



User Guide

HP Thin Client

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Product Notice

This user guide describes features that are common to most models. 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. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.microsoft.com>.






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About 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 Hardware Reference

Product features



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

Various options are available for your thin client. For more information about some of the available options, go to <http://www.hp.com> and search for your specific model.

Front components

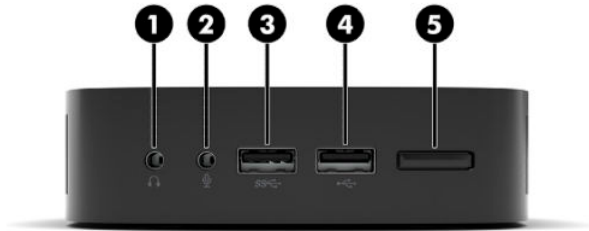


Table 1-1 Front components

Front components			
(1)	Audio-out (headphone) jack	(4)	USB port
(2)	Audio-in (microphone) jack	(5)	Power button
(3)	USB SuperSpeed port		

Rear components

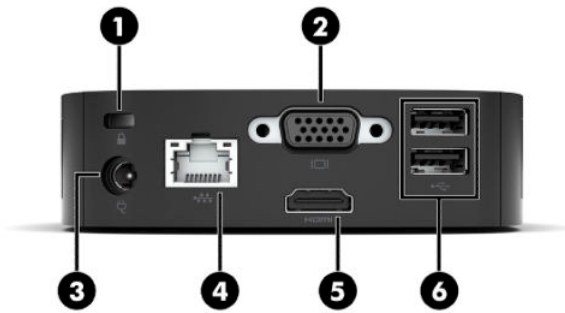


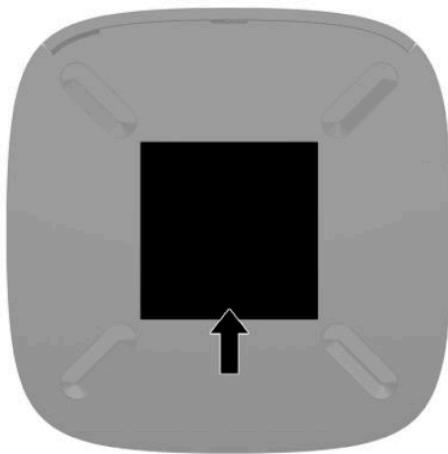
Table 1-2 Rear components

Rear components			
(1)	Security cable slot	(4)	RJ-45 (network) jack
(2)	VGA port	(5)	HDMI port
(3)	Power connector	(6)	USB ports (2)

IMPORTANT: Due to system power consumption limitations, if USB ports on the rear panel are occupied by a keyboard and mouse, the system does not support another device such as an external storage device. You must use a device with an external power cord supplied with the device.

Serial number location

Every thin client includes a unique serial number located as shown in the following illustration. Have this number available when contacting HP customer support for assistance.



Setup

Warnings and cautions

Before performing upgrades be sure to carefully read all of the applicable instructions, cautions, and warnings in this guide.

⚠ WARNING! To reduce the risk of personal injury or equipment damage from electric shock, hot surfaces, or fire:

Install the thin client in a location where children are unlikely to be present.

Do not plug telecommunications or telephone connectors into the network interface controller (NIC) receptacles.

Plug the power cord into an AC outlet that is easily accessible at all times.

If the power cord has a 3-pin attachment plug, plug the cord into a grounded (earthed) 3-pin outlet.

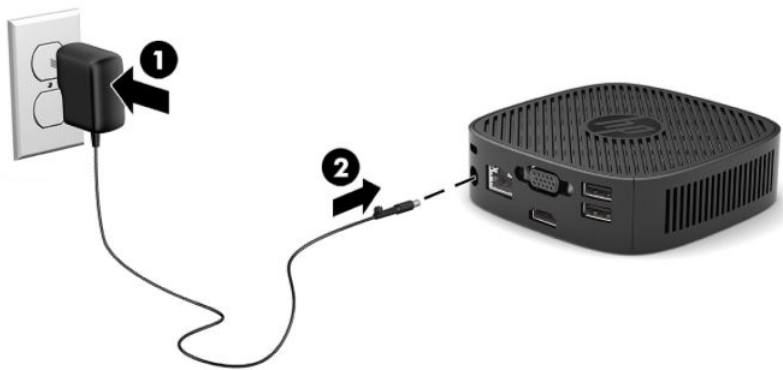
Disconnect power from the computer by unplugging the power cord from the AC outlet. When unplugging the power cord from the AC outlet, grasp the cord by the plug.

⚠ WARNING! 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>.

📄 NOTE: An optional mounting bracket is available from HP for mounting the thin client to a wall, desk, or swing arm.


Connecting the AC power cord

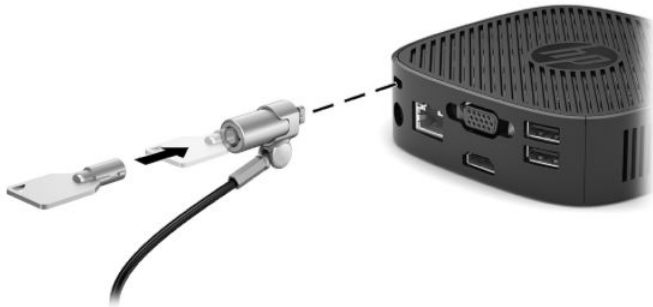
1. Connect the power adapter to an AC outlet (1).
2. Connect the power adapter to the thin client (2).



