Troubleshooting Guide

HP t610 Series Flexible Thin Clients

Second Edition (June 2012)

First Edition (May 2012)

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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.

Table of contents

1 Product features

Standard features

Thank you for purchasing an HP thin client. We hope you have years of use from our HP t610 Series Flexible Thin Clients. Our goal is to provide you with award-winning clients that are easy to deploy and manage with the power and reliability you expect.

The next sections describe the features of the thin clients. For a complete list of the hardware and software installed on a specific model, visit http://h10010.www1.hp.com/wwpc/us/en/sm/WF04a/12454-12454-321959-338927-89307.html and search for a specific thin client model.

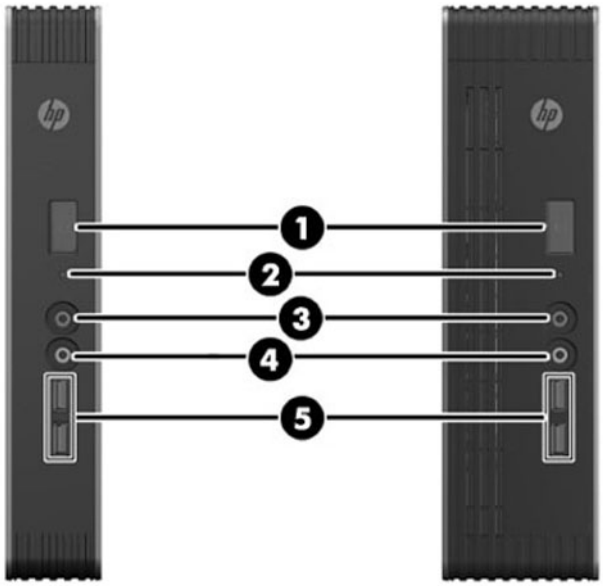
The thin clients exhibit the following features:

- no diskette drives
- 5-minute setup time
- central deployment and management using a broad range of easy and scalable remote management solutions

Various options are available for your thin client. For more information about available options, visit the HP website at http://h10010.www1.hp.com/wwpc/us/en/sm/WF12a/12454-12454-321959.html.

Front panel components

Figure 1-1 HP t610 Thin Client (left) and HP t610 PLUS Thin Client (right) front panel components



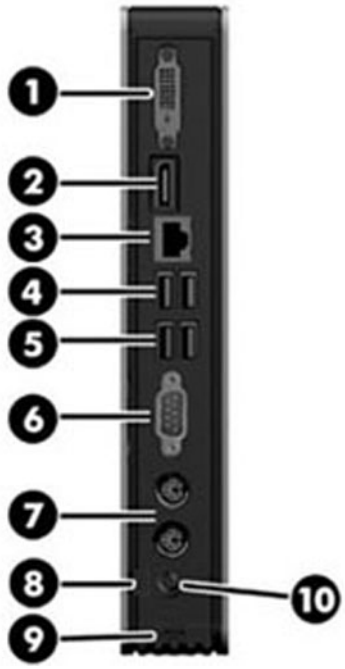
(1)	Power button	(4)	Line-out (headphone) audio connector
(2)	Flash activity LED	(5)	Universal serial bus (USB) connectors (2)
(3)	Line-in (microphone) connector		

For more information, refer to the model-specific QuickSpecs at http://h18004.www1.hp.com/products/quickspecs/QuickSpecs_Archives/QuickSpecs_Archives.html.

Rear panel components

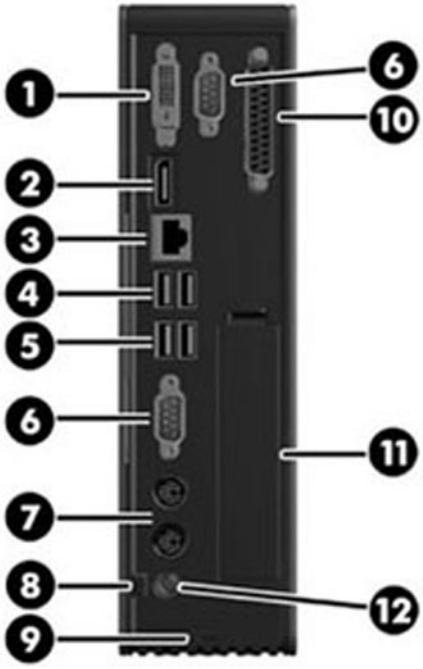
For more information, http://www.hp.com and search for your specific thin client model to find the model-specific QuickSpecs.

Figure 1-2 HP t610 Thin Client rear panel components



(1)	DVI-I connector for DVI-D and VGA output	(6)	Serial connector
(2)	DisplayPort connector	(7)	PS/2 connectors (2)
(3)	Ethernet RJ-45 connector	(8)	Power cord retention slot
(4)	Universal serial bus (USB) connectors (2) 2.0	(9)	Cable lock slot
(5)	Universal serial bus (USB) connectors (2) 3.0	(10)	Power connector

Figure 1-3 HP t610 PLUS Thin Client rear panel components



(1)	DVI-I connector for DVI-D and VGA output	(7)	PS/2 connectors (2)
(2)	DisplayPort connector	(8)	Power cord retention slot
(3)	Ethernet RJ-45 connector	(9)	Cable lock slot
(4)	Universal serial bus (USB) connectors (2) 2.0	(10)	Parallel connector
(5)	Universal serial bus (USB) connectors (2) 3.0	(11)	PCI-Express expansion slot
(6)	Serial connector	(12)	Power connector

Installing the rubber feet

CAUTION: To prevent loss of performance or damage to the thin client, be sure to install the rubber feet before operating the thin client in a horizontal orientation.

To install the rubber feet:

1. As you face the front of the thin client, lay the thin client on its left side.
2. Remove the feet from their backing.
3. Press each foot down securely onto a corner of the right side of the thin client.

Figure 1-4 Installing the rubber feet

Installing the stand

If the thin client will be installed in an vertical orientation and it will not be mounted, the stand should be installed for stability.

To install the stand:

1. Turn unit upside down.
2. Locate the slots on the bottom of the unit into which the tabs on the stand fit.
3. Insert the tabs into the slots, and then slide the stand about 1.26 cm (1/2 inch) toward the front of the unit until it locks into place.

Figure 1-5 Installing the stand

Removing the stand

To remove the stand:

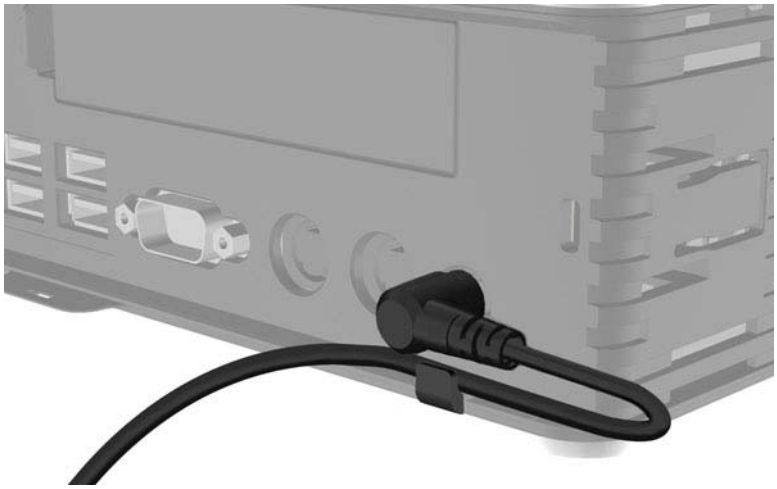
1. Turn unit upside down.
2. Press the tab (1), and then slide the stand about 1.26 cm (1/2 inch) toward the back of the unit and lift the stand off the unit (2).

