.61 cm/21.5-inch model specifications

Specification	Measurement	
Display, wide-screen	54.61 cm	21.5 in
Type	FHD	
Viewable Image Size	**54.61 cm, diagonal**	21.5 in, diagonal
Tilt	–5° to +20°	
Weight		
Without stand	3.3 kg	7.28 lb
With stand	3.9 kg	8.60 lb
Dimensions (include stand)		
Height	**38.44 cm**	15.13 in
Depth	**20.99 cm**	8.26 in
Width	**50.30 cm**	19.80 in
Maximum graphic resolution	HDMI max. 1920 × 1080 (144 Hz)	
	VGA max. 1920 × 1080 (60 Hz)	
Optimum graphic resolution	HDMI opt. 1920 × 1080 (144 Hz)	
	VGA opt. 1920 × 1080 (60 Hz)	
Text mode	640 × 480	
Static contrast ratio	1,000:1 typical	
Dot pitch	0.2479 mm × 0.2479 mm	
Pixels per inch	102 PPI	
Horizontal frequency	VGA: 30–80 KHz, HDMI: 30–167 KHz	
Vertical refresh rate	VGA: 50–60 Hz, HDMI: 48–144 Hz	
Response time	The response time can be adjusted to as low as 1 ms in the on-screen display menu. All performance specifications represent the typical specifications provided by HP component manufacturers; actual performance may vary either higher or lower.	
Environmental requirements		
Temperature		
Operating Temperature	**5°C to 35°C**	41°F to 95°F
Storage Temperature	**-20°C to 60°C**	-4°F to 140°F
Relative humidity	20% to 80%	
Altitude		
Operating	**0 m to 5,000 m**	0 ft to 16,400 ft
Storage	**0 m to 12,192 m**	0 ft to 40,000 ft
Power Source	100 V ac to 240 V ac 50/60 Hz	
Measured power consumption		
Full power	38.5 W	
Typical settings	28 W	
Sleep	<0.5 W	
Off	<0.3 W	
Input terminals	One VGA port and one HDMI port	

60.47 cm/23.8-inch model specifications

Specification	Measurement	
Display, wide-screen	60.47 cm	23.8 in
Type	FHD	
Viewable Image Size	**60.47 cm, diagonal**	23.8 in, diagonal
Tilt	–6° to +22°	
Height adjustment	**110mm**	4.33 in
Weight		
Without stand	3.9 kg	8.60 lb
With stand	6.1 kg	13.45 lb
Dimensions (include stand)		
Height	**48.99 cm**	19.29 in
Depth	**21.80 cm**	8.58 in
Width	**54.08 cm**	21.29 in
Maximum graphic resolution	DP max. 1920 × 1080 (144 Hz)	
	HDMI max. 1920 × 1080 (144 Hz)	
Optimum graphic resolution	DP opt. 1920 × 1080 (144 Hz)	
	HDMI opt. 1920 × 1080 (144 Hz)	
Text mode	640 × 480	
Static contrast ratio	1,000:1 typical	
Dot pitch	0.2745 mm × 0.2745 mm	
Pixels per inch	93 PPI	
Horizontal frequency	DP: 30–167 KHz, HDMI: 30–167 KHz	
Vertical refresh rate	DP: 48–144 Hz, HDMI: 48–144 Hz	
Response time	The response time can be adjusted to as low as 1 ms in the on-screen display menu. All performance specifications represent the typical specifications provided by HP component manufacturers; actual performance may vary either higher or lower.	
Environmental requirements		
Temperature		
Operating Temperature	**5°C to 35°C**	41°F to 95°F
Storage Temperature	**-20°C to 60°C**	-4°F to 140°F
Relative humidity	20% to 80%	
Altitude		
Operating	**0 m to 5,000 m**	0 ft to 16,400 ft
Storage	**0 m to 12,192 m**	0 ft to 40,000 ft
Power Source	100 V ac to 240 V ac 50/60 Hz	
Measured power consumption		
Full power	46 W	
Typical settings	32 W	
Sleep	<0.5 W	
Off	<0.3 W	
Input terminals	One HDMI port and one DisplayPort connector	

Preset display resolutions

The display resolutions listed below are the most commonly used modes and are set as factory defaults. This monitor automatically recognizes these preset modes, and they will appear properly sized and centered on the screen.