Installing a security cable

You can secure the monitor to a fixed object with an optional security cable available from HP. Use the key provided to attach and remove the lock.

 **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.




Mounting and orienting the thin client

Attaching the mounting bracket

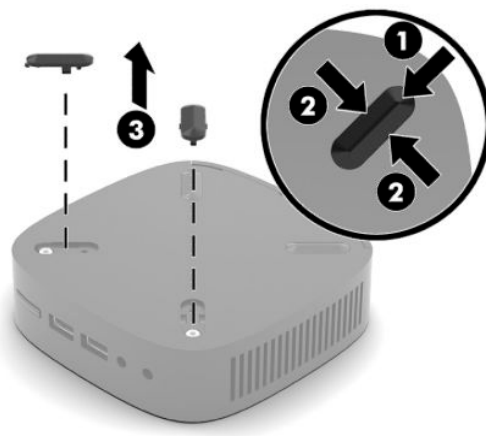
A mounting bracket is included with the thin client for mounting the thin client to a wall, desk, or swing arm.

This unit has two mounting points that can be accessed by removing the rubber feet on the bottom of the thin client. These mounting points follow the VESA (Video Electronics Standards Association) standard, which provides industry-standard mounting interfaces for Flat Displays (FDs), such as flat panel monitors, flat displays, and flat TVs. The mounting bracket connects to 75 mm and 100 mm VESA-standard mounting points, allowing you to mount the thin client in a variety of orientations.

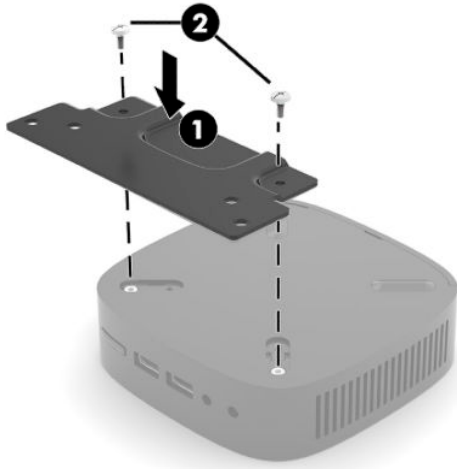
 **NOTE:** When mounting to a thin client, use the 8 mm screws included with the thin client.

To attach the mounting bracket:

1. Lay the thin client upside down.
2. Remove the two rubber feet from the holes in the bottom of the thin client that are nearest the front of the unit. To remove a rubber foot, squeeze the front of the foot (1) inward to lift it up, then squeeze the two sides of the foot (2) to release the sides, and then lift the foot off the unit (3).



3. Position the mounting bracket on the bottom of the thin client with the large end protruding out from the thin client. Use two 8 mm screws included with the thin client to attach the mounting bracket.



4. Attach the mounting bracket to a wall, desk, or swing arm using either the 75 mm or 100 mm screw holes on the mounting bracket.

Supported mounting options

The following illustrations demonstrate some of the supported mounting options for the mounting bracket.

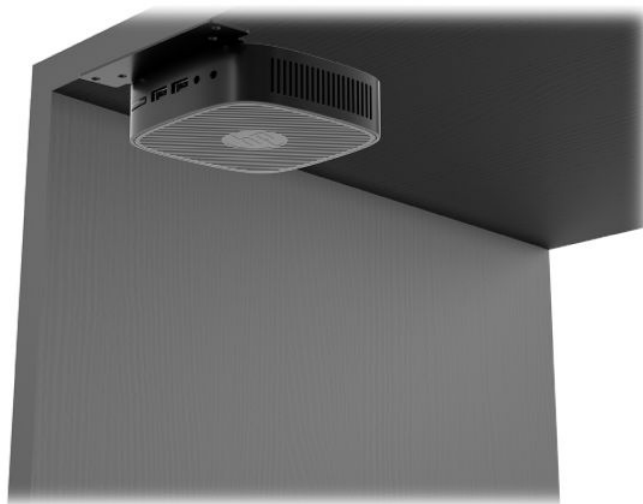
- On the back of a monitor:




- On a wall:



- Under a desk:



Supported orientation and placement

 **IMPORTANT:** You must adhere to the HP-supported orientation to ensure your thin clients function properly.

- HP supports the horizontal orientation for the thin client:




- The thin client may be placed under a monitor stand with at least 2.54 cm (1 in) clearance and 7.5 cm (3 in) for side cable routing:



Non-supported placement

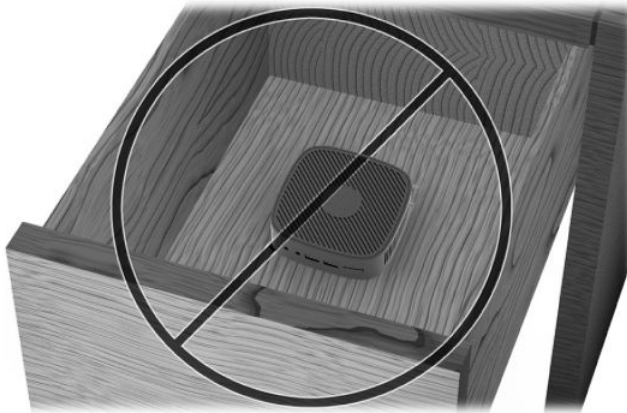
HP does not support the following placements for the thin client:

 **IMPORTANT:** Non-supported placement of thin clients could result in operation failure and/or damage to the devices.

Thin clients require proper ventilation to maintain operating temperature. Do not block the vents.