Figure 1-6 Removing the stand

Using the power cord retention slot

To prevent accidental disconnection, press a loop of the power cord into the power cord retention slot.

Figure 1-7 Power cord retention slot (HP t610 PLUS Thin Client pictured in horizontal orientation)



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.

Figure 1-8 Serial number location

2 Hardware changes

General hardware installation sequence

To ensure the proper installation thin client hardware components:

1. Back up any data, if necessary.
2. If the thin client is powered on:
   a. Turn the unit and any other attached devices off.
   b. Disconnect the power cord from the wall outlet.
   c. Disconnect any external devices or cables, such as a cable lock.

WARNING! 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.

WARNING! To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telecommunications or telephone connectors into the network interface controller (NIC) receptacles.

CAUTION: Static electricity can damage the electronic components of the thin client or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. See Electrostatic discharge on page 68 for more information.

3. Remove the stand, if it is installed. See Removing the stand on page 7 for more information.
4. Remove the side access panel and metal side cover, if necessary. See Removing and replacing the side access panel and metal side cover on page 11 for more information.
5. Remove any hardware that you will replace.
6. Install or replace equipment. For removal and replacement procedures, see the following sections:
   - Removing and replacing the battery on page 15
   - Installing a SODIMM on page 16
   - Installing a flash memory module on page 19
   - Replacing an internal hard drive on page 21
   - Installing a PCI-Express card on page 24

NOTE: Option kits include more detailed installation instructions.

7. Replace the side access panel and metal side cover. See Removing and replacing the side access panel and metal side cover on page 11 for more information.
8. Install the stand, if you will be using the thin client unmounted in a vertical orientation. See Installing the stand on page 6 for more information.
9. Reconnect any external devices and power cords.
10. Turn on the monitor, the thin client, and any devices you want to test.
11. Load any necessary drivers.

NOTE: You can download select hardware drivers from HP at http://www.hp.com/country/us/eng/support.html.

12. Reconfigure the thin client, if necessary.

Removing and replacing the side access panel and metal side cover

Removing the side access panel

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

To remove the left or right access panel:

1. Remove the stand, if it is installed. See Removing the stand on page 7 for more information.
2. Press the tab on the bottom cover (1), and then slide the cover back (2) and lift it off the chassis.

Figure 2-1 Removing the bottom cover

3. Lay the thin client on its side on a secure working surface.
   - Remove the right side access panel to remove or install a SODIMM.
   - Remove the left side access panel to:
     - Remove or replace the battery
     - Install or remove a flash memory module
     - Install or remove an internal hard drive
     - Install or remove a PCI Express card

4. Slide the access panel about 6.35 mm (1/4 inch) toward the bottom of the unit, and then lift the access panel up and off the chassis.

Figure 2-2 Removing the side access panel

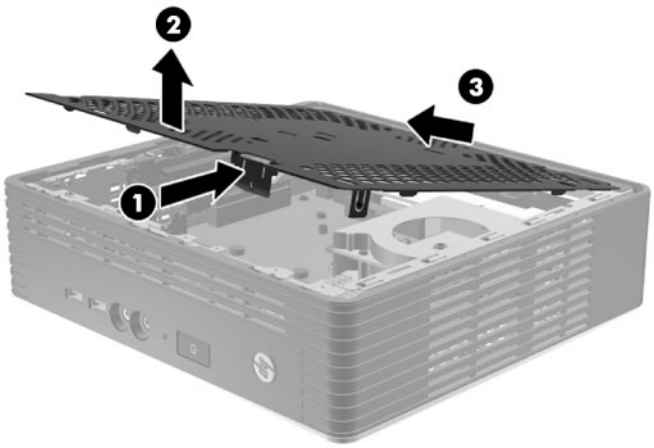
Removing the left metal side cover

NOTE: Do not remove the metal side cover to install a SODIMM. The SODIMM compartment is in the right side of the chassis.

You must remove the metal side cover to access internal components such as the battery or to install a flash memory module, internal hard drive, or PCI-Express card.

1. Push the tab in the front edge of the side cover toward the back to release the sided cover (1).
2. Lift the front edge of the metal side cover (2), then pull the cover to the front and lift it off the chassis (3).

Figure 2-3 Removing the metal side cover

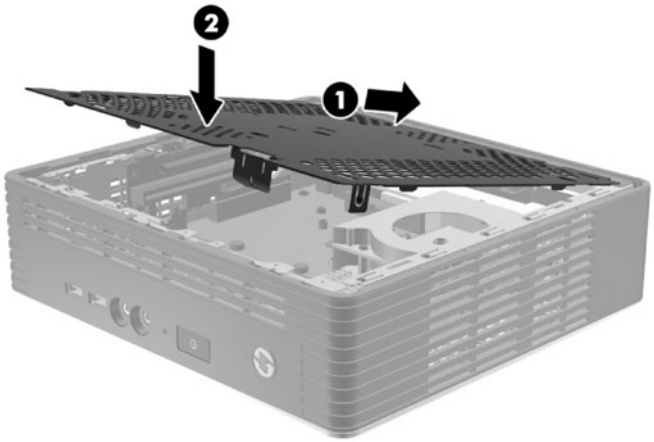


Replacing the left metal side cover

1. Place the metal side cover on the chassis, rear edge first, making sure to insert the two tabs of the rear edge into the notches in the chassis (1).

2. Align the tabs on both sides of the cover and press the front edge down firmly until the latch closes.

Figure 2-4 Replacing the metal side cover

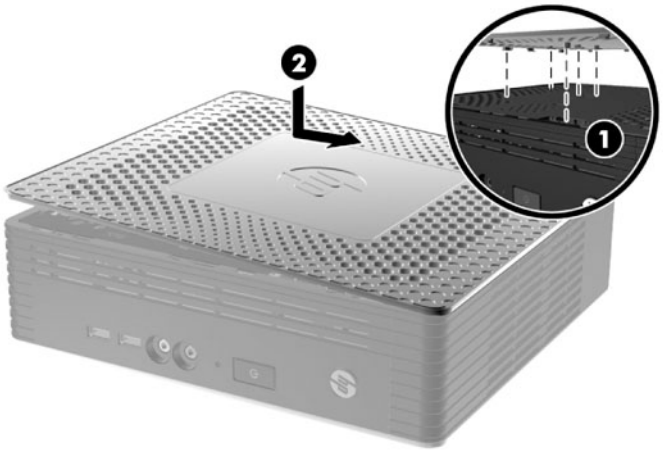


Replacing the side access panel

To replace the access panel:

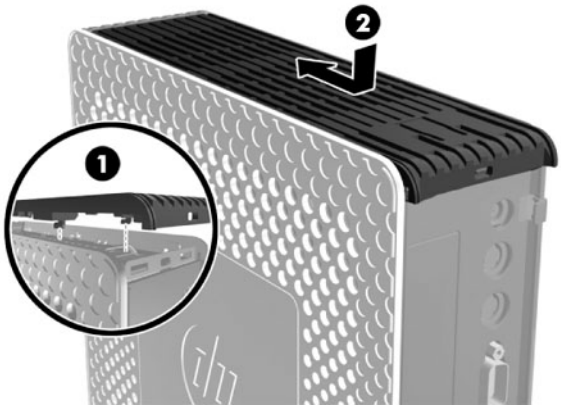
1. Place the access panel on the side of the unit, offset about 6.35 mm (1/4 inch) toward the top of the unit (1), allowing the hooks on the underside of the panel to slip into notches in the side access panel.
2. Slide the panel toward the bottom of the unit until it locks into place (2).

Figure 2-5 Replacing the side access panel



3. Turn the chassis upside down. Align the hooks on the underside of the bottom cover with the slots in the chassis and press the cover down and then forward until it locks in place.

Figure 2-6 Replacing the bottom cover



4. Replace the stand, if the thin client is to be used in the tower orientation.

Removing and replacing the battery

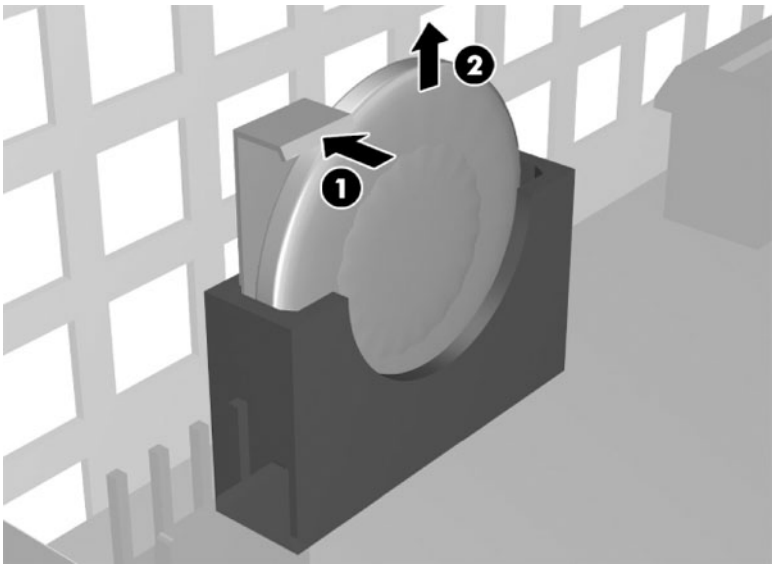
Before beginning the replacement process, review General hardware installation sequence on page 9 for procedures you should follow before and after installing or replacing hardware.

⚠ **WARNING!** You must remove the left side panel to access the battery. Before removing the side access panel, ensure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

To remove and replace the battery:

1. Locate the battery on the system board.
2. To remove the battery, pull the metal clamp extending above the battery aside and lift the battery out (1).

Figure 2-7 Removing and replacing the internal battery



3. To insert the replacement battery, position it with the positive side facing the chassis wall. Slide the battery down into the slot until the clamp snaps over the edge of the battery (2).

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

Installing thin client options

Various options can be installed on the thin client:

- Installing a SODIMM on page 16
- Installing a flash memory module on page 19
- Replacing an internal hard drive on page 21
- Installing a PCI-Express card on page 24
- Installing external drives on page 26

Installing a SODIMM

The computer comes with double data rate 3 synchronous dynamic random access memory (DDR3-SDRAM) small outline dual inline memory modules (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 4 GB of memory.

For proper system operation, the SODIMMs must be:

- industry-standard 204-pin
- unbuffered non-ECC PC3-12800 DDR3-1600 MHz-compliant
- 1.5 volt DDR3-SDRAM SODIMMs

The DDR3-SDRAM SODIMMs must also:

- support CAS latency 9 DDR3 1600 MHz (9-9-9 timing)
- contain the mandatory Joint Electronic Device Engineering Council (JEDEC) specification

In addition, the computer supports:

- 2-Gbit 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 will not operate properly if you install unsupported SODIMMs.

Before beginning the replacement process, review General hardware installation sequence on page 9 for procedures you should follow before and after installing or replacing hardware.

WARNING! You must remove the right side panel to access the SODIMM compartment. Before removing the side access panel, ensure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

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 these procedures, ensure 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.

To install the SODIMM:

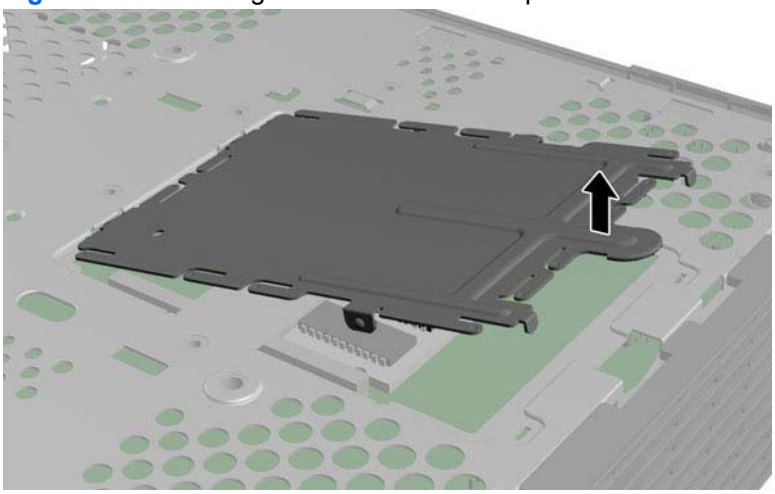
NOTE: Populate the SODIMM sockets in the following order: SODIMM1, then SODIMM2.

1. Slide the serial number tab out of the way.

   NOTE: Be sure not to lose this tab.

2. Pull the front of the access plate up, and lift it off the thin client.

   Figure 2-8 Removing the SODIMM access plate

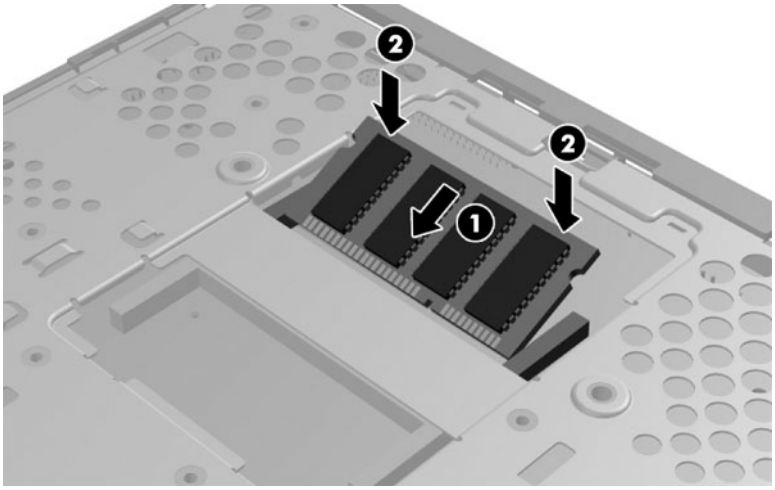
3. Align the notched edge of the SODIMM with the tab in the socket.