54.61 cm/21.5-inch model

Preset	Pixel format	Horz freq (kHz)	Vert freq (Hz)
1	640 × 480	31.469	59.940
2	720 × 400	31.469	70.087
3	800 × 600	37.879	60.317
4	1024 × 768	48.363	60.004
5	1024 × 768	60.023	75.029
6	1280 × 720	45.000	60.000
7	1280 × 800	49.702	59.810
8	1280 × 1024	63.981	60.020
9	1440 × 900	55.935	59.887
10	1600 × 900	60.000	60.000
11	1680 × 1050	65.290	59.954
12	1920 × 1080	67.500	60.000
13	1920 × 1080	95.433	84.905 (HDMI only)
14	1920 × 1080	112.500	100.000 (HDMI only)
15	1920 × 1080	135.000	120.000 (HDMI only)
16	1920 × 1080	159.840	144.001 (HDMI only)

60.47 cm/23.8-inch model

Preset	Pixel format	Horz freq (kHz)	Vert freq (Hz)
1	640 × 480	31.469	59.940
2	720 × 400	31.469	70.087
3	800 × 600	37.879	60.317
4	1024 × 768	48.363	60.004
5	1024 × 768	60.023	75.029
6	1280 × 720	45.000	60.000
7	1280 × 800	49.702	59.810
8	1280 × 1024	63.981	60.020
9	1440 × 900	55.935	59.887
10	1600 × 900	60.000	60.000
11	1680 × 1050	65.290	59.954
12	1920 × 1080	67.500	60.000
13	1920 × 1080	95.433	84.905
14	1920 × 1080	112.500	100.000
15	1920 × 1080	135.000	120.000
16	1920 × 1080	159.840 166.440	144.001 (HDMI) 143.855 (DisplayPort)

High-definition video formats

Preset	Timing name	Pixel format	Horz freq (kHz)	Vert freq (Hz)
1	480p	720 × 480	31.469	59.94
2	576p	720 × 576	31.250	50.00
3	720p50	1280 × 720	37.500	50.00
4	720p60	1280 ×720	45.000	60.00
5	1080p50	1920 × 1080	56.250	50.00
6	1080p60	1920 × 1080	67.500	60.00
7	1080p100	1920 × 1080	112.500	100.00
8	1080p120	1920 × 1080	135.000	120.00

Energy saver feature

The monitor supports a reduced power state. The reduced power state is initiated if the monitor detects the absence of either the horizontal sync signal or the vertical sync signal. Upon detecting the absence of these signals, the monitor screen is blanked, the backlight is turned off, and the power light turns amber. When the monitor is in the reduced power state, the monitor uses <0.5 watts of power. There is a brief warm-up period before the monitor returns to its normal operating state.

See the computer manual for instructions on setting the energy saver mode (sometimes called power management feature).

NOTE: The above power saver feature works only when the monitor is connected to a computer that has energy saver features.

By selecting the settings in the monitor Sleep Timer utility, you can also program the monitor to initiate the reduced power state at a predetermined time. When the monitor Sleep Timer utility initiates the reduced power state, the power light blinks amber.

Appendix B   Accessibility

Accessibility

HP is working to weave diversity, inclusion and work/life into the fabric of our company, so it is reflected in everything we do. Here are some examples of how we are putting differences to work to create an inclusive environment focused on connecting people to the power of technology throughout the world.

Finding the technology tools you need

Technology can unleash your human potential. Assistive technology removes barriers and helps you create independence at home, at work, and in the community. Assistive technology helps increase, maintain, and improve the functional capabilities of electronic and information technology. For more information, see Finding the best assistive technology on page 28.