Do not put thin clients in drawers or other sealed enclosures. Do not place a monitor or other object on top of the thin client. Do not mount a thin client between the wall and a monitor. Thin clients require proper ventilation to maintain operating temperatures.

- In a desk drawer:



- With a monitor on the thin client:



Routine thin client care

Use the following information to properly care for your thin client:

- Never operate the thin client with the outside panel removed.
- Keep the thin client away from excessive moisture, direct sunlight, and extreme heat and cold. For information about the recommended temperature and humidity ranges for the thin client, go to <http://www.hp.com/go/quickspecs>.
- Keep liquids away from the thin client and keyboard.
- Turn off the thin client and wipe the exterior with a soft, damp cloth as needed. Using cleaning products may discolor or damage the finish.

2 Troubleshooting

Computer Setup (F10) Utility, BIOS Settings

Computer Setup (F10) Utilities

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

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Modify the boot order of bootable devices such as solid-state drives or USB flash drives.
- Enable or disable post messages to change the display status of Power-On Self-Test (POST) messages. Disabling POST messages suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. To manually enable POST messages during POST, press any key (except **F1** through **F12**).
- Enter the Asset Tag or property identification number assigned by the company to this computer.
- Secure integrated I/O functionality, including the USB, audio, or embedded NIC, so that they cannot be used until they are unsecured.

Using Computer Setup (F10) Utilities

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


1. Turn on or restart the computer.
2. Press either **Esc** or **F10** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

Pressing **Esc** displays a menu that allows you to access different options available at startup.



NOTE: If you do not press **Esc** or **F10** at the appropriate time, you must restart the computer and again press **Esc** or **F10** when the monitor light turns green to access the utility.

3. If you pressed **Esc**, press **F10** to enter Computer Setup.
4. Use the left and right arrow keys to select the appropriate heading. Use the up and down arrow keys to select the option you want, and then press **Enter**. To return to the Computer Setup Utilities menu, press **Esc**.
5. To apply and save changes, select **File > Save Changes and Exit**.
 - If you have made changes that you do not want applied, select **Ignore Changes and Exit**.
 - To reset to factory settings, select **Apply Defaults and Exit**. This option will restore the original factory system defaults.

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

The following menus are available in the Computer Setup Utility menu:

Table 2-1 Computer Setup Utility menu options

Heading	Table
File	Computer Setup – File on page 11
Storage	Computer Setup – Storage on page 12
Security	Computer Setup – Security on page 12
Power	Computer Setup – Power on page 13
Advanced	Computer Setup – Advanced on page 14

Computer Setup – File

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

Table 2-2 Computer Setup – File

Option	Description
System Information	Lists: <ul style="list-style-type: none">• Product name• SKU number• System Board CT Number• Processor type• Processor speed• Processor stepping• Cache size (L1/L2)• Memory size• Integrated MAC• System BIOS• Chassis serial number• Asset tracking number
About	Displays copyright notice.
Set Time and Date	Allows you to set system time and date.
Flash System BIOS	Allows you to flash system BIOS from a USB recovery key.
Default Setup	Allows you to: <ul style="list-style-type: none">• Save Current Settings as Default• Restore Factory Settings as Default

Table 2-2 Computer Setup – File (continued)

Option	Description
Apply Defaults and Exit	Loads the original factory system configuration settings for use by a subsequent “Apply Defaults and Exit” action.
Ignore Changes and Exit	Exits Computer Setup without applying or saving any changes.
Save Changes and Exit	Saves changes to system configuration or default settings and exits Computer Setup.

Computer Setup – Storage

Table 2-3 Computer Setup – Storage

Option	Description
Device Configuration	Lists all installed BIOS-controlled storage devices. When a device is selected, detailed information and options are displayed. The following options may be presented: Hard Disk: Size, model, firmware version, serial number.
Boot Order	Allows you to: <ul style="list-style-type: none"> Specify the order in which EFI boot sources (such as a internal drive, USB hard drive, or USB optical drive) are checked for a bootable operating system image. Each device on the list may be individually excluded from or included for consideration as a bootable operating system source. Specify the order of attached hard drives. The first hard drive in the order will have priority in the boot sequence and will be recognized as drive C (if any devices are attached). <p>NOTE: You can use F5 to disable individual boot items, as well as disable EFI boot.</p> <p>MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started.</p> <p>Shortcut to Temporarily Override Boot Order</p> <p>To boot one time from a device other than the default device specified in Boot Order, restart the computer and press Esc (to access the boot menu) and then F9 (Boot Order), or only F9 (skipping the boot menu) when the monitor light turns green. After POST is completed, a list of bootable devices is displayed. Use the arrow keys to select the preferred bootable device and press Enter. The computer then boots from the selected non-default device for this one time.</p>

