Troubleshooting Guide

HP t620 Flexible Series Thin Client

Product notice

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

About This Book

WARNING!   Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

NOTE: Text set off in this manner provides important supplemental information.

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1 Product features

Front panel components

For more information, go to http://www.hp.com and search for your specific thin client model to find the model-specific QuickSpecs.
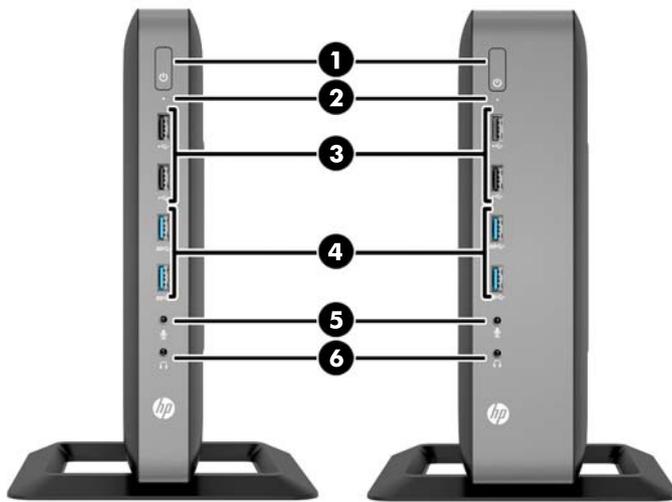
(1)	Power button	(4)	USB 3.0 ports (2)
(2)	Flash drive activity LED	(5)	Microphone port
(3)	USB 2.0 ports (2)	(6)	Headphone port

Rear panel components

For more information, go to http://www.hp.com and search for your specific thin client model to find the model-specific QuickSpecs.
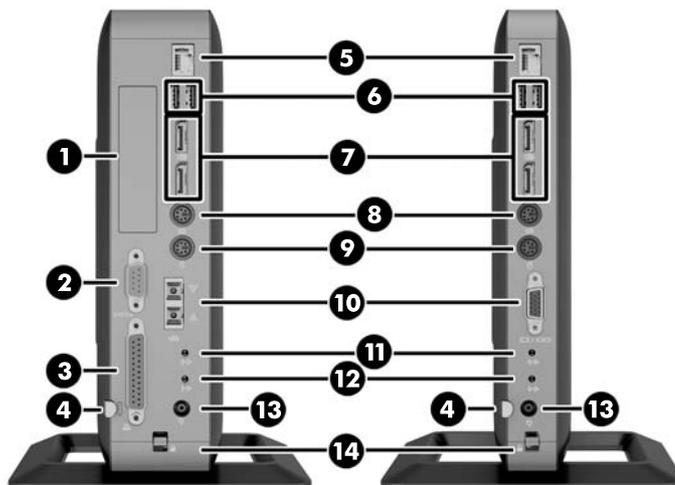
(1)	Half-height PCIe 2.0 expansion slot*	(8)	PS/2 keyboard port
(2)	Serial port*	(9)	PS/2 mouse port
(3)	Parallel port*	(10)	Serial port
			Optional: VGA port or fiber NIC port
(4)	Retractable power cord retention hook	(11)	Audio line-in port
(5)	Ethernet RJ-45 port	(12)	Audio line-out port
(6)	USB 2.0 ports (2)	(13)	Power
(7)	Dual-mode DisplayPort 1.2 ports (2)	(14)	Cable lock slot and rear cover latch

*Available on some models. Refer to the model-specific QuickSpecs at www.hp.com for details.

If the configurable port (item #10) is VGA, then the devices connected at boot up or subsequently disconnected determine which video ports are enabled and which is disabled.

- If a VGA device is connected at boot up, then only one DisplayPort port may be used. If the VGA device is subsequently disconnected, then both DisplayPort ports are enabled.

- If a VGA device and one DisplayPort device are connected at boot up, then the other DisplayPort port is disabled. If the VGA device is subsequently disconnected, then that DisplayPort port is enabled.

- If two DisplayPort devices are connected at boot up, then the VGA port is disabled. If one or both DisplayPort devices are subsequently disconnected, the VGA port is enabled.

Presence of an optional VGA or Fiber NIC port does not disable a DisplayPort port.

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 service for assistance.
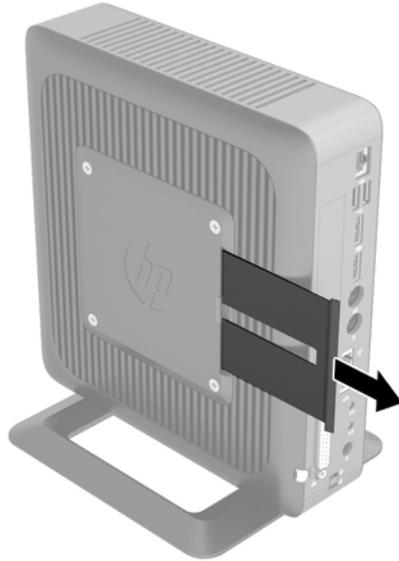
2   Hardware changes

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:

Disconnect the power cord from the power outlet and allow the internal system components to cool before you touch them.

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

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

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

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

⚠ **WARNING!**   Energized and moving parts inside.

Disconnect power to the equipment before removing the enclosure.

Replace and secure the enclosure before re-energizing the equipment.

⚠ **CAUTION:**   Static electricity can damage the electrical components of the computer or optional equipment. Before beginning the following procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

When the computer is plugged into an AC power source, voltage is always applied to the system board. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

Connecting the power cord

1. Plug the female end of the power cord into the power supply brick (1).
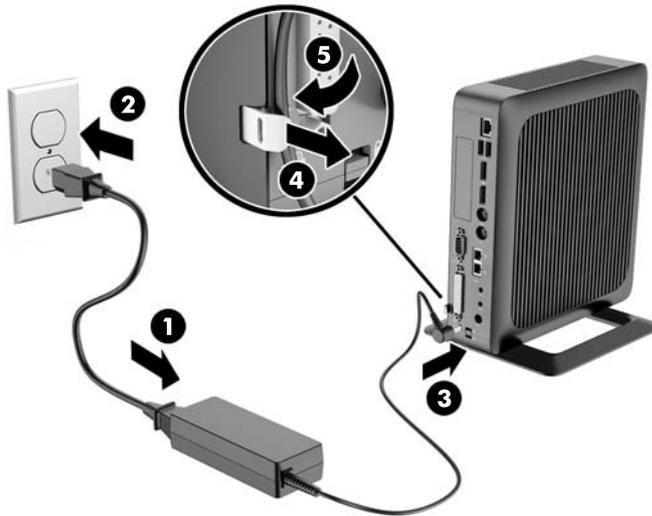
2. Connect the other end of the power cord to an electrical outlet (2).

3. Connect the round end of the power supply cord to the power supply connector on the rear of the computer (3).

4. Use the slot (4) on the side of the retractable power cord retention hook to pull the hook out.

5. Press the power cord into the retention hook (5) and bundle any excess power cord.

⚠ **CAUTION:** Failure to secure the power cable with the retention hook may result in the power cord becoming disconnected, causing loss of data.

Attaching the stand

> ⚠️ **CAUTION:** The computer must be operated with the stand attached to ensure proper airflow around the computer.

The computer can be used in either a tower or horizontal orientation with the stand included with the computer.

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

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

4. Disconnect the power cord from the power outlet and disconnect any external devices.

5. Attach the stand to the computer.

   - Attach the stand to the bottom of the computer to use the computer in the tower orientation.

     a. Turn the computer upside down and locate the two screw holes in the grid on the bottom of the computer.

     b. Position the stand (1) over the bottom of the computer and line up the captive thumbscrews in the stand with the screw holes in the computer.

     c. Tighten the captive thumbscrews (2) securely.

- Attach the stand to the right side of the computer to use it in the horizontal orientation.

  a. Lay the computer down with the right side up and locate the two screw holes in the grid on the right side of the computer.

  b. Position the stand (1) over the side of the computer and line up the captive thumbscrews in the stand with the screw holes in the computer.

  c. Tighten the captive thumbscrews (2) securely.
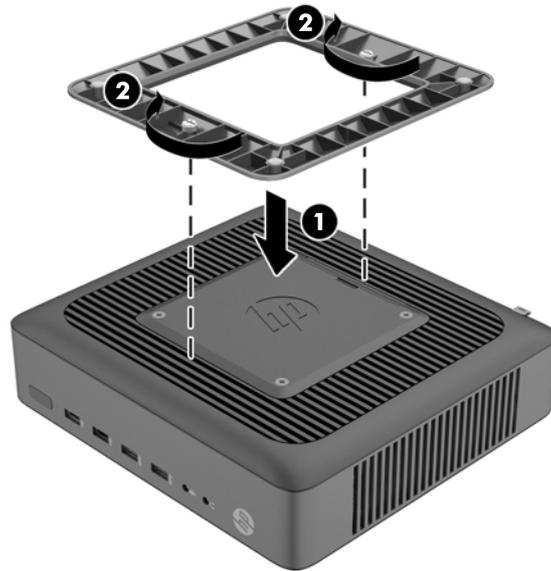
6. Reconnect the external equipment, plug the power cord into a power outlet, and then turn the computer on.

   NOTE: Be sure that at least 10.2 centimeters (4 inches) of space on all sides of the computer remain clear and free of obstructions.

NOTE: An optional Quick Release mounting bracket is available from HP for mounting the computer to a wall, desk, or swing arm. When the mounting bracket is used, do not install the computer with the I/O ports oriented towards the ground.

Removing and replacing the access panel

Removing the access panel

⚠ **WARNING!** To reduce the risk of personal injury or equipment damage from electric shock, hot surfaces, or fire, ALWAYS operate the computer with the access panel in place. In addition to enhancing safety, the access panel may provide important instructions and identification information, which may be lost if the access panel is not used. DO NOT use any access panel except the one that is provided by HP for use with this computer.

Before removing the side access panel, be sure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

To remove the access panel:

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

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

4. Disconnect the power cord from the power outlet, and disconnect any external devices.

⚠ **CAUTION:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer from the stand.