   CAUTION: To prevent damage to the SODIMM, hold it by the edges only. Do not touch the components on the SODIMM, and do not bend the SODIMM.

4. Hold the SODIMM at approximately a 20-degree angle, and then press the SODIMM into the socket (1) until it is seated. Gently apply pressure to both the left and right edges of the SODIMM until the retention clips snap into place.

NOTE: A SODIMM can be installed in only one way. Match the notch on the SODIMM with the tab on the socket.

Figure 2-9 Installing a SODIMM

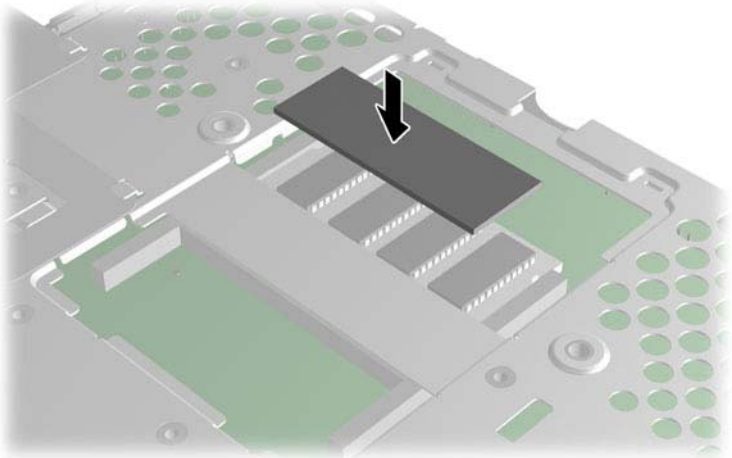


5. Press the SODIMM down into the compartment (2).

6. If you are installing the SODIMM in the HP t610 Thin Client, place a thermal pad on the SODIMM.

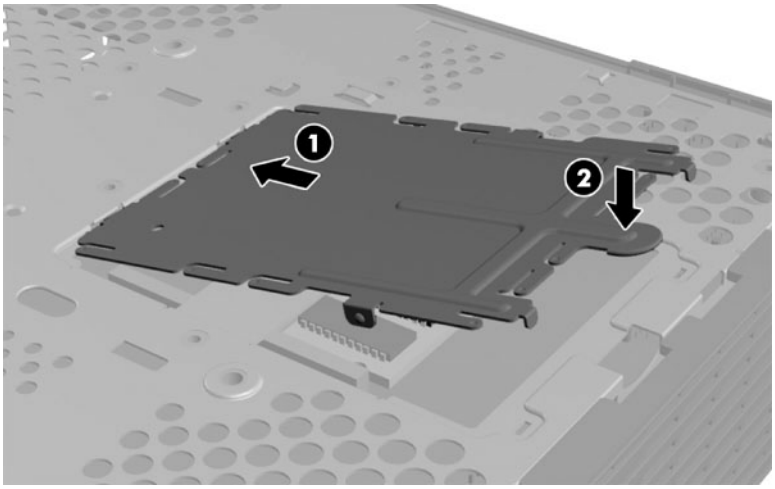
CAUTION: The thermal pad is required to help cool the SODIMM in the HP t610 Thin Client. (The HP t610 PLUS Thin Client does not require a thermal pad.)

Figure 2-10 Installing the thermal pad in the HP t610 Thin Client



7. Insert the tab on the front edge of the access plate into its slot (1) and press the plate down lightly to engage the latch (2).

Figure 2-11 Replacing the SODIMM access plate



8. Slide the serial number tab back to its original position.

Installing a flash memory module

Before beginning the installation process, review General hardware installation sequence on page 9 for procedures you should follow before and after installing or replacing hardware.

⚠ **WARNING!** You must remove the left side panel to access the system board. Before removing the side access panel, ensure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

⚠ **CAUTION:** Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure 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.

To install the flash memory module:

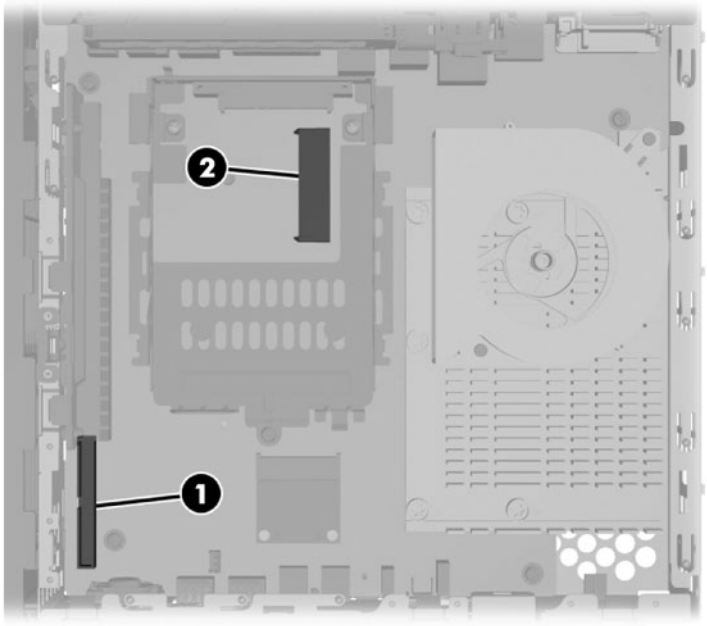
1. If an internal hard drive is installed, remove it. See Removing an internal hard drive on page 21 for instructions.

2. Locate the correct flash memory module socket on the system board.

   a. The PATA socket (1) is populated by default.

   b. The SATA socket (2) can be populated with an optional SATA flash memory module.

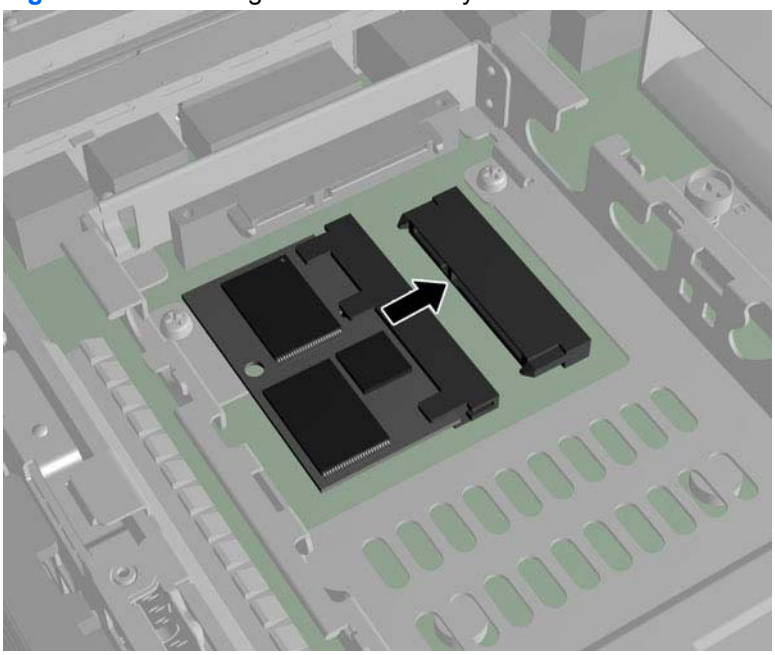
Figure 2-12 Identifying the Flash Memory Module sockets



3. Align the connector on the flash memory module with the socket on the system board and press the flash memory module into the socket.