Our commitment

HP is committed to providing products and services that are accessible for people with disabilities. This commitment supports our company's diversity objectives and helps us ensure that the benefits of technology are available to all.

Our accessibility goal is to design, produce, and market products and services that can be effectively used by everyone, including people with disabilities, either on a stand-alone basis or with appropriate assistive devices.

To achieve our goal, this Accessibility Policy establishes seven key objectives to guide our actions as a company. All HP managers and employees are expected to support these objectives and their implementation in accordance with their roles and responsibilities:

- Raise the level of awareness of accessibility issues within our company, and provide our employees with the training they need to design, produce, market, and deliver accessible products and services.

- Develop accessibility guidelines for products and services, and hold product development groups accountable for implementing these guidelines where competitively, technically, and economically feasible.

- Involve people with disabilities in the development of accessibility guidelines, and in the design and testing of products and services.

- Document accessibility features and make information about our products and services publicly available in an accessible form.

- Establish relationships with leading assistive technology and solution providers.

- Support internal and external research and development that will improve assistive technology relevant to our products and services.

- Support and contribute to industry standards and guidelines for accessibility.

International Association of Accessibility Professionals (IAAP)

IAAP is a not-for-profit association focused on advancing the accessibility profession through networking, education, and certification. The objective is to help accessibility professionals develop and advance their careers and to better enable organizations to integrate accessibility into their products and infrastructure.

HP is a founding member, and we joined to participate with other organizations to advance the field of accessibility. This commitment supports our company's accessibility goal of designing, producing, and marketing products and services that can be effectively used by people with disabilities.

IAAP will make our profession strong by globally connecting individuals, students, and organizations to learn from one another. If you are interested in learning more, go to http://www.accessibilityassociation.org to join the online community, sign up for newsletters, and learn about membership options.

Finding the best assistive technology

Everyone, including people with disabilities or age-related limitations, should be able to communicate, express themselves, and connect with the world using technology. HP is committed to increasing accessibility awareness within HP and with our customers and partners. Whether it's large fonts that are easy on the eyes, voice recognition that lets you give your hands a rest, or any other assistive technology to help with your specific situation—a variety of assistive technologies make HP products easier to use. How do you choose?

Assessing your needs

Technology can unleash your potential. Assistive technology removes barriers and helps you create independence at home, at work, and in the community. Assistive technology (AT) helps increase, maintain, and improve the functional capabilities of electronic and information technology.

You may choose from many AT products. Your AT assessment should allow you to evaluate several products, answer your questions, and facilitate your selection of the best solution for your situation. You will find that professionals qualified to do AT assessments come from many fields, including those licensed or certified in physical therapy, occupational therapy, speech/language pathology, and other areas of expertise. Others, while not certified or licensed, may also provide evaluation information. You will want to ask about the individual's experience, expertise, and fees to determine if they are appropriate for your needs.

Accessibility for HP products

The following links provide information on accessibility features and assistive technology, if applicable, included in various HP products. These resources will help you select the specific assistive technology features and product(s) most appropriate for your situation.

- HP Elite x3–Accessibility Options (Windows 10 Mobile)
- HP PCs–Windows 7 Accessibility Options
- HP PCs–Windows 8 Accessibility Options
- HP PC's–Windows 10 Accessibility Options
- HP Slate 7 Tablets–Enabling Accessibility Features on Your HP Tablet (Android 4.1/Jelly Bean)
- HP SlateBook PCs–Enabling Accessibility Features (Android 4.3, 4.2/Jelly Bean)
- HP Chromebook PCs–Enabling Accessibility Features on Your HP Chromebook or Chromebox (Chrome OS)
- HP Shopping–peripherals for HP products

If you need additional support with the accessibility features on your HP product, see Contacting support on page 33.