6. Lay the unit flat on a stable surface with the right side up.

7. Release the latch (1) on the left side of the rear I/O panel, rotate the I/O panel (2) to the right, and then lift it off the computer.
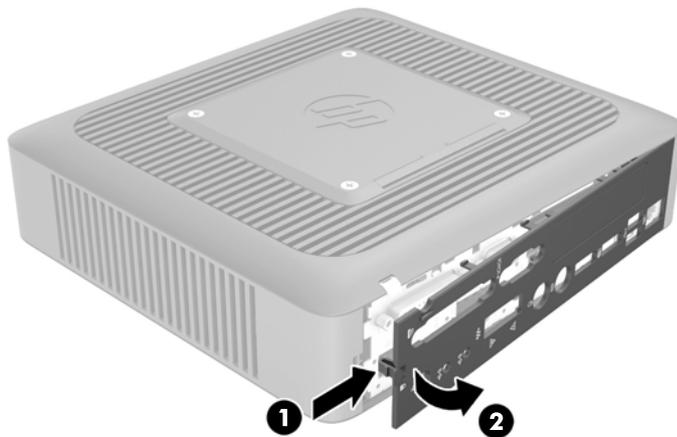
8. Move the access panel latch (1) to the left to release the access panel.

9. Slide the access panel (2) approximately 6 cm (.24 in) toward the back of the chassis, and then lift the panel off of the computer.

Replacing the access panel

To replace the access panel:

1. Set the access panel (1) onto the chassis approximately 6 cm (.24 in) inside the edge of the chassis, and then slide the panel toward the front of the chassis until it locks in place.

2. Move the access panel latch (2) to the right to secure the access panel.

3. Insert the hooks on the right side of the I/O panel (1) into the right side of the back of the chassis, and then press the left side (2) to the chassis until it locks in place.

Installing internal USB flash drives

There are two USB flash drive ports on the system board.

To install a USB flash drive:

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

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

4. Disconnect the power cord from the power outlet, and disconnect any external devices.

5. Remove the computer from the stand and lay the computer down with the right side up.

6. Remove the computer access panel and back I/O panel. See Removing and replacing the access panel on page 8.

    ⚠ **WARNING!** To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before you touch them.

7. If the computer is an HP t620 PLUS Thin Client, push the fan assembly latch (1) toward the front of the computer and rotate the assembly (2) up and out of the way.
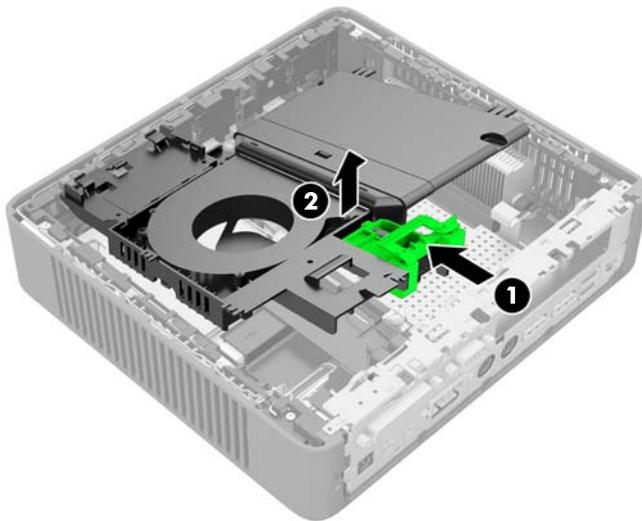
8. Locate the USB flash drive ports on the system board.
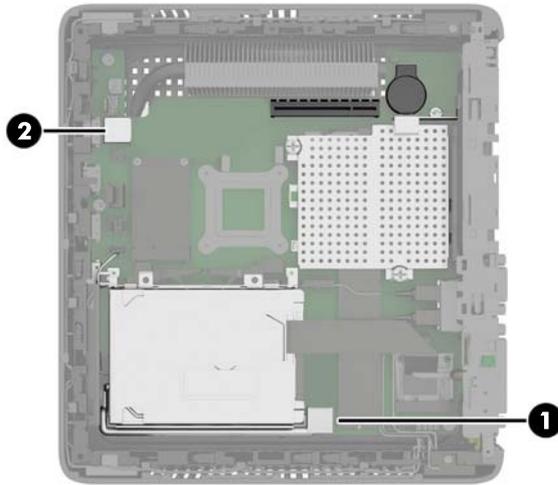
(1)	USB-1 port	(2)	USB-2 port
	USB 2.0 flash drive: maximum dimensions 55 mm (L) x 16 mm (W) x 8 mm (H)		USB 2.0 flash drive: maximum dimensions 65 mm (L) x 25 mm (W) x 10 mm (H)

NOTE: Be sure that the USB flash drive to be installed does not exceed the maximum size for that USB port.

9. Align the USB flash drive with the USB port and press the drive firmly into the port until it is securely seated.

10. If the computer is an HP t620 PLUS Thin Client, rotate the fan assembly down, push the fan assembly latch (1) toward the front of the computer, lower the assembly (2) until it stops, and then release the latch.
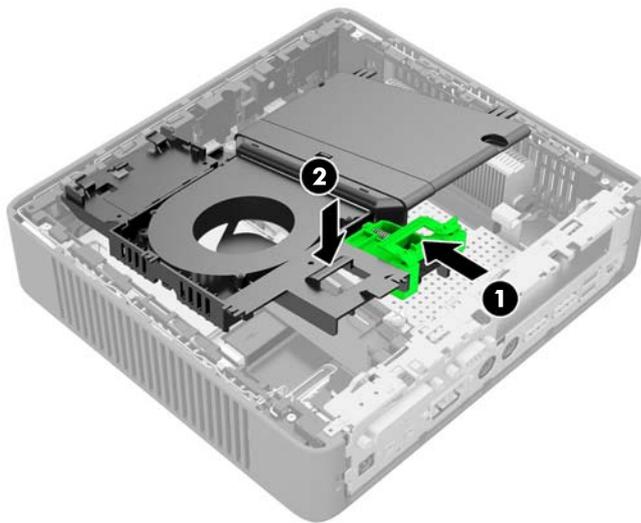
11. Replace and latch the access panel, and then reinstall the I/O panel.

12. Replace the computer stand.

13. Reconnect the power cord and turn on the computer.

14. Lock any security devices that were disengaged when the computer cover or access panel was removed.

Installing additional memory

The computer comes with double data rate 3 synchronous dynamic random access memory (DDR3L-SDRAM) small outline dual inline memory modules (SODIMMs).

SODIMMs

The memory sockets on the system board can be populated with up to two industry-standard SODIMMs. These memory sockets are populated with at least one preinstalled SODIMM. To achieve the maximum memory support, you can populate the system board with up to 16 GB of memory.

DDR3L-SDRAM SODIMMs

For proper system operation, the SODIMMs must adhere to the following specifications:

● industry-standard 204-pin

● unbuffered non-ECC PC3L-12800 DDR3L-1600 MHz-compliant

● 1.35 volt DDR3L-SDRAM SODIMMs

● support CAS latency 11 DDR3L 1600 MHz (11-11-11 timing)

● contain the mandatory Joint Electronic Device Engineering Council (JEDEC) specification

The computer supports the following:

● 2 Gb and 4 Gb non-ECC memory technologies

● single-sided and double-sided SODIMMS

● SODIMMs constructed with x8 and x16 devices; SODIMMs constructed with x4 SDRAM are not supported

NOTE: The system does not operate properly when unsupported SODIMMs are installed.

Populating SODIMM sockets

There are two SODIMM sockets on the system board with one total channel. The sockets are labeled DIMM1 and DIMM2. The system operates in single-channel mode at 1600 MHz.
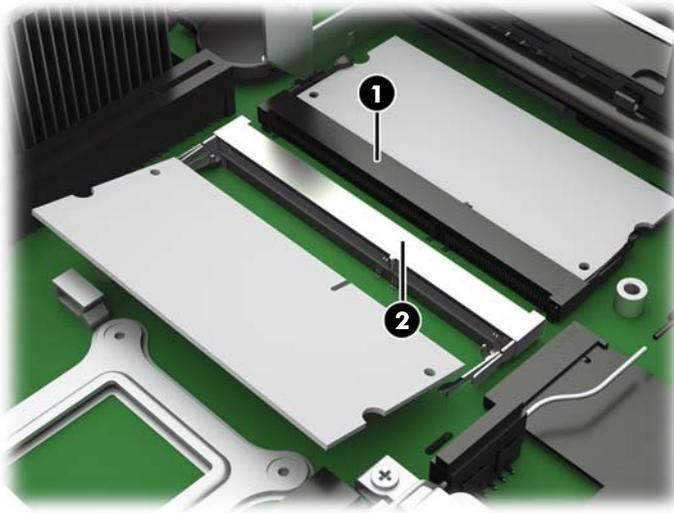
Item	Description	System Board Label	Socket Color
1	SODIMM1 socket, Channel A	DIMM1	Black
2	SODIMM2 socket, Channel A	DIMM2	White

NOTE: If both SODIMM sockets are populated with dual-sided SODIMMs, the system memory speed is reduced to 1333 MHz.

Installing SODIMMs

⚠ **CAUTION:** You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

The memory module sockets have gold-plated metal contacts. When upgrading the memory, it is important to use memory modules with gold-plated metal contacts to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

Static electricity can damage the electronic components of the computer or optional cards. Before beginning the following procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

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

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

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

4. Disconnect the power cord from the power outlet, and disconnect any external devices.

   ⚠ **CAUTION:** You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

5. Remove the computer from the stand and lay the computer down with the right side up.

6. Remove the computer access panel and back I/O panel. See Removing and replacing the access panel on page 8.

   ⚠ **WARNING!** To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before you touch them.