Computer Setup – Security



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

Table 2-4 Computer Setup – Security

Option	Description
Setup Password	Allows you to set and enable a setup (administrator) password. NOTE: If the setup password is set, it is required to change Computer Setup options, flash the ROM, and make changes to certain plug and play settings under Windows.
Power-On Password	Allows you to set and enable a power-on password. The power-on password prompt appears after a power cycle or reboot. If the user does not enter the correct power-on password, the unit will not boot.
Password Options	Allows you to enable/disable: <ul style="list-style-type: none"> Stringent Password – When set, enables a mode in which there is no physical bypass of the password function. If enabled, removing the password jumper will be ignored. Password Prompt on F9 & F12 – Default is enabled.

(This selection appears only if a power-on

Table 2-4 Computer Setup – Security (continued)

Option	Description
password or setup password is set.)	<ul style="list-style-type: none"> • Setup Browse Mode – Allows viewing, but not changing, the F10 Setup Options without entering setup password). Default is enabled.
Device Security	<p>Allows you to set Device Available/Device Hidden (default is 'Device Available') for:</p> <ul style="list-style-type: none"> • System audio • Network controller • Internal storage
USB Security	<p>Allows you to set Enabled/Disabled (default is enabled) for:</p> <ul style="list-style-type: none"> • Front USB Ports <ul style="list-style-type: none"> – USB2 Port 2 – USB3 Port 1 • Rear USB Ports <ul style="list-style-type: none"> – USB2 Port 3 – USB2 Port 4
Network Boot	<p>Enables/disables the computer's ability to start from an operating system installed on a network server. (Feature available on NIC models only; the network controller must be either a PCI expansion card or embedded on the system board.) Default is enabled.</p>
System IDs	<p>Allows you to set:</p> <ul style="list-style-type: none"> • Asset tag (18-byte identifier) – A property identification number assigned by the company to the computer. • Ownership tag (80-byte identifier)
System Security	<p>Provides these options:</p> <ul style="list-style-type: none"> • Data Execution Prevention (enable/disable) - Helps prevent operating system security breaches. Default is enabled. • Virtualization Technology (enable/disable) – Controls the virtualization features of the processor. Changing this setting requires turning the computer off and then back on. Default is disabled.

Computer Setup – Power



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

Table 2-5 Computer Setup – Power

Option	Description
OS Power Management	<p>Runtime Power Management (enable/disable) – Allows certain operating systems to reduce processor voltage and frequency when the current software load does not require the full capabilities of the processor. Default is enabled.</p> <p>Idle Power Savings (Extended/Normal) – Extended/Normal. Allows certain operating systems to decrease the processors power consumption when the processor is idle. Default is 'extended'.</p>

Computer Setup – Advanced



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

Table 2-6 Computer Setup – Advanced

Option	Heading
Power-On Options	<p>Allows you to set:</p> <ul style="list-style-type: none">• POST messages (enable/disable) – Default is disabled.• Press the ESC key for Startup Menu (Displayed/Hidden).• POST Delay (in seconds) – Enabling this feature will add a user-specified delay to the POST process. This delay is sometimes needed for hard disks on some PCI cards that spin up very slowly, so slowly that they are not ready to start by the time POST is finished. The POST delay also gives you more time to select F10 to enter Computer (F10) Setup. Default is 'None'.• Remote Wakeup Boot Source (Local Hard Drive/Remote Server). Allows you to set the source from which the computer gets its boot files when remotely awakened.
Bus Options	<p>On some models, allows you to enable or disable:</p> <ul style="list-style-type: none">• PCI SERR# Generation. Default is enabled.• PCI VGA Palette Snooping, which sets the VGA palette snooping bit in PCI configuration space; only needed when more than one graphics controller is installed. Default is disabled.
Device Options	<ul style="list-style-type: none">• Integrated Graphics (Auto/Force) – Use this option to manage integrated (UMA) graphics memory allocation. The value you choose allocates memory permanently to graphics and is unavailable to the operating system. For example, if you set this value to 512M on a system with 2 GB of RAM, the system always allocates 512 MB for graphics and the other 1.5 GB for use by the BIOS and operating system. Default is 'Auto' which sets UMA memory by the memory installed on the platform as follows:<ul style="list-style-type: none">– < 4 GB: 256 MB– 4 GB - 6 GB: 512 MB– > 6 GB: 1 GBIf you select Force, the UMA Frame Buffer Size option displays, which lets you set the UMA memory size allocation between 128 MB and 512 MB.• S5 Wake on LAN (enable/disable)• Num Lock State at Power-On (off/on). Default is off.• Prompt for Power-On Password on Wake on LAN. Default is disabled.

Changing BIOS Settings from the HP BIOS Configuration Utility (HPBCU)

Some BIOS settings can be changed locally from the operating system without having to go through the F10 utility. This table identifies the items that can be controlled with this method.