Additional links to external partners and suppliers that may provide additional assistance:

- Microsoft Accessibility information (Windows 7, Windows 8, Windows 10, Microsoft Office)
- Google Products accessibility information (Android, Chrome, Google Apps)
- Assistive Technologies sorted by impairment type
- Assistive Technologies sorted by product type
- Assistive Technology vendors with product descriptions
- Assistive Technology Industry Association (ATIA)

Standards and legislation

Standards

Section 508 of the Federal Acquisition Regulation (FAR) standards was created by the US Access Board to address access to information and communication technology (ICT) for people with physical, sensory, or cognitive disabilities. The standards contain technical criteria specific to various types of technologies, as well as performance-based requirements which focus on functional capabilities of covered products. Specific criteria cover software applications and operating systems, web-based information and applications, computers, telecommunications products, video and multi-media, and self-contained closed products.

Mandate 376 – EN 301 549

The EN 301 549 standard was created by the European Union within Mandate 376 as the basis for an online toolkit for public procurement of ICT products. The standard specifies the functional accessibility requirements applicable to ICT products and services, together with a description of the test procedures and evaluation methodology for each accessibility requirement.

Web Content Accessibility Guidelines (WCAG)

Web Content Accessibility Guidelines (WCAG) from the W3C's Web Accessibility Initiative (WAI) helps web designers and developers create sites that better meet the needs of people with disabilities or age-related limitations. WCAG advances accessibility across the full range of web content (text, images, audio, and video) and web applications. WCAG can be precisely tested, is easy to understand and use, and allows web developers flexibility for innovation. WCAG 2.0 has also been approved as ISO/IEC 40500:2012.

WCAG specifically addresses barriers to accessing the web experienced by people with visual, auditory, physical, cognitive, and neurological disabilities, and by older web users with accessibility needs. WCAG 2.0 provides characteristics of accessible content:

- **Perceivable** (for instance, by addressing text alternatives for images, captions for audio, adaptability of presentation, and color contrast)
- **Operable** (by addressing keyboard access, color contrast, timing of input, seizure avoidance, and navigability)
- **Understandable** (by addressing readability, predictability, and input assistance)
- **Robust** (for instance, by addressing compatibility with assistive technologies)

Legislation and regulations

Accessibility of IT and information has become an area of increasing legislative importance. This section provides links to information on key legislation, regulations, and standards.

- United States
- Canada
- Europe
- United Kingdom
- Australia
- Worldwide

United States

Section 508 of the Rehabilitation Act specifies that agencies must identify which standards apply to the procurement of ICT, perform market research to determine the availability of accessible products and services, and document the results of their market research. The following resources provide assistance in meeting Section 508 requirements:

- www.section508.gov

- Buy Accessible

The U.S. Access Board is currently updating the Section 508 standards. This effort will address new technologies and other areas where the standards need to be modified. For more information, go to Section 508 Refresh.

Section 255 of the Telecommunications Act requires telecommunications products and services to be accessible to people with disabilities. FCC rules cover all hardware and software telephone network equipment and telecommunications equipment used in the home or office. Such equipment includes telephones, wireless handsets, fax machines, answering machines, and pagers. FCC rules also cover basic and special telecommunications services, including regular telephone calls, call waiting, speed dialing, call forwarding, computer-provided directory assistance, call monitoring, caller identification, call tracing, and repeat dialing, as well as voice mail and interactive voice response systems that provide callers with menus of choices. For more information, go to Federal Communication Commission Section 255 information.

21st Century Communications and Video Accessibility Act (CVAA)

The CVAA updates federal communications law to increase the access of persons with disabilities to modern communications, updating accessibility laws enacted in the 1980s and 1990s to include new digital, broadband, and mobile innovations. Regulations are enforced by the FCC and documented as 47 CFR Part 14 and Part 79.

- FCC Guide on the CVAA

Other U.S. legislation and initiatives

- Americans with Disabilities Act (ADA), Telecommunications Act, the Rehabilitation Act and others

Canada

The Accessibility for Ontarians with Disabilities Act was established to develop and implement accessibility standards to make goods, services, and facilities accessible to Ontarians with disabilities and to provide for the involvement of persons with disabilities in the development of the accessibility standards. The first standard of the AODA is the customer service standard; however, standards for transportation, employment, and information and communication are also being developed. The AODA applies to the Government of Ontario, the Legislative Assembly, every designated public sector organization, and to every other person or organization that provides goods, services, or facilities to the public or other third parties and that has at least one employee in Ontario; and accessibility measures must be implemented on or before January 1, 2025. For more information, go to Accessibility for Ontarians with Disability Act (AODA).