7. If the computer is an HP t620 PLUS Thin Client, push the fan assembly latch (1) toward the front of the computer and rotate the assembly (2) up and out of the way.
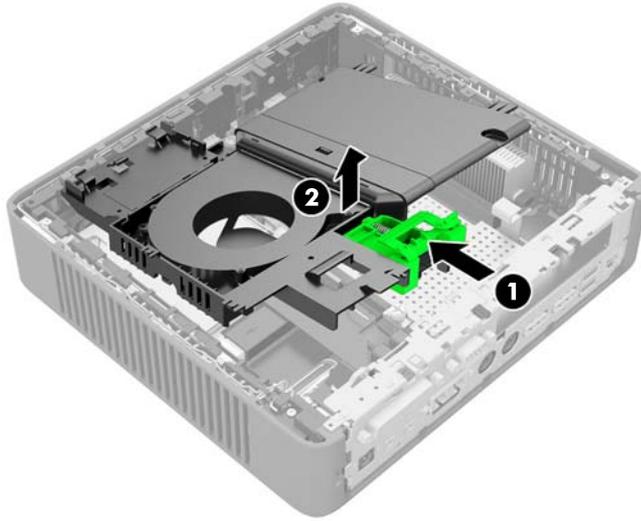
8. Locate the memory compartment on the system board.
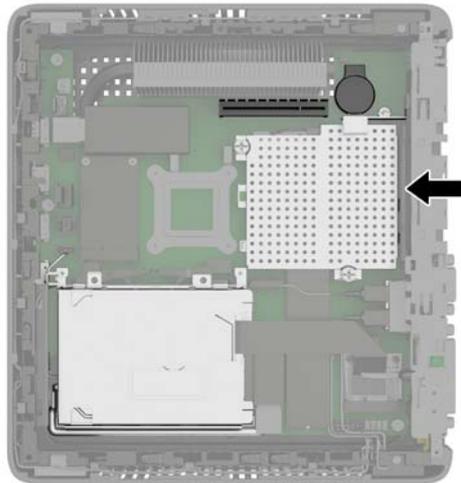
9. If a fiber NIC is installed, move the cable carefully out of the slot in the memory compartment cover.

10. Remove the two screws and springs (1) securing the memory compartment cover.

> 🗒 **NOTE:** Be sure to retain the two screws and the springs beneath them.
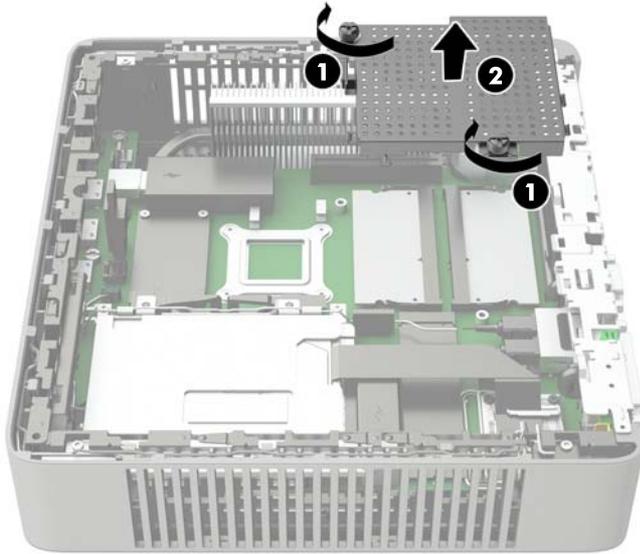
11. Slide the memory compartment cover (2) slightly toward the front of the computer to free it, and then lift it out of the chassis.

12. To remove a SODIMM, press outward on the two latches (1) on each side of the SODIMM, rotate the SODIMM up (2), and then pull the SODIMM out of the socket (3).
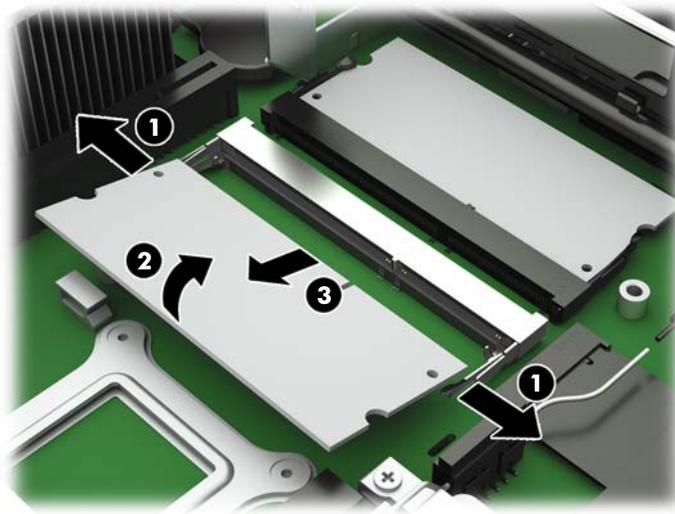
13. Slide the new SODIMM (1) into the socket at approximately a 30° angle, and then press the SODIMM into the socket (2) so that the latches lock it in place.
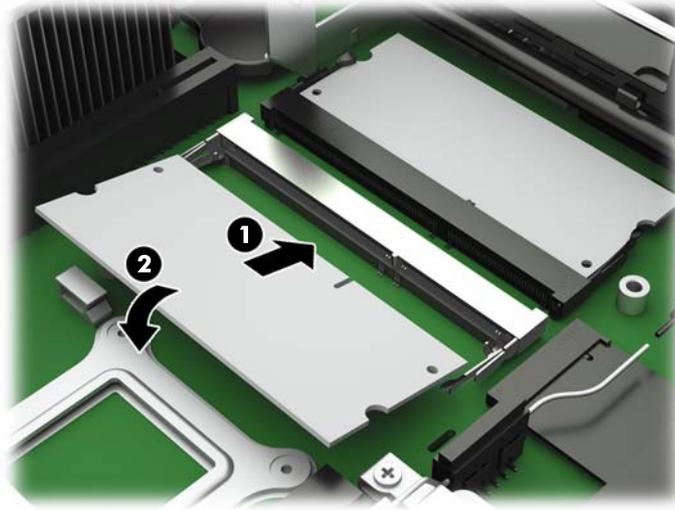
> **NOTE:** A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

14. Hold the memory compartment cover with the fiber NIC slot toward the front of the computer, and then set the memory compartment cover (1) over the SODIMMs.
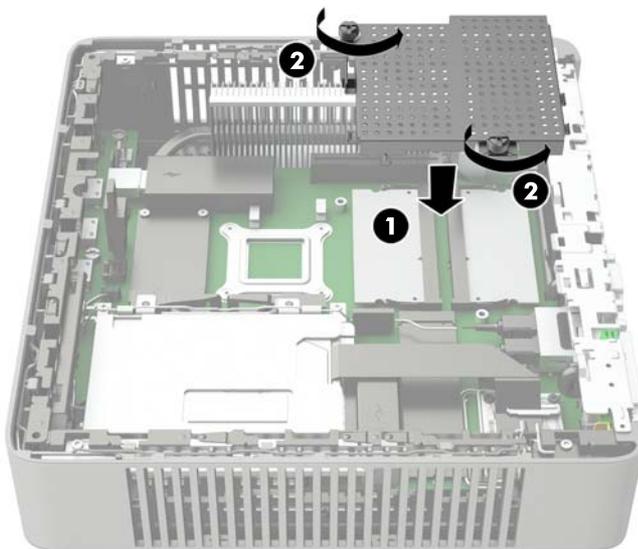
15. If a fiber NIC is installed, move the cable carefully into the slot in the memory compartment cover.

16. Line up the screw holes in the memory cover with the screw posts in the chassis, and then fasten the two screws (2) with the springs to secure the memory compartment cover.

17. If the computer is an HP t620 PLUS Thin Client, rotate the fan assembly down, push the fan assembly latch (1) toward the front of the computer, lower the assembly (2) until it stops, and then release the latch.
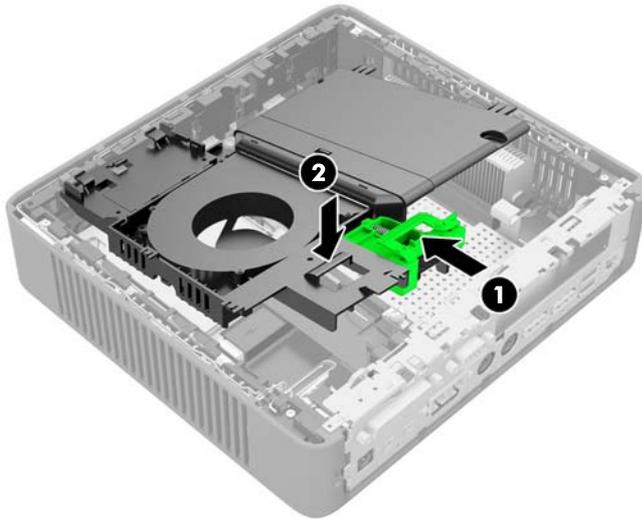
18. Replace and latch the access panel, and then reinstall the I/O panel.

19. Replace the computer stand.

20. Reconnect the power cord and turn on the computer.

21. Lock any security devices that were disengaged when the computer cover or access panel was removed.

The computer automatically recognizes the additional memory when you turn on the computer.

Installing a PCI-Express card

You may install an optional half-height PCI-Express (PCIe) card in the HP t620 PLUS Thin Client. A riser card is installed in this computer by default.

⚠ **WARNING!** To reduce the risk of personal injury or equipment damage from electric shock, hot surfaces, or fire, disconnect the power cord from the power outlet and allow the internal system components to cool before you touch them.

To install a PCIe card:

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

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

4. Disconnect the power cord from the power outlet, and disconnect any external devices.

⚠ **CAUTION:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer from the stand and lay the computer down with the right side up.

6. Remove the computer access panel and back I/O panel. See Removing and replacing the access panel on page 8.

7. Push the fan assembly latch (1) toward the front of the computer and rotate the assembly (2) up and out of the way.

8. Locate the slot in the riser card.

9. Slide the expansion slot cover left and remove it.

10. Align the PCIe card connectors with the slot in the riser card and the metal tab at the end of the card with the slot in the chassis. Press the PCIe card firmly into the slot in the riser card until it is securely seated and the tab is in the slot.

11. Rotate the fan assembly down, push the fan assembly latch (1) toward the front of the computer, lower the assembly (2) until it stops, and then release the latch.