Table 2-7 BIOS settings that can be changed in the operating system

BIOS setting	Default value	Other values
Language	English	Francais, Espanol, Deutsch, Italiano, Dansk, Suomi, Nederlands, Norsk, Portugues, Svenska, Japanese
Set Time	00:00	00:00:23:59

Table 2-7 BIOS settings that can be changed in the operating system (continued)

BIOS setting	Default value	Other values
Set Day	01/01/2011	01/01/2011 to current date
Default Setup	None	Save Current Settings as Default; Restore Factory Settings as Default
Apply Defaults and Exit	Disable	Enable
SATA Emulation	AHCI	IDE
USB Storage Boot	Before SATA	After SATA; Disable
Secure Erase	Disable	Enable
System Audio	Device available	Device hidden
Network Controller	Device available	Device hidden
Front USB Ports	Enable	Disable
Rear USB Ports	Enable	Disable
Network Boot	Enable	Disable
Asset Tracking Number		
Ownership Tag		
BIOS Update	Disable	Auto; Force
BIOS Image File Name		
Data Execution Prevention	Enable	Disable
Virtualization Technology	Disable	Enable
Runtime Power Management	Enable	Disable
Idle Power Savings	Extended	Normal
POST Messages	Disable	Enable
Press the ESC key for Startup Menu	Displayed	Hidden
POST Delay (in seconds)	None	5, 10, 15, 20, 60
Bypass F1 Prompt on Configuration Changes	Disable	Enable
Remote Wakeup Boot Source	Local Hard Drive	Remote Server
PCI SERR# Generation	Enable	Disable
PCI VGA Palette Snooping	Disable	Enable
Integrated Graphics	Auto	Disable, Force
Num Lock State at Power-On	Off	On

Updating or restoring a BIOS

HP Device Manager

HP Device Manager can be used to update the BIOS of a thin client. Customers can use a prebuilt BIOS add-on or can use the standard BIOS upgrade package along with an HP Device Manager File and Registry template. For more information about HP Device Manager File and Registry templates, review the *HP Device Manager User Guide* found at <http://www.hp.com/go/hpdm>.

BootBlock Emergency Recovery Mode

In the event of a failed BIOS update (for example if power is lost while updating), the System BIOS may become corrupted. BootBlock Emergency Recovery Mode detects this condition and automatically searches the root directory of the hard drive and any USB media sources for a compatible binary image. Copy the binary (.bin) file in the DOS Flash folder to the root of the desired storage device, and then turn on the system. Once the recovery process locates the binary image, it attempts the recovery process. The automatic recovery continues until it successfully restores or updates the BIOS. Sometimes there are restrictions on which BIOS versions are allowed to be installed on a platform. If the BIOS that was on the system had restrictions, then only allowable BIOS versions may be used for recovery.

Diagnostics and troubleshooting

Power lights

Table 2-8 Power lights and their descriptions

Light	Status
Power light off	When the thin client is plugged into the AC outlet and the power light is off, the thin client is powered off. However, the network can trigger a Wake On LAN event in order to perform management functions.
Power light on	<p>Displays during start sequence and while the thin client is on. During start sequence, hardware initialization is processed and startup tests are performed on the following:</p> <ul style="list-style-type: none">• Processor initialization• Memory detection and initialization• Video detection and initialization <p>NOTE: If one of the tests fails, the thin client will simply stop, but the light will stay on. If the video test fails, the thin client beeps. There are no messages sent to video for any of these failed tests.</p> <p>NOTE: After the video subsystem is initialized, anything that fails will have an error message.</p>

NOTE: Ethernet activity lights are located inside the RJ-45 connector on the top, rear panel of the thin client. The lights are visible when an active Ethernet network cable is connected. Solid green indicates network connection, and blinking yellow indicates network activity.

Wake-on LAN

Wake-on LAN (WOL) allows a computer to be turned on by a network message. You can enable or disable WOL in Computer Setup using the **S5 Wake on LAN** setting.

To enable or disable WOL:

1. Turn on or restart the computer.
2. Press either **Esc** or **F10** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.



NOTE: If you do not press **Esc** or **F10** at the appropriate time, you must restart the computer and again press **Esc** or **F10** when the monitor light turns green to access the utility.

3. If you pressed **Esc**, press **F10** to enter Computer Setup.
4. Select **Advanced > Device Options**.
5. Set **S5 Wake on LAN** to either enabled or disabled.
6. Press **F10** to accept any changes.
7. Select **File > Save Changes and Exit**.

Power-On Sequence

At power-on, firmware initializes the hardware to a known state, then performs basic power-on diagnostic tests to determine the integrity of the hardware. Initialization performs the following functions:

1. Initializes CPU and memory controller.
2. Initializes and configures all PCI devices.
3. Initializes video software.
4. Initializes the video to a known state.
5. Initializes USB devices to a known state.
6. Performs power-on diagnostics. For more information, see [Power-on diagnostic tests on page 17](#).
7. Starts the operating system.

Power-on diagnostic tests

The Power-on diagnostics performs basic integrity tests of the hardware to determine its functionality and configuration. If a diagnostic test fails during hardware initialization the thin client simply stops. There are no messages sent to video.



NOTE: You may try to restart the thin client and run through the diagnostic tests a second time to confirm the first shutdown.

The following table lists the tests that are performed on the thin client.