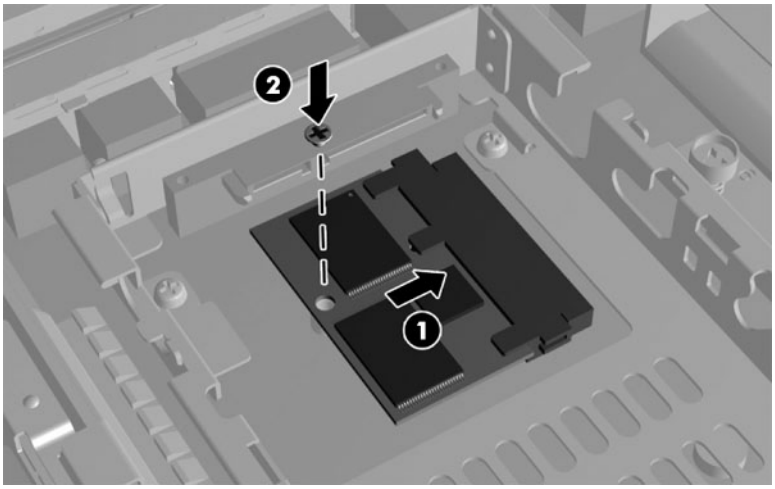
NOTE: A flash memory module can be installed in only one way. Line up the hole in the flash memory module with the retention post on the system board.

Figure 2-13 Inserting the flash memory module



4. Press the module connectors firmly into the flash memory module socket (1), making sure that the retention post on the system board is aligned with the hole in the module.

Figure 2-14 Securing the flash memory module



5. Insert the screw provided in the flash memory module option kit through the hole in the module into the retention post (2) and tighten to secure the module.

Replacing an internal hard drive

Before beginning the replacement process, review General hardware installation sequence on page 9 for procedures you should follow before and after installing or replacing hardware.

⚠ **WARNING!** You must remove the left side panel to access the system board. Before removing the side access panel, ensure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

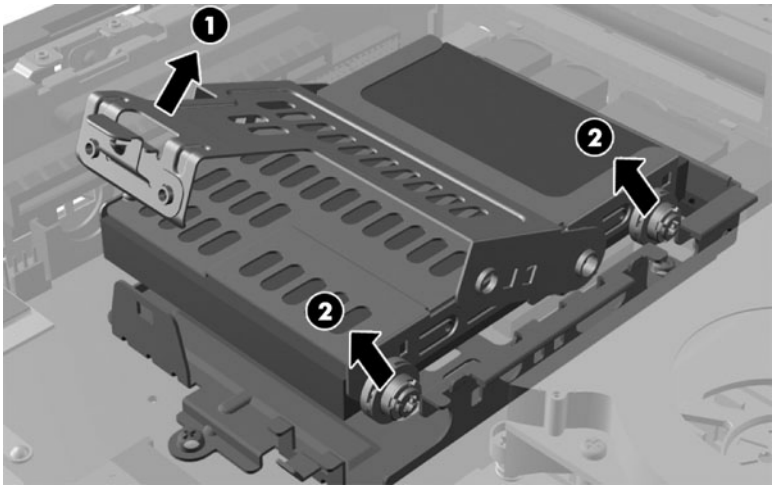
Removing an internal hard drive

To remove an internal hard drive:

1. If a PCI-Express card is installed, remove it.

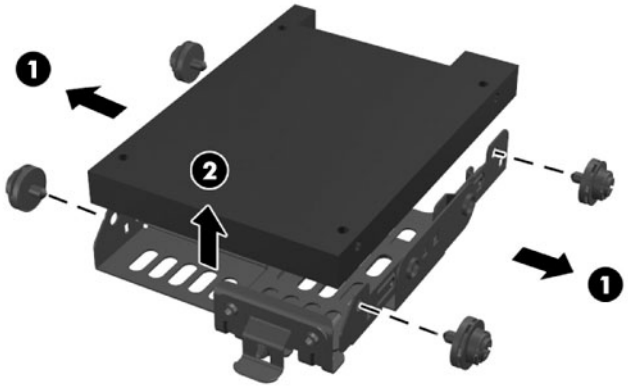
2. Lift the drive bracket latch (1) and slide the drive bracket out of the retention bracket (2).

Figure 2-15 Removing the hard drive bracket from the retention assembly



3. Remove the four screws that secure the hard drive in the drive bracket (1) and remove the hard drive from the bracket (2).

Figure 2-16 Removing the hard drive from the drive bracket



NOTE: Keep the four screws to use to install another hard drive.

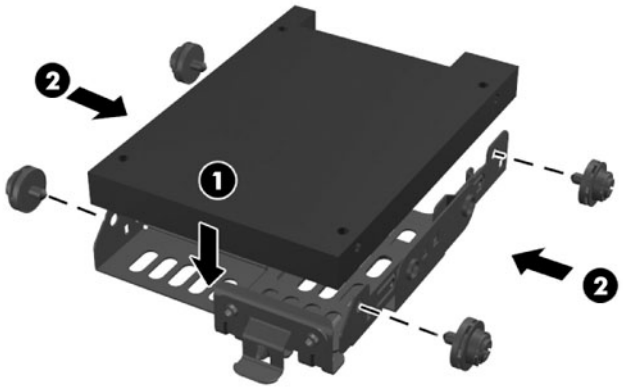
Installing an internal hard drive

To install an internal hard drive:

1. If a PCIe card is installed, remove it.

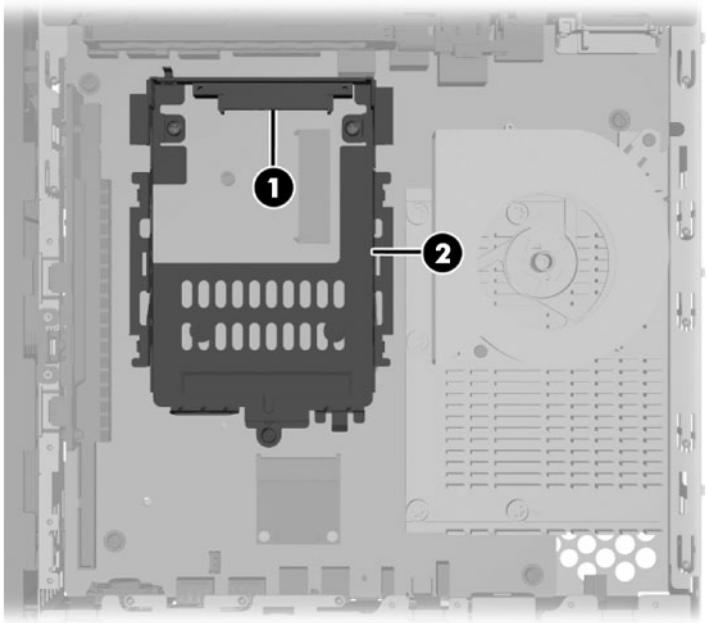
2. Insert the hard drive into the drive bracket (1) and secure it by fastening the four screws provided in the kit (2).