12. Replace and latch the access panel, and then reinstall the I/O panel.

13. Replace the computer stand.

14. Reconnect the power cord and turn on the computer.

15. Lock any security devices that were disengaged when the computer cover or access panel was removed.

Installing a half-height PCI-Express 2.0 card

You may install an optional half-height PCI-Express (PCIe) card in the HP t620 PLUS Thin Client. A riser card is installed in this computer by default.
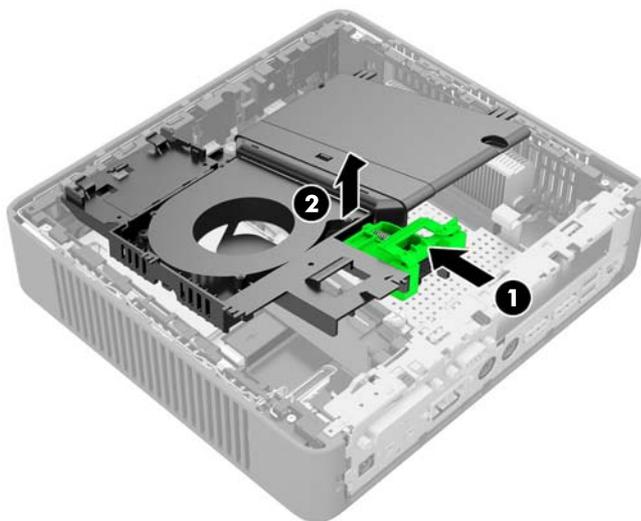
⚠ **WARNING!** To reduce the risk of personal injury or equipment damage from electric shock, hot surfaces, or fire, disconnect the power cord from the power outlet and allow the internal system components to cool before you touch them.
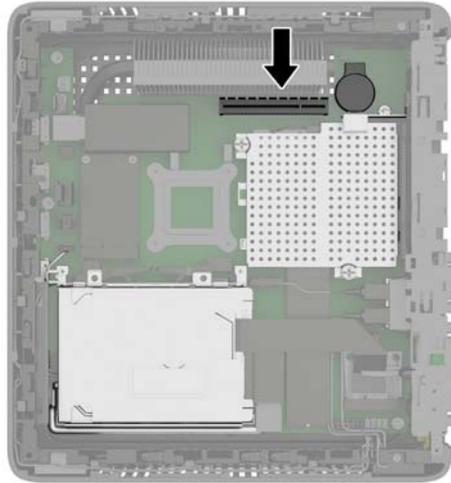
To install a PCIe card:

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

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

4. Disconnect the power cord from the power outlet, and disconnect any external devices.

⚠ **CAUTION:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

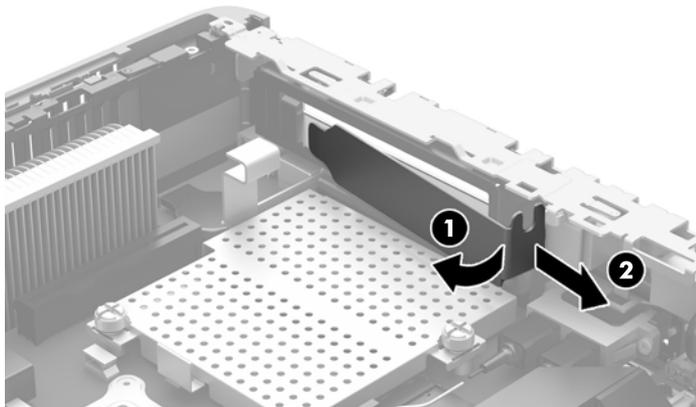5. Remove the computer from the stand and lay the computer down with the right side up.

6. Remove the computer access panel and back I/O panel. See Removing and replacing the access panel on page 8.

7. Push the fan assembly latch (1) toward the front of the computer and rotate the assembly (2) up and out of the way.

8. Locate the slot in the riser card.

9. Slide the expansion slot cover left and remove it.

10. Align the PCIe card connectors with the slot in the riser card and the metal tab at the end of the card with the slot in the chassis. Press the PCIe card firmly into the slot in the riser card until it is securely seated and the tab is in the slot.

11. Rotate the fan assembly down, push the fan assembly latch (1) toward the front of the computer, lower the assembly (2) until it stops, and then release the latch.

12. Replace and latch the access panel, and then reinstall the I/O panel.

13. Replace the computer stand.

14. Reconnect the power cord and turn on the computer.

15. Lock any security devices that were disengaged when the computer cover or access panel was removed.

Security

The thin client is equipped with a hood sensor. You may also use a cable lock to secure the computer.

For an additional layer of security, you may purchase a port cover to prevent unauthorized access to the rear ports.

Hood sensor

The hood sensor is a combination of hardware and software technology. If the access panel is removed, the hood sensor is released and the computer alerts local users to tampering or removal of the access panel.
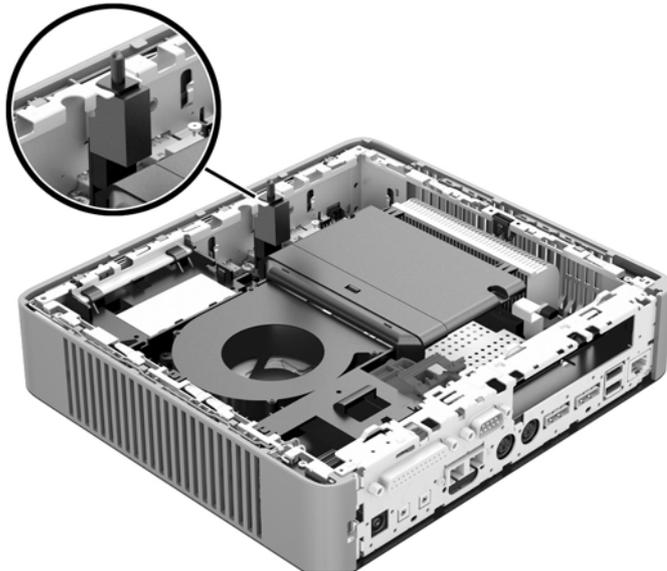
Cable lock

These thin clients are designed to accept a security cable lock. This cable lock prevents unauthorized removal of the thin client, as well as locking devices installed inside the case. To order this option, visit the HP website at http://www.hp.com and search for your specific thin client model.

1. Locate the cable lock slot on the back panel.

2. Insert the cable lock into the slot, and then use the key to lock it.
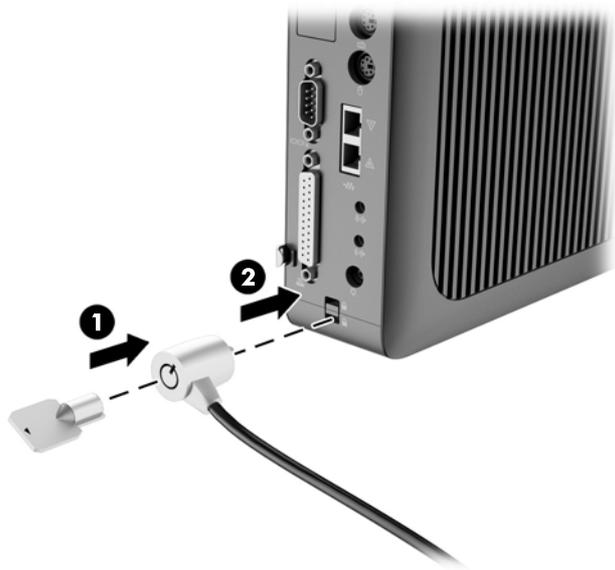
Removing and replacing the battery

⚠ **WARNING!** Before removing the side access panel, be sure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

To remove and replace the battery:

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as USB flash drives, from the computer.

3. Turn off the computer properly through the operating system, and then turn off any external devices.
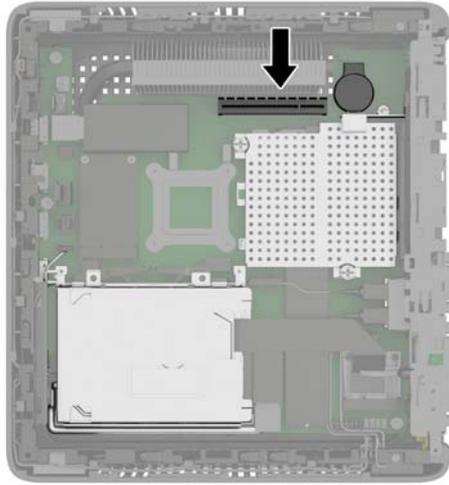
4. Disconnect the power cord from the power outlet, and disconnect any external devices.

⚠ **CAUTION:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer from the stand and lay the computer down with the right side up.

6. Remove the computer access panel and back I/O panel. See Removing and replacing the access panel on page 8.

7. If the computer is an HP t620 PLUS Thin Client, perform the following steps:

    a. Push the fan assembly latch (1) toward the front of the computer and rotate the assembly (2) up and out of the way.
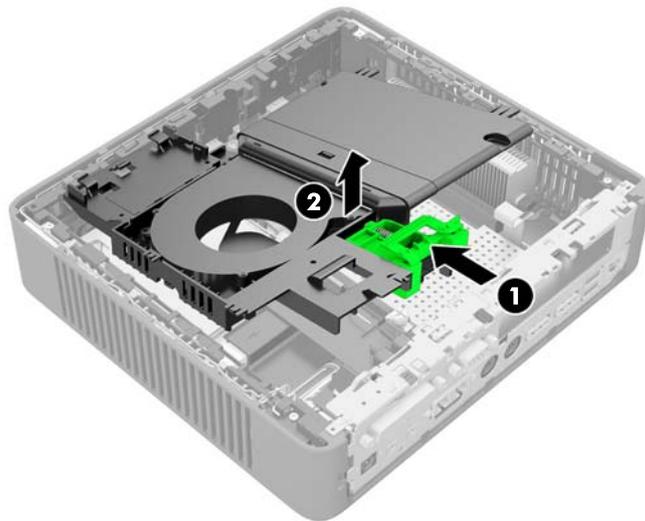
    b. If a PCIe card is installed, remove it carefully.

c. Pull the riser card out of the socket and carefully move it to one side.