Table 2-9 Power-on diagnostic tests

Test	Description
Boot Block Checksum	Tests boot block code for proper checksum value
DRAM	Simple write/read pattern test of the first 640k of memory
Timer	Tests timer interrupt by using polling method
RTC CMOS battery	Tests integrity of RTC CMOS battery

Interpreting POST diagnostic front panel lights and audible codes

This section provides front panel light codes as well as the audible codes that may occur before or during POST that may not have an associated error code or text message.

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

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

Not all diagnostic lights and audible codes are available on all models.

Table 2-10 Interpreting POST diagnostic front panel lights and audible codes

Activity	Beeps	Possible Cause	Recommended Action
White power light on.	None	Computer on.	None
Power light flashes two times, once every second, followed by a two second pause. Lights continue until problem is solved.	2	Processor thermal protection activated: A fan may be blocked or not turning. OR The heat sink/fan assembly is not properly attached to the processor. OR The thin client has vents blocked or is in a location where the ambient temperature is too high.	<ol style="list-style-type: none"> 1. Ensure that the computer air vents are not blocked and the processor cooling fan is plugged in and running, if equipped. 2. Contact an authorized reseller or service provider.
Power light flashes four times, once every second, followed by a two second pause. Lights continue until problem is solved.	4	Power failure (power supply is overloaded). OR The incorrect external power supply adapter is being used on the thin client.	<ol style="list-style-type: none"> 1. Check if a device is causing the problem by removing ALL attached devices. Turn on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure that all devices are functioning properly. 2. Replace the power supply. 3. Replace the system board.
Power light flashes five times, once every second, followed by a two second pause. Lights continue until problem is solved.	5	Pre-video memory error.	<p>CAUTION: To avoid damage to the memory modules or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a memory module.</p> <ol style="list-style-type: none"> 1. Reseat memory modules. 2. Replace memory modules one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the system board.
Power light flashes six times, once every second, followed by a two second pause. Lights continue until problem is solved.	6	Pre-video graphics error.	<p>For systems with a graphics card:</p> <ol style="list-style-type: none"> 1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board.

Table 2-10 Interpreting POST diagnostic front panel lights and audible codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
			For systems with integrated graphics, replace the system board.
Power light flashes eight times, once every second, followed by a two second pause. Lights continue until problem is solved.	8	Invalid ROM based on bad checksum.	<ol style="list-style-type: none"> 1. Reflash the system ROM with the latest BIOS image using the BIOS Recovery procedure. 2. Replace the system board.
System does not turn on and lights are not flashing.	None	System unable to turn on.	<p>Press and hold the power button for less than four seconds. If the hard drive light turns red, the power button is working correctly. Try the following:</p> <ol style="list-style-type: none"> 1. Remove the power cord from the computer. 2. Open the computer and remove the RTC battery from the system board. After several seconds, replace the battery. 3. Verify that the power cord is plugged into the power supply. 4. Close the thin client and reattach the power cord. 5. Try to turn on the computer. 6. Replace the thin client.

Troubleshooting

Basic troubleshooting

If the thin client is experiencing operating problems or will not turn on, review the following items.

Table 2-11 Basic troubleshooting issues and solutions

Issue	Solution
The thin client is experiencing operating problems.	Ensure that the following connectors are securely plugged into the thin client: Power connector, keyboard, mouse, network RJ-45 connector, display
The thin client does not turn on.	<ol style="list-style-type: none"> 1. Verify that the power supply is good by installing it on a known working thin client and testing it. If the power supply does not work on the test thin client, replace the power supply. 2. If the thin client does not work properly with the replaced power supply, have the thin client serviced.
The thin client powers on and displays a splash screen, but does not connect to the server.	<ol style="list-style-type: none"> 1. Verify that the network is operating and the network cable is working properly. 2. Verify that the thin client is communicating with the server by having the system administrator ping the thin client from the server: <ul style="list-style-type: none"> – If the thin client pings back, then the signal was accepted and the thin client is working. This indicates a configuration issue. – If the thin client does not ping back and the thin client does not connect to the server, re-image the thin client.
No link or activity on the Ethernet activity indicators, or the lights do not illuminate	<ol style="list-style-type: none"> 1. Verify that the network is not down.

Table 2-11 Basic troubleshooting issues and solutions (continued)

Issue	Solution
blinking green after powering on the thin client. (The network lights are located inside the RJ-45 connector on the top, rear panel of the thin client. Indicator lights are visible when the connector is installed.)	<ol style="list-style-type: none"> 2. Make sure the network cable is good by installing the cable onto a known working device. If a network signal is detected then the cable is good. 3. Verify the power supply is good by replacing the power cable to the thin client with a known working power supply cable and testing it. 4. If network lights still do not light and you know the power supply is good, then re-image the thin client. 5. If network lights still do not light, run the IP configuration procedure. 6. If network lights still do not light, have the thin client serviced.
A newly connected unknown USB peripheral does not respond or USB peripherals connected prior to the newly connected USB peripheral will not complete their device actions.	An unknown USB peripheral may be connected and disconnected to a running platform as long as you do not restart the system. If problems occur, disconnect the unknown USB peripheral and restart the platform.
Video does not display.	<ol style="list-style-type: none"> 1. Verify that the monitor brightness is set to a readable level. 2. Verify the monitor is good by connecting it to a known working computer and ensure its front light turns green (assuming the monitor is Energy Star compliant). If the monitor is defective, replace it with a working monitor and repeat testing. 3. Re-image the thin client and turn on the monitor again. 4. Test the thin client on a known working monitor. If the monitor does not display video, replace the thin client.