Figure 2-17 Inserting the hard drive into the drive bracket



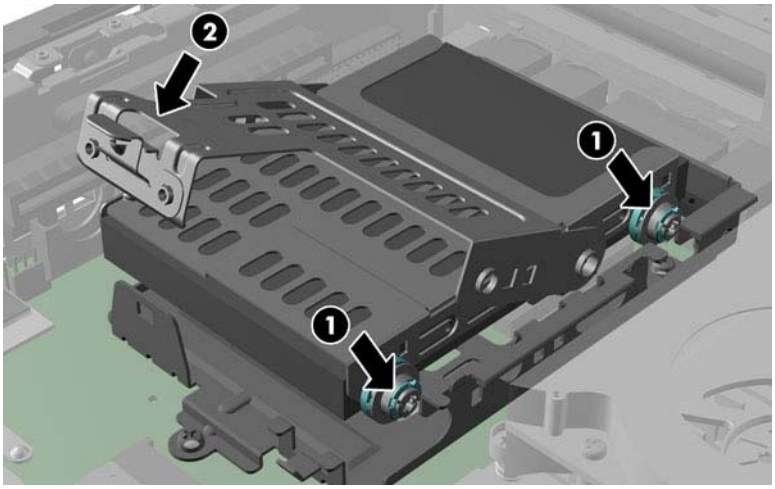
3. Locate the internal hard drive connector (1) and retention bracket (2) on the system board.

Figure 2-18 Locating the hard drive connector and retention bracket on the system board



4. Align the screws on the side of the drive bracket with the slots inside the retention bracket and slide the drive bracket into the retention bracket (1).

Figure 2-19 Securing the hard drive in the drive bracket



5. Press the drive bracket latch down firmly to push the drive onto the internal hard drive connector and secure the drive assembly (2).

6. Reinstall the PCIe card, if necessary. See Installing a PCI-Express card on page 24 for instructions.

Installing a PCI-Express card

You may install an optional PCI-Express (PCIe) card in the HP t610 PLUS Thin Client, which has a PCIe riser card installed.

Before beginning the replacement process, review General hardware installation sequence on page 9 for procedures you should follow before and after installing or replacing hardware.

⚠ **WARNING!** You must remove the left side panel to access the system board. Before removing the side access panel, ensure that the thin client is turned off and the power cord is disconnected from the electrical outlet.

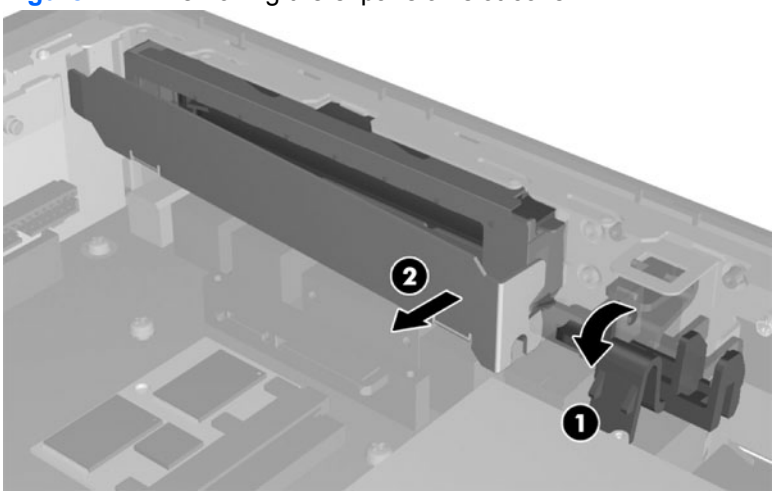
To install a PCIe card:

1. Press down on the plastic blank tab and pull it out of the chassis.

Figure 2-20 Removing the expansion slot blank

2. Open the metal latch securing the expansion slot cover on the inside of the thin client (1) and remove the expansion slot cover (2).

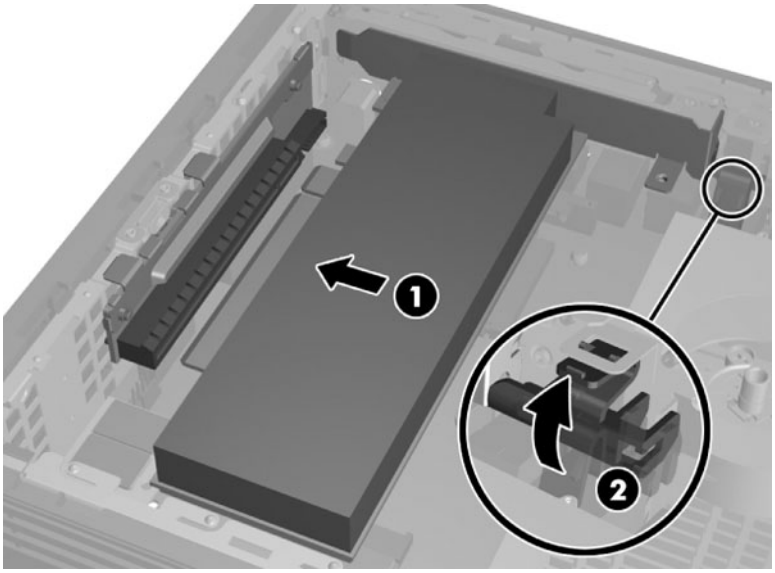
Figure 2-21 Removing the expansion slot cover



CAUTION: Do not lose this expansion slot cover. If you remove an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

3. Align the PCIe card connector with the PCI riser card socket and the expansion slot. Press the PCIe card firmly into the socket to ensure that the PCIe card is seated correctly and that the connector fits the expansion slot properly (1).

Figure 2-22 Installing the PCIe card



4. Close the metal latch to secure the PCIe card (2).

Installing external drives

Various external USB drives are available as options for the t610 Series Thin Clients. For more information about these drives, visit http://h10010.www1.hp.com/wwpc/us/en/sm/WF12a/12454-12454-321959.html, or refer to the instructions that accompany the option.

For more information about available options, visit the HP website at http://h10010.www1.hp.com/wwpc/us/en/sm/WF12a/12454-12454-321959.html.