Disconnecting the cables from the PCIe riser card is not necessary.
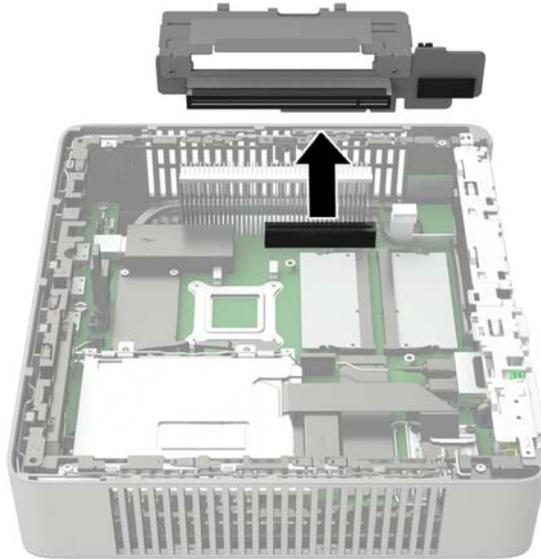
8. Locate the battery on the system board.
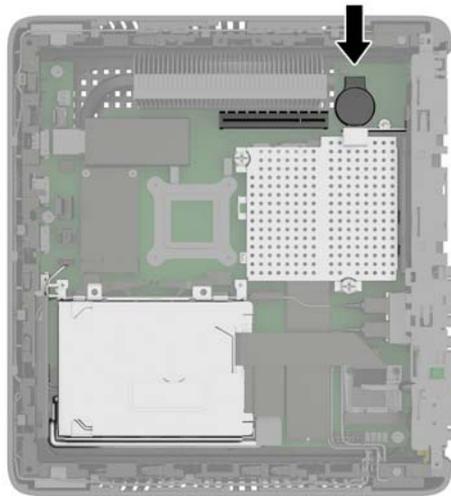
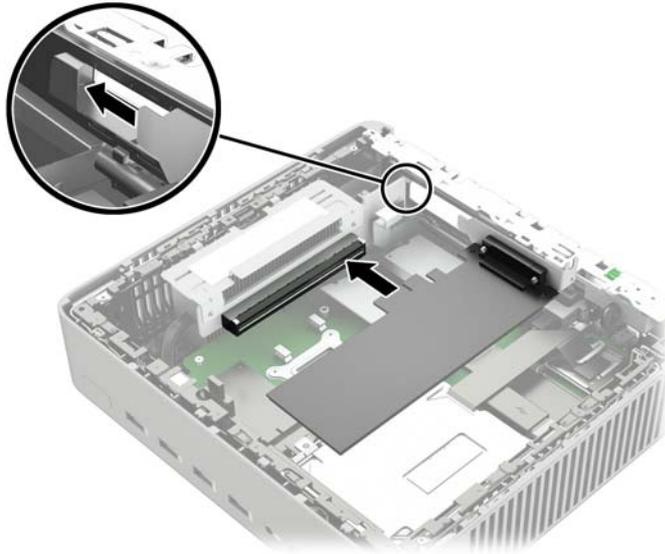**9.** Carefully pry the battery up from the system board.

10. Unplug the battery cable connector from the system board.

11. Connect the cable connector from the new battery to the system board.

12. Carefully press the new battery down to adhere the battery securely to the system board.

13. If the computer is an HP t620 PLUS Thin Client, perform the following steps.

a. If the cables from the PCIe riser card were disconnected in step 7 c, reconnect them.

b. Align the riser card with the socket on the system board and press the riser card firm into the socket.
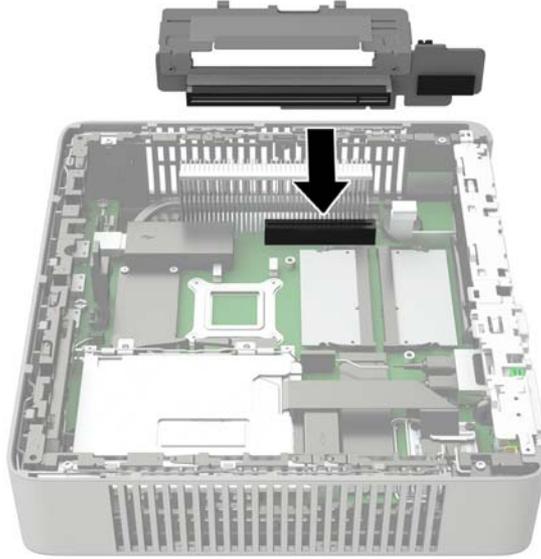
> **NOTE:** The riser card can be installed in only one way. Match the notch on the card with the tab on the socket.

c. If a PCIe card was installed, reinstall it. For instructions, see Installing a PCI-Express card on page 20.

d. Rotate the fan assembly down, push the fan assembly latch (1) toward the front of the computer, lower the assembly (2) until it stops, and then release the latch.
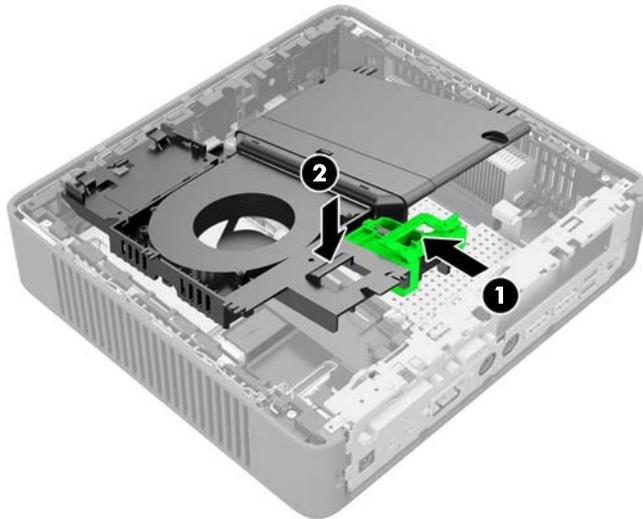
14. Replace and latch the access panel, and then reinstall the I/O panel.

15. Replace the computer stand.

16. Reconnect the power cord and turn on the computer.

**17.** Lock any security devices that were disengaged when the computer cover or access panel was removed.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, go to http://www.hp.com and search for "recycle".

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP partner, or their agents.

The Taiwan EPA requires dry battery manufacturing or importing firms, in accordance with Article 15 or the Waste Disposal Act, to indicate the recovery marks on the batteries used in sales, giveaways, or promotions. Contact a qualified Taiwanese recycler for proper battery disposal.

A   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 media devices.

- Select Post Messages Enabled or Disabled to change the display status of Power-On Self-Test (POST) messages. Post Messages Disabled 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 switch to Post Messages Enabled during POST, press any key (except F1 through F12).

- Enter the Asset Tag or property identification number assigned by the company to this computer.

- Enable the power-on password prompt during system restarts (warm boots) as well as during power-on.

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

- 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.

   NOTE: You can select the language for most menus, settings, and messages using the Language Selection option using the F8 key in Computer Setup.

3. If you pressed Esc, press F10 to enter Computer Setup.

4. A choice of five headings appears in the Computer Setup Utilities menu: File, Storage, Security, Power, and Advanced.

5. Use the arrow (left and right) keys to select the appropriate heading. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the Computer Setup Utilities menu, press Esc.

6. 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.

CAUTION: 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.

Heading	Table
File	Computer Setup—File on page 34
Storage	Computer Setup—Storage on page 35
Security	Computer Setup—Security on page 36
Power	Computer Setup—Power on page 38
Advanced	Computer Setup—Advanced on page 38

Computer Setup—File

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

Option	Description
System Information	Lists: ● Manufacturer ● Product name ● SKU number (some models) ● Serial number ● Asset Tag ● System Board ID ● Product Configuration ID ● System Board CT Number ● BIOS Revision ● BIOS Date ● Processor type ● Processor speed ● Installed memory size/speed, number of channels (single or dual) (if applicable)
About	Displays copyright notice.
Set Time and Date	Allows you to set system time and date.
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

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.
Storage Options	**SATA Emulation** **CAUTION:** SATA emulation changes may prevent access to existing drive data and degrade or corrupt established volumes. Allows you to choose how the SATA controller and devices are accessed by the operating system. There are two supported options: IDE and AHCI (default). IDE - This is the most backwards-compatible setting of the three options. Operating systems usually do not require additional driver support in IDE mode. AHCI (default option) - Allows operating systems with AHCI device drivers loaded to take advantage of more advanced features of the SATA controller.
DPS Self-test	Allows you to execute self-tests on ATA hard drives capable of performing the Drive Protection System (DPS) self-tests. **NOTE:** This selection will only appear when at least one drive capable of performing the DPS self tests is attached to the system.
Boot Order	Allows you to: • 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. EFI boot sources always have precedence over legacy boot sources. • Specify the order in which legacy boot sources (such as a network interface card, internal 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). **NOTE:** You can use F5 to disable individual boot items, as well as disable EFI boot and/or legacy boot. MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started. **Shortcut to Temporarily Override Boot Order** 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.

Computer Setup—Security

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

Table A-1 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 (This selection appears only if a power-on password or setup password is set.)	Allows you to enable/disable: Stringent Password: This item only selectable while Setup Password is set. **NOTE:** Disable the on-board password jumper's (E49) ability to reset the setup passwords. When enabling Stringent Password, losing the passwords may render the system permanently unusable.
Device Security	Allows you to set Device Available/Device Hidden (default is Device Available) for: ● System audio ● Network controller ● SATA Port 0 ● SATA Port 1

USB Security	Allows you to set Enabled/Disabled (default is Enabled) for:
	
	● Front USB Ports
	
	   ○ USB Port 3
	
	   ○ USB Port 4
	
	   ○ USB Port 8
	
	   ○ USB Port 9
	
	● Rear USB Ports
	
	   ○ USB Port 0
	
	   ○ USB Port 1
	
	● Accessory USB Ports
	
	   ○ USB Port 2
	
	   ○ USB Port 7

Slot Security	Allows you to disable the PCI Express slot and Mini Card Slot. Default is enabled. ● PCI Express x4 Slot # ● Mini Card Slot
Network Boot	Enables/disables the computer's ability to boot 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.
System IDs	Allows you to set: ● Asset tag (18-byte identifier), a property identification number assigned by the company to the computer. ● Universal Unique Identifier (UUID) number. The UUID can only be updated if the current chassis serial number is invalid. (These ID numbers are normally set in the factory and are used to uniquely identify the system.)
System Security	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.
Smart Cover	Cover Removal Sensor (Disable/Notify User). Allows notification to user that the cover has been opened.

Trusted Computing	Allows you to configure the trust computing device.
	
	● Security Device Support (Enabled/Disabled). Enable or Disable BIOS Support for security devices. When Disabled, OS will not show Security Device; the TCG EFI protocol and INIT 1A interface will not be available.
	
	● TPM State (Enabled/Disabled). Enable or Disable Security Device.
	