Diskless (no flash) model troubleshooting

This section is only for those models that do not have ATA Flash capability. Because there is no ATA Flash in this model, the boot priority sequence is:

- USB device
 - PXE (UEFI only)
1. When the thin client starts, the monitor should display the following information:

Table 2-12 Diskless (no flash) model troubleshooting issues and solutions

Item	Information	Action
MAC Address	NIC portion of the system board is OK	If no MAC Address, the system board is at fault. Contact support for service.
GUID	General system board information	If no GUID information, the system board is at fault and should be replaced.
Client ID	Information from server	If no Client ID information there is no network connection. This may be caused by a bad cable, the server is down, or a bad system board. Contact support for service for the bad system board.
MASK	Information from server	If no MASK information there is no network connection. This may be caused by a bad cable, the server is down, or a bad

Table 2-12 Diskless (no flash) model troubleshooting issues and solutions (continued)

Item	Information	Action
		system board. Contact support for service for the bad system board.
DHCP IP	Information from server	If no DHCP IP information there is no network connection. This may be caused by a bad cable, the server is down, or a bad system board. Contact support for service for the bad system board.

If you are running in a Microsoft RIS PXE environment, go to step 2.

If you are running in a Linux environment, go to step 3.

2. If you are running in a Microsoft RIS PXE environment, press the **F12** key to activate the network service boot as soon as the DHCP IP information appears on the screen.


If the thin client does not start up to the network, the server is not configured to PXE.

If you missed the F12 cue, the system will try to start to the ATA flash that is not present. The message on the screen will read: **ERROR: Non-system disk or disk error. Replace and press any key when ready.**

Pressing any key will restart the thin client.

3. If you are running in a Linux environment, an error message will appear on the screen if there is no Client IP. **ERROR: Non-system disk or disk error. Replace and press any key when ready.**

Configuring a PXE server

 **NOTE:** All PXE software is supported by authorized service providers on a warranty or service contract basis. Customers who call support with PXE issues and questions should be referred to their PXE provider for assistance.

Additionally, refer to the following:

– For Windows Server 2008 R2: <http://technet.microsoft.com/en-us/library/7d837d88-6d8e-420c-b68f-a5b4baeb5248.aspx>

– For Windows Server 2012: <http://technet.microsoft.com/en-us/library/jj648426.aspx>

The services listed below must be running, and they may be running on different servers:

1. Domain Name Service (DNS)
2. Remote Installation Services (RIS)

 **NOTE:** Active Directory DHCP is not required, but is recommended.

Using HP ThinUpdate to restore the image

HP ThinUpdate allows you to download images and add-ons from HP, capture an HP thin client image, and create bootable USB flash drives for image deployment.

HP ThinUpdate is preinstalled on some HP thin clients, and it is also available as an add-on at <http://www.hp.com/support> (search for the thin client model and select the **Drivers & software** section of the support page for that model).

- The Image Downloads feature lets you download an image from HP to either local storage or a USB flash drive. The USB flash drive option creates a bootable USB flash drive that can be used to deploy the image to other thin clients.
- The Image Capture feature lets you capture an image from an HP thin client and save it to a USB flash drive, which can be used to deploy the image to other thin clients.
- The Add-on Downloads feature lets you download add-ons from HP to either local storage or a USB flash drive.
- The USB Drive Management feature lets you do the following:
 - Create a bootable USB flash drive from an image file on local storage
 - Copy an .ibr image file from a USB flash drive to local storage
 - Restore a USB flash drive layout

You can use a bootable USB flash drive created with HP ThinUpdate to deploy an HP thin client image to another HP thin client of the same model with the same operating system.

System requirements

To create a recovery device for the purpose of reflashing or restoring the software image on the flash, you will need the following:

- One or more HP thin clients.
- Minimum USB flash drive size:
 - ThinPro: 8 GB
 - Windows 10 IoT (if using the USB format): 32 GB



NOTE: Optionally, you can use the tool on a Windows computer.

This restore method will not work with all USB flash drives. USB flash drives that do not show up as removable drive in Windows do not support this restore method. USB flash drives with multiple partitions generally do not support this restore method. The range of USB flash drives available on the market is constantly changing. Not all USB flash drives have been tested with the HP Thin Client Imaging Tool.

Device management

The thin client includes a license for HP Device Manager and has a Device Manager agent pre-installed. HP Device Manager is a thin client optimized management tool used to manage the full life cycle of HP thin clients to include Discover, Asset Management, Deployment and Configuration. For more information about HP Device Manager, please visit <http://www.hp.com/go/hpdm>.

If you wish to manage the thin client with other management tools such as Microsoft SCCM or LANDesk, go to <http://www.hp.com/go/clientmanagement> for more information.

Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 V ac, or from 220 to 240 V ac.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries or regions must meet the requirements of the country and region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Table 2-13 Power cord requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	BIS	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5

Table 2-13 Power cord requirements for specific countries and regions (continued)

Country/region	Accredited agency	Applicable note number
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.