Europe

EU Mandate 376 ETSI Technical Report ETSI DTR 102 612: "Human Factors (HF); European accessibility requirements for public procurement of products and services in the ICT domain (European Commission Mandate M 376, Phase 1)" has been released.

Background: The three European Standardization Organizations have set up two parallel project teams to carry out the work specified in the European Commission "Mandate 376 to CEN, CENELEC and ETSI, in Support of Accessibility Requirements for Public Procurement of Products and Services in the ICT Domain."

ETSI TC Human Factors Specialist Task Force 333 has developed ETSI DTR 102 612. Further details about the work performed by STF333 (e.g., Terms of Reference, specification of the detailed work tasks, time plan for the work, previous drafts, listing of comments received and means to contact the task force) can be found at the Special Task Force 333.

The parts relating to the assessment of suitable testing and conformity schemes were carried out by a parallel project, detailed in CEN BT/WG185/PT. For further information, go to the CEN project team website. The two projects are closely coordinated.

- CEN project team

- European Commission mandate for e-accessibility (PDF 46KB)

United Kingdom

The Disability Discrimination Act of 1995 (DDA) was enacted to ensure that websites are accessible to blind and disabled users in the United Kingdom.

- W3C UK Policies

Australia

The Australian government has announced their plan to implement Web Content Accessibility Guidelines 2.0.

All Australian government websites will require Level A compliance by 2012, and Double A by 2015. The new standard replaces WCAG 1.0, which was introduced as a mandated requirement for agencies in 2000.

Worldwide

- JTC1 Special Working Group on Accessibility (SWG-A)

- G3ict: The Global Initiative for Inclusive ICT

- Italian accessibility legislation

- W3C Web Accessibility Initiative (WAI)

Useful accessibility resources and links

The following organizations may be good resources for information about disabilities and age-related limitations.

NOTE: This is not an exhaustive list. These organizations are provided for informational purposes only. HP assumes no responsibility for information or contacts you may encounter on the Internet. Listing on this page does not imply endorsement by HP.

Organizations

- American Association of People with Disabilities (AAPD)
- The Association of Assistive Technology Act Programs (ATAP)
- Hearing Loss Association of America (HLAA)
- Information Technology Technical Assistance and Training Center (ITTATC)
- Lighthouse International
- National Association of the Deaf
- National Federation of the Blind
- Rehabilitation Engineering & Assistive Technology Society of North America (RESNA)
- Telecommunications for the Deaf and Hard of Hearing, Inc. (TDI)
- W3C Web Accessibility Initiative (WAI)

Educational institutions

- California State University, Northridge, Center on Disabilities (CSUN)
- University of Wisconsin - Madison, Trace Center
- University of Minnesota computer accommodations program

Other disability resources

- ADA (Americans with Disabilities Act) Technical Assistance Program
- Business & Disability network
- EnableMart
- European Disability Forum
- Job Accommodation Network
- Microsoft Enable
- U.S. Department of Justice - A Guide to disability rights Laws

HP links

Our contact webform

HP comfort and safety guide

HP public sector sales

Contacting support

NOTE: Support is in English only.

- Customers who are deaf or hard of hearing that have questions about technical support or accessibility of HP products:
  - Use TRS/VRS/WebCapTel to call (877) 656-7058 Monday through Friday, 6 a.m. to 9 p.m. Mountain Time.

- Customers with other disabilities or age-related limitations who have questions about technical support or accessibility of HP products, choose one of the following options:
  - Call (888) 259-5707 Monday through Friday, 6 a.m. to 9 p.m. Mountain Time.
  - Complete the Contact form for people with disabilities or age-related limitations.