	    NOTE: Your computer will reboot during restart in order to change state of the device.
	
	● Pending operation (None/TPM Clear). Schedule an operation for the security device.
	
	    NOTE: Your computer will reboot during restart in order to change state of security device.

Secure Boot Configuration	The options on this setup page are only for Windows 8 and other operating systems that support Secure Boot. Changing the default setting of the setup options on this page for operating system that do not support secure boot may prevent the system from booting successfully. Legacy Support (Enable/Disable). Enable or disable the legacy operating system support (Windows Embedded Standard 7 and HP Thin-Pro). Secure Boot (Enable/Disable). Only when the Legacy Support set to "Disable", this item can be set to Enabled. This item is for Secure Boot flow control. Secure boot is possible only if system run in user mode. Key Management ● Clear Secure Boot Keys (Clear/Don't Clear). Lets you clear the Secure Boot Key. ● Key ownership (HP keys/ Customer keys). Lets you change the keys of different owners. Fast Boot (Enable/Disable). Enable Fast Boot cause system boot by initializing a minimal set of devices which is required to launch active boot option. This option has no effect for BBS boot options.

Computer Setup—Power

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

Table A-2 Computer Setup—Power

Option	Description
Hardware Power Management	SATA Power Management – Enables or disables SATA bus and/or device power management. Default is enabled. S5 Maximum Power Savings – Turns off power to all nonessential hardware when system is off to meet EUP Lot 6 requirement of less than 0.5 Watt power usage. Default is disabled. S4/S5 Wake on LAN (Disable/Enable). Permits the user to control whether the system should wake from S4 of S5 if a magic packet id received by NIC.
Thermal	CPU Fan speed (Read-Only), show the CPU fan speed in RPM on the t620 Flex system.

Computer Setup—Advanced

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

Table A-3 Computer Setup—Advanced (for advanced users)

Option	Heading

Power-On Options	Allows you to set:
	
	● POST messages (enable/disable). Default is disabled.
	
	● After Power Loss (off/on/previous state). Default is Power off. Setting this option to:
	
	   ○ Power off—causes the computer to remain powered off when power is restored.
	
	   ○ Power on—causes the computer to power on automatically as soon as power is restored.
	
	   ○ Previous state—causes the computer to power on automatically as soon as power is restored, if it was on when power was lost.
	
	NOTE: If you turn off power to the computer using the switch on a power strip, you will not be able to use the suspend/sleep feature or the Remote Management features.
	
	● 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 boot 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.

BIOS Power-On	Allows you to set the computer to turn on automatically at a time you specify.
Onboard Devices	Allows you to set resources for or disable Legacy devices.

Bus Options	On some models, allows you to enable or disable:
	• 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	Allows you to set:
	• Printer mode (Bi-Directional, EPP + ECP, Output Only). Default is EPP+ECP.
	• Num Lock State at Power-On (off/on). Default is off.
	• 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 memory allocation to 512 MB.
	If you select Force, the UMA Frame Buffer Size option displays, which lets you set the UMA memory size allocation between 32 MB and 1 GB.
	• Internal Speaker (some models) (does not affect external speakers). Default is enabled.
	• Multi-Processor (Enable, Disable) Default Enabled; Use this option to disable multiprocessoe support under the OS.
	• NIC Option ROM Download (PXE, disabled). The BIOS contains an embedded NIC option ROM to allow the unit to boot through the network to a PXE server. This is typically used to download a corporate image to a hard drive. The NIC option ROM takes up memory space below 1MB commonly referred to as DOS Compatibility Hole (DCH) space. This space is limited. This F10 option will allow users to disable the downloading of this embedded NIC option ROM thus giving more DCH space for additional PCI cards which may need option ROM space. The default will be to have the NIC option-ROM-enabled. Default is PXE.

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

Some BIOS settings may be changed locally within the operating system without having to go through the F10 utility[1]. This table identifies the items that can be controlled with this method.

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
Set Day	01/01/2011	01/01/2011 to current date
Apply Defaults and Exit	Disable	Enable
SATA Emulation	AHCI	IDE
System Audio	Device available	Device hidden
Network Controller	Device available	Device hidden
SATA0	Device available	Device hidden
SATA1	Device available	Device hidden
Front USB Ports	Enable	Disable
Rear USB Ports	Enable	Disable
Internal USB Ports	Enable	Disable
Front USB Port 3, 4, 8, & 9	Enable	Disable
Rear USB Port 0 & 1	Enable	Disable
Internal USB Port 2 & 7	Enable	Disable
PCI Express x4 Slot #	Enable	Disable
Mini Card Slot	Enable	Disable
Network Boot	Enable	Disable
Data Execution Prevention	Enable	Disable
Virtualization Technology	Disable	Enable
Trusted Computing	Enable	Disable
Legacy Support	Enable	Disable (Note: The default value may be varied depends on the OS)
Secure Boot	Disable	Enable (Note: The default value may be varied depends on the OS)
Clear Secure Boot Keys	Don't Clear	Clear
Key Ownership	HP Keys	Custom Keys
Fast Boot	Disable	Enable (Note: The default value may be varied depends on the OS)

Smart Cover	Disable	Notify, User
SATA Power Management	Enable	Disable
S5 Maximum Power Savings	Disable	Enable
S4/S5 Wake on LAN	Disable	Enable
CPU Fan Check	Enable	Disable
POST Messages	Disable	Enable
After Power Loss	Off	On, Previous State
POST Delay (in seconds)	None	5, 10, 15, 20, 60
Power on Sunday – Saturday	Disable	Enable
Power on Time (hh:mm)	00:00	00:00:23:59
Serial Port A	IO=3F8; IRQ=4	Disable, IO=3F8h; IRQ=3, IO=2F8h; IRQ=4, IO=2F8h; IRQ=3, IO=3E8h; IRQ=4, IO=3E8h; IRQ=3, IO=2E8h; IRQ=4, IO=2E8h; IRQ=3
Serial Port B	IO=2F8h; IRQ=3	Disable, IO=3F8h; IRQ=4, IO=3F8h; IRQ=3, IO=2F8h; IRQ=4, IO=3E8h; IRQ=4, IO=3E8h; IRQ=3, IO=2E8h; IRQ=4, IO=2E8h; IRQ=3
Parallel Port	IO=378h; IRQ=7; DMA=3	Disable, IO=378h; IRQ=7; DMA=1, IO=278h; IRQ=7; DMA=1, IO=278h; IRQ=7; DMA=3, IO=3BCh; IRQ=7; DMA=1, IO=3BCh; IRQ=7; DMA=3
PCI SERR# Generation	Enable	Disable
PCI VGA Palette Snooping	Disable	Enable
Printer Mode	EPP+ECP	Bi-Directional, Output-Only
Num Lock State at Power-On	On	Off
Integrated Graphics	Auto	Disable, Force
UMA Frame Buffer Size	512M	32M, 64M, 128M, 256M, 1G
Multi-Processor	Enable	Disable
Integrated Audio	Enable	Disable
Internal Speaker	Enable	Disable
NIC Option ROM Download	PXE	Disable

B   Diagnostics and Troubleshooting

LEDs

Table B-1 **Power and IDE Flash Activity LEDs**

LED	Status
Power LED Off	When the unit is plugged into the wall socket and the Power LED is off, the unit is powered off. However, the network can trigger a Wake On LAN event in order to perform management functions.
Power LED On	Displays during boot sequence and while the unit is on. During boot sequence, hardware initialization is processed and startup tests are performed on the following: ● Processor initialization ● Memory detection and initialization ● Video detection and initialization **NOTE:** If one of the tests fails, the unit will simply stop, but the LED will stay on. If the video test fails, the unit beeps. There are no messages sent to video for any of these failed tests. **NOTE:** After the video is initialized, anything that fails will have an error message.
NOTE: RJ-45 LEDs are located inside the RJ-45 connector on the top, rear panel of the thin client. The LEDs are visible when the connector is installed. Blinking green indicates network activity, and amber indicates a 100MB speed connection.	
IDE LED is Off	When the unit is powered on and the flash activity light is off, then there is no access to the system flash.
IDE LED blinks white	Indicates the system is accessing the internal IDE flash.

Wake-on LAN

Wake-on LAN (WOL) allows a computer to be turned on or resumed from sleep or hibernation state by a network message. You can enable or disable WOL in Computer Setup using the **S5 Maximum Power Savings** 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. Navigate to **Power > Hardware Power Management**.

5. Set **S5 Maximum Power Savings** as follows:

   ● Disable WOL = Enabled

   ● Enable WOL = Disabled

6. Press F10 to accept any changes.

7. Select **File** > **Save Changes and Exit**.

Power-On Sequence

At power-on, the flash boot block code 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 VGA 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".

7. The unit boots the operating system.

Resetting the Setup and power-on Passwords

You can reset the Setup and Power-on passwords as follows:

1. Turn off the computer and disconnect the power cord from the power outlet.

2. Remove the side access panel and the metal side cover.

3. Remove the password jumper from the system board header labeled PSWD/E49.

4. Replace the metal side cover and the side access panel.

5. Connect the computer to AC power, and then turn on the computer.

6. Turn off the computer and disconnect the power cord from the power outlet.

7. Remove the side access panel and the metal side cover.

8. Replace the password jumper.

9. Replace the metal side cover and the side access panel.

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 unit simply stops. There are no messages sent to video.

NOTE: You may try to restart the unit 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 unit.

Table B-2 Power-On Diagnostic Test

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
Parallel Port	Initiates the port's driver and determines if the device is present
Serial Port	Tests the serial port using simple port verification test to determine if ports are present
Timer	Tests timer interrupt by using polling method
RTC CMOS battery	Tests integrity of RTC CMOS battery
NAND flash device	Tests for proper NAND flash device ID present

Interpreting POST Diagnostic Front Panel LEDs and Audible Codes

This section covers the front panel LED codes as well as the audible codes that may occur before or during POST that do not necessarily have an error code or text message associated with them.

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

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

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

Table B-3 **Diagnostic Front Panel LEDs and Audible Codes**

Activity	Beeps	Possible Cause	Recommended Action
White Power LED On.	None	Computer on.	None
White Power LED flashes every two seconds.	None	Computer in Suspend to RAM mode (some models only) or normal Suspend mode.	None required. Press any key or move the mouse to wake the computer.
Red Power LED flashes two times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	2	Processor thermal protection activated: A fan may be blocked or not turning. OR The heat sink/fan assembly is not properly attached to the processor. OR The unit has vents blocked or is in a location where the ambient temperature is too high.	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.