3 Mounting the thin client

HP Quick Release

The HP t610 Series Flexible Thin Clients incorporate four mounting points on one side of the unit. 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 HP Quick Release connects to the 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 15 mm screws supplied with the Quick Release Kit.

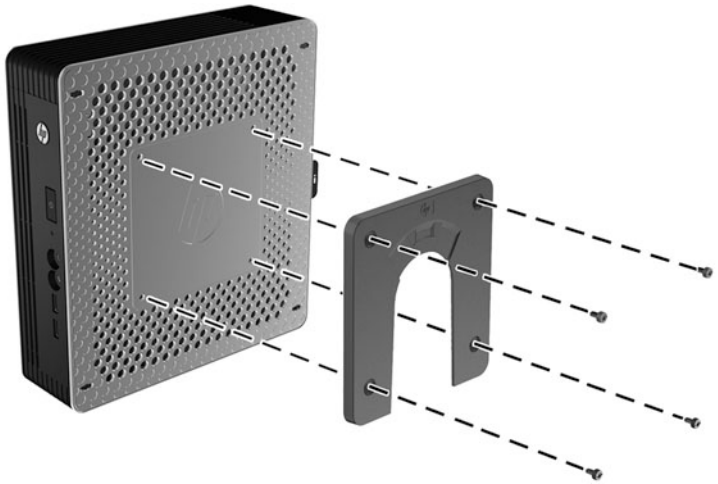
Figure 3-1 HP Quick Release

To order this option, visit the HP website at http://h10010.www1.hp.com/wwpc/us/en/sm/WF06c/A10-51210-347116-329242-347116-1838057-1838058-1838059.html.

To use the HP Quick Release with a VESA-configured thin client:

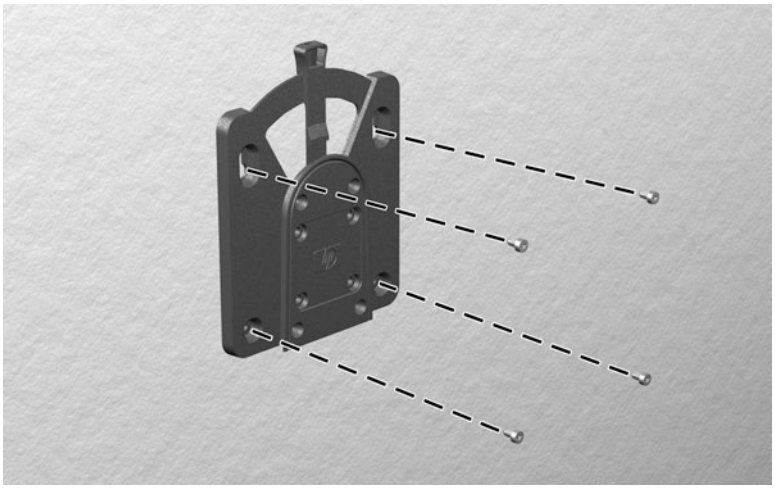
1. Using four 15 mm screws included in the mounting device kit, attach one side of the HP Quick Release to the thin client as shown in the following illustration.

Figure 3-2 Connecting the HP Quick Release to the thin client



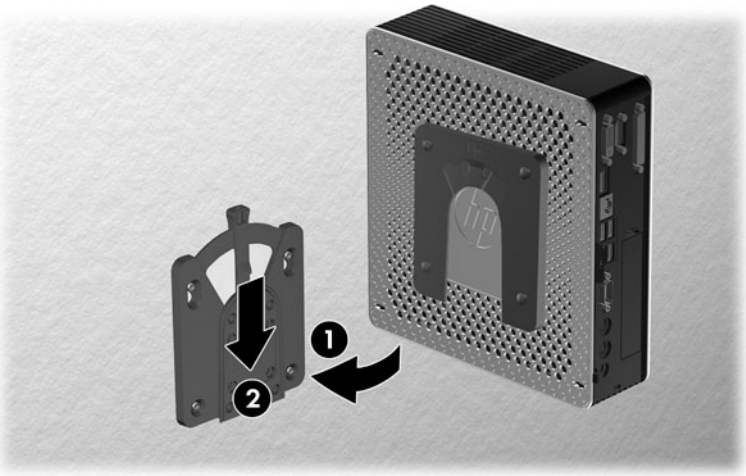
2. Using four screws included in the mounting device kit, attach the other side of the HP Quick Release to the device to which you will mount the thin client. Make sure the release lever points upward.

Figure 3-3 Connecting the HP Quick Release to another device



3. Slide the side of the mounting device attached to the thin client (1) over the other side of the mounting device (2) on the device on which you want to mount the thin client. An audible 'click' indicates a secure connection.

Figure 3-4 Connecting the thin client



NOTE: When attached, the HP Quick Release automatically locks in position. You only need to slide the lever to one side to remove the thin client.

CAUTION: To ensure proper function of the HP Quick Release and a secure connection of all components, make sure both the release lever on one side of the mounting device and the rounded opening on the other side face upward.

Supported mounting options

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

- You can mount the thin client on the back of a flat panel monitor stand.

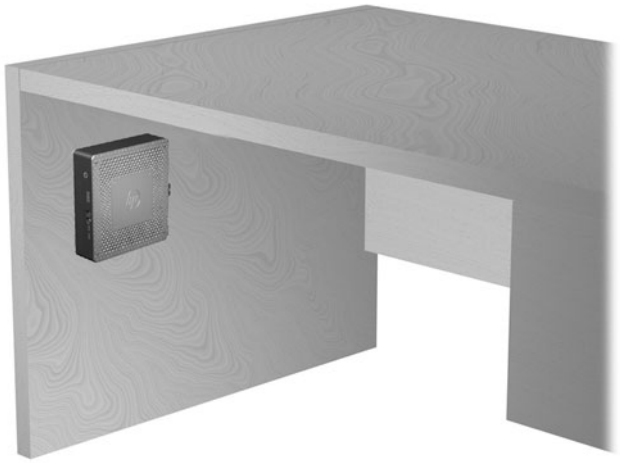
Figure 3-5 Thin client mounted on back of monitor stand

- You can mount the thin client on a wall.

Figure 3-6 Thin client mounted on wall

- You can mount the thin client under a desk with at least one inch of clearance.

Figure 3-7 Thin client mounted under desk



4 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 hard drives, optical 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).
- Establish an Ownership Tag, the text of which is displayed each time the system is turned on or restarted.
- 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.
- Enable or disable removable media boot ability.
- Replicate the system setup by saving system configuration information on a USB device and restoring it on one or more computers.
- Execute self-tests on a specified ATA hard drive (when supported by drive).
- Enable or disable DriveLock security (when supported by drive).

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 in the ESC (Startup) Menu or 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 or previously saved default settings (some models), 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.