Statement of Volatility

Thin client products typically have three types of memory devices – RAM, ROM, and flash memory. Data stored in the RAM memory device is lost once power is removed from the device. RAM devices can be powered by main, aux, or battery power. Therefore, even when the thin client is not connected to an AC outlet, some RAM devices may be powered by battery. Data stored in ROM or flash memory devices is retained even if the power is removed from the device. Manufacturers of flash devices usually specify a period of time (typically around 10 years) for data retention.

Definition of power states:

Main power: Power available when the thin client is turned on.

Aux or standby power: Power available when the thin client is in off state when the thin client is connected to power.

Battery power: Power from a coin battery installed in the thin client.

The following table lists available memory devices. Thin clients use onboard eMMC flash memory. The operating system interfaces with these flash devices similar to a traditional IDE/SATA hard drive. The embedded eMMC device contains the image of the operating system and can only be written to by an administrator. A special software tool is required to format the flash devices and clear the data stored in them.

Table 2-14 Available memory devices and types

Description	Location/size	Power	Loss of data	Comments
System boot ROM (BIOS)	SPI ROM (64 Mb) non-socketed, non-removable			
System memory (RAM)	SODIMM socket. Onboard, non-removable (2 GB)	Main power	If main power is removed	Only S0/S5 states are supported
LOM eFUSE	256 bytes embedded in LAN chip	Aux		One Time Programmable memory (OTP)

Use the following steps to update and reset BIOS to factory default settings:

1. Download the latest BIOS for your thin client from <http://www.hp.com/support>.
2. Follow the instructions provided with the download to update the BIOS.
3. Restart the thin client. While the thin client is powering on, press the **F10** key to enter BIOS setup utility.
4. If the Ownership Tag or Asset Tag is defined, manually clear in **Security > System IDs**.
5. Select **File > Save Changes and Exit**.
6. To clear the Setup or Power-On passwords and all other settings, turn off the computer, and then remove the power cord and the access panel.
7. Remove the CMOS/RTC battery.
8. After several seconds, replace the battery.
9. Replace the access panel and power cord, and then turn on the thin client. The passwords are removed and all other user-configurable, non-volatile memory settings are reset to their factory default values.

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.

Specifications

For the latest specifications or additional specifications for the thin client, go to <http://www.hp.com/go/quickspecs/> and search for your specific thin client to find the QuickSpecs.

Table 2-15 Specifications

Item	Metric	U.S.
Dimensions		
Width	110.0 mm	4.3 in
Depth	110.0 mm	4.3 in
Height	30.0 mm	1.2 in
Weight	285 g	0.83 lbs
Temperature (operating)	10°C to 40°C	50°F to 104°F
Relative Humidity (operating)		10% to 90%
Power Supply		
Operating Voltage Range	100 VAC to 240 VAC	
Rated Line Frequency	50 Hz to 60 Hz	
Power Output (maximum)	15 W	
Rated Output Current (maximum)	3 A	
Output Voltage	+5 V dc	
USB 3.0 port output max power	4.5 W	
USB 2.0 port output max power (total for all 3 ports)	3.5 W	

3 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

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 27](#).

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**.

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. The screen displays one of the following options:

- A Failure ID link is displayed. Select the link and follow the on-screen instructions.
- A Quick Response (QR) code is displayed. With a mobile device, scan the code and then follow the on-screen instructions.
- Instructions for calling support are displayed. Follow those instructions.

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. Select **Download HP Diagnostics Windows**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

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, follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **Diagnostics** section, select **Download**, and then follow the on-screen instructions to select the specific Windows diagnostics version to be downloaded to your computer or USB flash drive.

The tool is downloaded to the selected location.

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 USB 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



NOTE: For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 29](#).

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 Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in solving the problem:

- ▲ Select **Get Support**, and then use a mobile device to scan the QR code that displays on the next screen. The HP Customer Support - Service Center page displays, with your Failure ID and product number automatically filled in. Follow the on-screen instructions.

– or –

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 29](#).

- b. Hard drive


- c. BIOS

3. When the diagnostic tool opens, select a language, 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. Select **Download HP Diagnostics UEFI**, 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 about 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. 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**, select your type of product, enter the product name or number in the search box that is displayed, 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.

A Shipping information

Shipping preparation

Follow these suggestions when preparing to ship the thin client:

1. Turn off the thin client and external devices.
2. Disconnect the AC power cord from the AC outlet, and then from the thin client.
3. Disconnect the system components and external devices from their power sources, and then from the thin client.
4. Pack the system components and external devices in their original packing boxes or similar packaging with sufficient packing material to protect them.



NOTE: For environmental nonoperating ranges, go to <http://www.hp.com/go/quickspecs>.

Important service repair information

In all cases, remove and safeguard all external options before returning the thin client to HP for repair or exchange.

In countries that support customer mail-in repair by returning the same unit to the customer, HP makes every effort to return the repaired unit with the same internal memory and flash modules that were sent.

In countries that do not support customer mail-in repair by returning the same unit to the customer, all internal options should be removed and safeguarded in addition to the external options. The thin client should be restored to the **original configuration** before returning it to HP for repair.

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 34](#).

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 about 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 39](#).

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 about 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](#).

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