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes four times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	4	Power failure (power supply is overloaded). OR The incorrect external power supply adapter is being used on the unit.	1. Check if a device is causing the problem by removing ALL attached devices. Power on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly. 2. Replace the power supply. 3. Replace the system board.
Red Power LED flashes five times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	5	Pre-video memory error.	**CAUTION:** To avoid damage to the memory modules or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a memory module. 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.
Red Power LED flashes six times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	6	Pre-video graphics error.	For systems with a graphics card: 1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board. For systems with integrated graphics, replace the system board.

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes eight times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	8	Invalid ROM based on bad checksum.	1. Reflash the system ROM with the latest BIOS image using the BIOS Recovery procedure. 2. Replace the system board.
System does not power on and LEDs are not flashing.	None	System unable to power on.	Press and hold the power button for less than 4 seconds. If the hard drive LED turns white, the power button is working correctly. Try the following: 1. Remove the power cord from the computer. 2. Open the computer and press the yellow CMOS button on the system board for 4 seconds (located near the front USB ports). 3. Verify that the AC cord is plugged into the power supply. 4. Close the unit and reattach the power cord. 5. Try to power on the computer. 6. Replace the unit.

POST Numeric Codes and Text Messages

This section covers those POST errors that have numeric codes associated with them. The section also includes some text messages that may be encountered during POST.

NOTE: The computer will beep once after a POST text message is displayed on the screen.

Table B-4 **Numeric Codes and Text Messages**

Control panel message	Description	Recommended action
103-System Board Failure	DMA or timers.	1. Clear CMOS. 2. Remove expansion boards. 3. Replace the system board.
110-Out of Memory Space for Option ROMs	Recently added PCI expansion card contains an option ROM too large to download during POST.	1. If a PCI expansion card was recently added, remove it to see if the problem remains. 2. In Computer Setup, set **Advanced** > **Device Options** > **NIC PXE Option ROM Download** to **DISABLE** to prevent PXE option ROM for the internal NIC from being downloaded during POST to free more memory for an expansion card's option ROM. Internal PXE option ROM is used for booting from the NIC to a PXE server.
161-Real-Time Clock Power Loss	Invalid time or date in configuration memory. RTC (real-time clock) battery may need to be replaced.	Reset the date and time under **Control Panel** (Computer Setup can also be used). If the problem persists, replace the RTC battery. See the Removal and Replacement section for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement.
164-MemorySize Error	Memory amount has changed since the last boot (memory added or removed).	Press the F1 key to save the memory changes.
201-Memory Error	RAM failure.	1. Ensure memory modules are correctly installed. 2. Verify proper memory module type. 3. Remove and replace the identified faulty memory module(s). 4. If the error persists after replacing memory modules, replace the system board.
214-DIMM Configuration Warning	Populated DIMM Configuration is not optimized.	Rearrange the DIMMs so that each channel has the same amount of memory.

Control panel message	Description	Recommended action
301-Keyboard Error	Keyboard failure.	1. Reconnect keyboard with computer turned off.
		2. Check connector for bent or missing pins.
		3. Ensure that none of the keys are depressed.
		4. Replace keyboard.
510-Flash Screen Image Corrupted	Flash Screen image has errors.	Reflash the system ROM with the latest BIOS image.
512-Chassis, Rear Chassis, or Front Chassis Fan not Detected	Chassis, rear chassis, or front chassis fan is not connected or may have malfunctioned.	1. Reseat chassis, rear chassis, or front chassis fan.
		2. Reseat fan cable.
		3. Replace chassis, rear chassis, or front chassis fan.
513-Front Chassis fan not detected	Front chassis fan is not connected or may have malfunctioned.	1. Reseat front chassis fan.
		2. Reseat fan cable.
		3. Replace front chassis fan.
912-Computer Cover Has Been Removed Since Last System Startup	Computer cover was removed since last system startup.	No action required.
921-Device in PCI Express slot failed to initialize	There is an incompatibility/problem with this device and the system or PCI Express Link could not be retrained to an x1.	Try rebooting the system. If the error reoccurs, the device may not work with this system
1720-SMART Hard Drive Detects Imminent Failure	Hard drive is about to fail. (Some hard drives have a hard drive firmware patch that will fix an erroneous error message.)	1. Determine if hard drive is giving correct error message. Run the Drive Protection System test using F2 Diagnostics.
		2. Apply hard drive firmware patch if applicable. (Available at http://www.hp.com/support.)
		3. Back up contents and replace hard drive.
Invalid Electronic Serial Number	Electronic serial number is missing.	Enter the correct serial number in Computer Setup.

Table B-4 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
Network Server Mode Active and No Keyboard Attached	Keyboard failure while Network Server Mode enabled.	1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. 3. Ensure that none of the keys are depressed. 4. Replace keyboard.
Parity Check 2	Parity RAM failure.	Run Computer Setup and Diagnostic utilities.

Troubleshooting

Basic Troubleshooting

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

Table B-5 Power-On Troubleshooting

Issue	Procedures
The thin client unit is experiencing operating problems.	Ensure that the following connectors are securely plugged into the thin client unit: ● Power connector ● Keyboard ● Mouse ● Network RJ-45 connector ● Monitor
The thin client unit does not power on.	1. Verify that the power supply is good by installing it on a known working unit and testing it. If the power supply does not work on the test unit, replace the power supply. 2. If the unit does not work properly with the replaced power supply, have the unit serviced.
The thin client unit powers on and displays a splash screen, but does not connect to the server.	1. Verify that the network is operating and the network cable is working properly. 2. Verify that the unit is communicating with the server by having the System Administrator ping the unit from the server: ◦ If the thin client pings back, then the signal was accepted and the unit 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 unit.

No link or activity on the network RJ-45 LEDs or the LEDs do not illuminate blinking green after powering on the thin client unit. (The network LEDs 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.)	**1.** Verify that the network is not down. **2.** Make sure the RJ-45 cable is good by installing the RJ-45 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 unit with a known working power supply cable and testing it. **4.** If network LED's still do not light and you know the power supply is good, then re-image the unit. **5.** If network LED's still do not light, run the IP configuration procedure. **6.** If network LED's still do not light, have the unit 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 reboot the system. If problems occur, disconnect the unknown USB peripheral and reboot the platform.
Video does not display.	**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 LED 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 unit and power on the monitor again. **4.** Test the thin client unit on a known working monitor. If the monitor does not display video, replace the thin client unit.

Diskless (No-Flash) Unit Troubleshooting

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

- USB device

- PXE

1. When the unit boots, the monitor should display the following information:

Table B-6 Diskless Unit Troubleshooting

Item	Information	Action
MAC Address	NIC portion of the system board is OK	If no MAC Address, the system board is at fault. Contact the Call Center 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 the Call Center 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 system board. Contact the Call Center 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 the Call Center for service for the bad system board.

If you are running in an 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 unit does not boot to the network the server is not configured to PXE.

If you missed the F12 cue, the system will try to boot 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 boot cycle.

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 that call the HP Customer Service Center with PXE issues and questions should be referred to their PXE provider for assistance.

Additionally, refer to the following:

– For Windows 2008 R2: http://support.microsoft.com/kb/891275

– For Windows 2012: http://technet.microsoft.com/en-us/library/cc766320(WS.10).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.

C Restoring the Flash Image

System Requirements

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

- A personal computer running Microsoft Windows XP Professional or Windows 7.

- One or more HP t620 Flexible Thin Clients

- 8-GB USB flash device for Microsoft Windows Embedded Standard 7 (WES 7) (if using the USB format) or Linux.

  This restore method will not work with all USB flash devices. USB flash devices with multiple partitions generally do not support this restore method. The range of USB flash devices available on the market is constantly changing. Not all USB flash devices have been tested with the HP Thin Client Imaging Tool.

Before using the utility, you must download the appropriate image from http://www.hp.com.

Getting Started

There are two deployment options supported by this utility. You can choose to do one or more of the following using your personal computer:"

- Create a bootable flash image on a USB flash device.

- Unbundle the image to a directory for use in a custom deployment scenario or PXE image.

Download and run the Package-for-the-Web deliverable (an .exe file) that contains the original factory image for the thin client. The HP Thin Client Imaging Tool (CRStart.exe) runs automatically.

Choose one of the deployment options: Each option is described in the following paragraphs.

- USB Format

- Deployment

During the restore process, the thin client flash drive will be reformatted and all data on it will be erased before the system image is copied to it. To prevent loss of data, be sure that you have saved any user-created data from the flash drive. During the

first restart of the thin client following the restore process, it may take approximately 15 minutes to unbundle the software before the Windows Desktop is displayed.

Formatting a USB Flash Drive

⚠ **CAUTION:**   To prevent loss of data, be sure that you have saved any user-created data from the USB drive to another drive.

1. Connect your USB flash device (drive key) to your personal computer. Ensure that only one USB flash device is connected to the system.

2. Click **USB Format**.

3. Select the USB drive from the list, using the up and down arrows to display the correct drive letter. (If the USB drive does not appear in the list, click **Update Drives**, then scroll through the list again.)

   During the next step, the USB drive will be reformatted and all data on it will be erased before the bootable image is copied to it. To prevent loss of data, be sure that you have saved any data from the USB drive to another drive.

4. Click **Format**. Connect the bootable USB flash device to the thin client. Only one bootable USB device may be attached to the thin client during this process.

   📝 **NOTE:**   Do not use USB 3.0 devices.

5. Restart the thin client.

6. When prompted **Do you want to continue? [Y/N]** click **Y** to begin the image restore process on the thin client.

Unpacking the Image and Tools for Deployment

▲   Click **Deployment**.

The components that comprise the thin client recovery image (DSKIMG.BIN) are unbundled.

When this process is complete, the four most important files include: IBRPE.EXE (the image restoration utility), FLASH.IBR (the OS image), the ReadMe.TXT file, and boot.wim (the pre-install environment).

📝 **NOTE:**   Linux uses the file name FLASH.DD while other operating system images use FLASH.IMG

Deploying with PXE

1. Ensure that IBRPE.EXE and FLASH.IBR file exist.

2. Add the following command to execute IBRPE in WinPE environment: `[full path]
   \IBRPE.EXE [full path]\FLASH.IBR HD0`

To view the IBR command line options: At the command prompt, type `IBR.EXE /?` and press Enter.

See your documentation if using a different PXE server, such as Altiris Deployment Solution.

D   Device management

The t620 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 on HP Device Manager, please visit www.hp.com/go/hpdm.

If you wish to manage the t620 with other management tools such as Microsoft SCCM or LANDesk, go to www.hp.com/go/clientmanagement for more information.

E   Adding an Image Restore Tool

1. Ensure that the boot order is set to use the **Network** as the first boot device.

2. Ensure that IBR.exe (Image Restore) and Flash.dd are stored in the same directory on the server. (e.g., `c:\program files\altiris\express\deployment server\images`)

3. From the Altiris Deployment Server Console, click **File > New > Job** .

4. Enter a unique name for the job that you will use to deploy the original thin client image.

5. Click the name of the new job.

6. Near the upper right side of the screen, click **Add**.

7. Select **Run Script** from the menu.

8. Type [full path]images\ibr\exe-y\images\flash.xx hd0

    NOTE: Linux uses the file name FLASH.DD while other operating system images use FLASH.IMG

9. Under **In which OS would you like to run this script?** Click **DOS**.

10. Click **Finish**.

11. You can now drag and drop the job onto the appropriate machine(s) or schedule it to run later, depending on your needs. Refer to the documentation for Altiris Deployment Solution (http://www.altiris.com/support/documentation) for more detailed information.

F   System BIOS

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 pre-built BIOS add-on or can use the standard BIOS upgrade package along with an HP Device Manager File and Registry template. For more information on HP Device Manager File and Registry templates, review the *HP Device Manager User Guide* found at www.hp.com/go/hpdm.

Windows BIOS Flashing

You can use the BIOS Flash Update SoftPaq to restore or upgrade the system BIOS. Several methods for changing the BIOS firmware stored on your computer are available.

The BIOS executable is a utility designed to flash the System BIOS within a Microsoft Windows environment. To display the available options for this utility, launch the executable file under the Microsoft Windows environment.

You can run the BIOS executable with or without the USB storage device. If the system does not have a USB storage device installed, the BIOS update will perform under the Microsoft Windows environment and followed by system reboot.

Linux BIOS Flashing

You can use the hp-flash utility and its associated driver to update the BIOS on systems running Linux. After the driver loads, execute the utility from a command prompt with administrator privileges. The HP ThinPro or HP Smart Client Linux OS images include the utility for updating the BIOS, but the binary file to flash must be copied from the DOS Flash folder to the unit. Review the README.txt file for more specific instructions in the SoftPaq. The Linux Flash folder also contains the files necessary to build the BIOS flash driver module for the particular kernel being used; the hp-flash utility is not kernel-dependent other than the choice of 32-bit (i686) and 64-bit (x86_64) flavors.

BitLocker Drive Encryption / BIOS Measurements

If you have Windows BitLocker Drive Encryption (BDE) enabled on your system, we recommend that you temporarily suspend BDE before updating the BIOS. You should also obtain your BDE recovery password or recovery PIN before suspending BDE. After the you flash the BIOS, you can resume BDE.

To make a change to BDE, select **Start > Control Panel > BitLocker Drive Encryption**, click **Suspend Protection** or **Resume Protection** and then click **Yes**.

As a general rule, updating the BIOS will modify measurement values stored in the Platform Configuration Registers (PCRs) of the system's security module. Temporarily disable technologies that use these PCR values to ascertain platform health (BDE is one such example) prior to flashing the BIOS. Once you update the BIOS, re-enable the functions and restart the system so that you can take new measurements.

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 power 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. If the system has a BIOS Setup password, you may need to use the Startup Menu / Utilities submenu to flash the BIOS manually after providing the password. 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.

G   Power cord set requirements

The power supplies on some computers have external power switches. The voltage select switch feature on the computer permits it to operate from any line voltage between 100-120 or 220-240 volts AC. Power supplies on those computers that do not have external power switches are equipped with internal switches that sense the incoming voltage and automatically switch to the proper voltage.

The power cord set received with the computer meets the requirements for use in the country where you purchased the equipment.

Power cord sets for use in other countries must meet the requirements of the country where you use the computer.

General requirements

The requirements listed below are applicable to all countries:

1. The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.

2. The power cord set must have a minimum current capacity of 10A (7A Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.

3. The diameter of the wire must be a minimum of 0.75 mm_2 or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet).

The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

⚠ **WARNING!**   Do not operate this product with a damaged power cord set. If the power cord set is damaged in any manner, replace it immediately.

Japanese power cord requirements

For use in Japan, use only the power cord received with this product.

⚠ **CAUTION:**   Do not use the power cord received with this product on any other products.

Country-specific requirements

Additional requirements specific to a country are shown in parentheses and explained below.

Country	Accrediting Agency	Country	Accrediting Agency
Australia (1)	EANSW	Italy (1)	IMQ
Austria (1)	OVE	Japan (3)	METI
Belgium (1)	CEBC	Norway (1)	NEMKO
Canada (2)	CSA	Sweden (1)	SEMKO
Denmark (1)	DEMKO	Switzerland (1)	SEV
Finland (1)	SETI	United Kingdom (1)	BSI
France (1)	UTE	United States (2)	UL
Germany (1)	VDE		

1. The flexible cord must be Type HO5VV-F, 3-conductor, $0.75mm_2$ conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

2. The flexible cord must be Type SVT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.

3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, $0.75 mm_2$ conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

H   Statement of Volatility

Thin Client products typically have three types of memory devices namely, RAM, ROM, and Flash memory devices. Data stored in the RAM memory device will be lost once the power is removed from the device. RAM devices could be powered by main, aux, or battery power (power states are explained below). Therefore, even when the unit is not connected to an AC outlet, some of the RAM devices could be powered by battery power. Data stored in the ROM or Flash memory devices will retain its data even if the power is removed to the device. Manufacturers of Flash device usually specify a period of time (in the order of 10 years) for data retention.

Definition of power states:

Main Power: Power available when the unit is turned on.

Aux or Standby power: Power available when the unit is in off state when the power supply is connected to an active AC outlet.

Battery Power: Power from a coin battery present in the Thin Client systems.

The table below lists the available memory devices and their types per the models. Please note that the Thin Client systems do not use traditional hard drives with moving parts. Instead, they use flash memory devices with an IDE front end interface. Hence, the operating systems interface with these flash devices similar to a regular IDE hard drive. This IDE flash device contains the image of the operating system. The flash device can only be written by an administrator. A special software tool is required to format the flash devices and clear the data stored in them.

Please find below a list of steps that should be taken to update BIOS and use it to set the BIOS settings to factory default settings.

1. Download the latest BIOS (system ROM) from the HP website.

2. Follow the instructions to flash the BIOS that are found on the website.

    Flashing the BIOS will reset it back to factory settings.

3. Turn on the system, and while system is powering on, and after the HP splash screen, press the F10 key to enter BIOS setup screen.

4. Set defaults and exit (this will clear passwords and any other settings)

Model	Description	Location/Size	Power	Loss of data	Comments
t620, t620 PLUS	System Boot ROM (BIOS)	SPI ROM (64 Mbit) socketed, removable.			
	System memory (RAM)	SODIMM socket. Removable (4GB/ 8GB)	Main power	If main power is removed	Only S0/S3/S5/ G3 ACPI states are supported
	RTC (CMOS) RAM	RTC RAM is 256 bytes RAM Memory embedded in AMD APU's System on Chip (SOC).	Main/battery	If battery power is removed	
	Keyboard/mouse (ROM)	RTC RAM is 256 bytes RAM Memory embedded in AMD APU's System on Chip (SOC). 2k bytes embedded in the super I/O controller (SIO12)	Main		
	Keyboard/mouse (RAM)	256 bytes embedded in the super I/O controller (SIO12)	Main	If main power is removed	
	LOM EEPROM	LOM EEPROM 256 bytes embedded in LAN Chip.	SUS		One Time programmable memory (OTP)
	TPM	6 kBytes embedded in TPM Chip. It's ROM for TCG Firmware	Main		

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.

If you require additional information or need assistance please contact James Smalls at 281-514-5723.

I Specifications

Dimensions		
Width: HP t620 Thin Client	40 mm	1.57 in.
Width: HP t620 PLUS Thin Client	65 mm	2.56 in.
Depth	240 mm	9.45 in
Height (without stand)	219.70 mm	8.65 In
Height (with stand)	220 mm	8.66 in.
Temperature Range (fanless design)*		
Operating**	10°C to 40°C	50°F to 104°F
With the fiber NIC is installed	10°C to 35°C	50°F to 95°F
(max. rate of change is 10°C per hour or 18°F per hour)		
Nonoperating	-30°C to 60°C	-22°F to 140°F
(max. rate of change is 20°C per hour or 36°F per hour)		

*Specifications are at sea level with altitude derating of 1°C/300 m (1.8°F/1000 ft) to a maximum of 3 Km (10,000 ft), with no direct, sustained sunlight. Upper limit may be limited by the type and number of options installed.

** The operating temperature range when the thin client is attached to a flat panel using the HP Quick Release is 10°C to 35°C (50°F to 95°F).

Relative Humidity (non-condensing)		
Operating		10% to 90%
(max. wet bulb temperature is 28°C or 84.2°F)		
Nonoperating		5% to 95%
(max. wet bulb temperature is 38.7°C or 101.6°F)		

Maximum Altitude (unpressurized)		
Operating	3048 m	10,000 ft
(max. allowed rate of change is 457m per minute or 1500 ft per minute)		
Nonoperating	9144 m	30,000 ft
(max. allowed rate of change is 457m per minute or 1500 ft per minute)		
Power Supply	HP t620 Thin Client	HP t620 PLUS Thin Client
Operating Voltage Range	100 VAC to 240 VAC	100 VAC to 240 VAC
Rated Line Frequency	50 Hz to 60 Hz	50 Hz to 60 Hz
Power Output (maximum)	65 W	85 W
Rated Output Current (maximum)	3.33 A	4.36 A
Output Voltage	+19.5 V dc	+19.5 V dc

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