Table 4-1 Computer Setup (F10) Utility

Heading	Table
File	Computer Setup—File on page 33
Storage	Computer Setup—Storage on page 34
Security	Computer Setup—Security on page 36
Power	Computer Setup—Power on page 40
Advanced	Computer Setup—Advanced on page 41

Computer Setup—File

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

Table 4-2 Computer Setup—File

Option	Description
System Information	Lists: • Product name • SKU number (some models) • Processor type/speed/stepping • Cache size (L1/L2) • Installed memory size/speed, number of channels (single or dual) (if applicable) • Integrated MAC address for embedded, enabled NIC (if applicable) • System BIOS (includes family name and version) • Chassis serial number • Asset tracking number
About	Displays copyright notice.
Set Time and Date	Allows you to set system time and date.
Flash System ROM	Allows you to update the system ROM with a BIOS image file located on removable media.
Replicated Setup	**Save to Removable Media** Saves system configuration to a formatted USB flash media device. **Restore from Removable Media** Restores system configuration from a USB flash media device.
Default Setup	**Save Current Settings as Default** Saves the current system configuration settings as the default to be used whenever “Apply Defaults and Exit” is selected. **Restore Factory Settings as Default** Loads the original factory system configuration settings for use by a subsequent “Apply Defaults and Exit” action.
Apply Defaults and Exit	Applies the currently selected default settings.
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

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

Table 4-3 Computer Setup—Storage

Option	Description

Table 4-3 Computer Setup—Storage (continued)

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, connector color. • SMART (ATA disks only) • SSD Life Used • Translation mode (ATA disks only) Lets you select the translation mode to be used for the device. This enables the BIOS to access disks partitioned and formatted on other systems and may be necessary for users of older versions of UNIX (e.g., SCO UNIX version 3.2). Options are Automatic, Bit-Shift, LBA Assisted, User, and Off. Available only when the drive translation mode is set to User, allows you to specify the parameters (logical cylinders, heads, and sectors per track) used by the BIOS to translate disk I/O requests (from the operating system or an application) into terms the hard drive can accept. Logical cylinders may not exceed 1024. The number of heads may not exceed 256. The number of sectors per track may not exceed 63. **CAUTION:** Ordinarily, the translation mode selected automatically by the BIOS should not be changed. If the selected translation mode is not compatible with the translation mode that was active when the disk was partitioned and formatted, the data on the disk will be inaccessible. **Default Values** *(ATA disks only)* **SATA Defaults** See Translation Mode above for details.

Table 4-3 Computer Setup—Storage (continued)

Storage Options	**SATA Emulation** **CAUTION:** SATA emulation changes may prevent access to existing hard 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 (default) and AHCI. IDE (default option) - This is the most backwards-compatible setting of the three options. Operating systems usually do not require additional driver support in IDE mode. AHCI - Allows operating systems with AHCI device drivers loaded to take advantage of more advanced features of the SATA controller. **Removable Media Boot** Enables/disables ability to boot the system from removable media. Default is enabled.
Boot Order	Allows you to: • Specify the order in which EFI boot sources (such as a internal hard drive, USB hard drive, USB optical drive, or internal 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 hard drive, USB optical drive, or internal 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. **NOTE:** 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 4-4 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.

Table 4-4 Computer Setup—Security (continued)

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: • Lock Legacy Resources (determines whether or not Windows Device Manager is allowed to change resource settings for serial and parallel ports). • Setup Browse Mode (appears if a setup password is set) (allows viewing, but not changing, the F10 Setup Options without entering setup password). Default is enabled. • Password prompt on F9 & F12 (requires setup password to use these boot functions). Default is enabled. • Network Server Mode. Default is disabled. See the *Desktop Management Guide* for more information.
Device Security	Allows you to set Device Available/Device Hidden (default is Device Available) for: • Embedded security device (some models) • System audio • USB 3.0 controller • Network controller • SATA Port 0 • SATA Port 1 • SATA Port 2
USB Security	Allows you to set Enabled/Disabled (default is Enabled) for: • Front USB Ports ◦ USB Port 1 ◦ USB Port 2 • Rear USB Ports ◦ USB Port 1 ◦ USB Port 2 ◦ USB3 Port 1 ◦ USB3 Port 2 • Accessory USB Ports ◦ USB Port 1
Slot Security	Allows you to disable any PCI Express slot. Default is enabled.
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.

Table 4-4 Computer Setup—Security (continued)

System IDs	Allows you to set: • Asset tag (18-byte identifier), a property identification number assigned by the company to the computer. • Ownership tag (80-byte identifier) displayed during POST. • 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.) • Keyboard locale setting for System ID entry.
Master Boot Record Security	Restores the backup Master Boot Record to the current bootable disk. Default is disabled. Only appears if all of the following conditions are true: • MBR security is enabled • A backup copy of the MBR has been previously saved • The current bootable disk is the same disk from which the backup copy was saved **CAUTION:** Restoring a previously saved MBR after a disk utility or operating system has modified the MBR, may cause the data on the disk to become inaccessible. Only restore a previously saved MBR if you are confident that the current bootable disk's MBR has been corrupted or infected with a virus.

Table 4-4 Computer Setup—Security (continued)

System Security (some models: these options are hardware dependent)	Data Execution Prevention (enable/disable) - Helps prevent operating system security breaches. Default is enabled. SVM CPU Virtualization (enable/disable). Controls the virtualization features of the processor. Changing this setting requires turning the computer off and then back on. Default is disabled. Embedded Security Device Support (some models) (enable/disable) - Permits activation and deactivation of the Embedded Security Device. **NOTE:** To configure the Embedded Security Device, a Setup password must be set. • Reset to Factory Settings (some models) (Do not reset/Reset) - Resetting to factory defaults will erase all security keys. Changing this setting requires turning the computer off and then back on. Default is Do not reset. **CAUTION:** The embedded security device is a critical component of many security schemes. Erasing the security keys will prevent access to data protected by the Embedded Security Device. Choosing Reset to Factory Settings may result in significant data loss. OS management of Embedded Security Device (some models) (enable/disable) - This option allows the user to limit operating system control of the Embedded Security Device. Changing this setting requires turning the computer off and then back on. This option allows the user to limit OS control of the Embedded Security Device. Default is disabled. Reset of Embedded Security Device through OS (some models) (enable/disable) - This option allows the user to limit the operating system ability to request a Reset to Factory Settings of the Embedded Security Device. Changing this setting requires turning the computer off and then back on. Default is disabled. **NOTE:** To enable this option, a Setup password must be set.
DriveLock Security	Allows you to assign or modify a master or user password for hard drives. When this feature is enabled, the user is prompted to provide one of the DriveLock passwords during POST. If neither is successfully entered, the hard drive will remain inaccessible until one of the passwords is successfully provided during a subsequent cold-boot sequence. **NOTE:** This selection will only appear when at least one drive that supports the DriveLock feature is attached to the system. See the *Desktop Management Guide* for more information.

Computer Setup—Power

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

Table 4-5 Computer Setup—Power

Option	Description
OS Power Management	• Idle Power Savings—Extended/Auto/Normal. Allows certain operating systems to decrease the processors power consumption when the processor is idle. Default is extended. • 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. • Unique Sleep State Blink Rates—Enable/Disable. This feature is designed to provide a visual indication of what sleep state the system is in. Each sleep state has a unique blink pattern. Default is disabled. ◦ S0 (On) = Solid green LED. ◦ S3 (Stand By)= 3 blinks at 1Hz (50% duty cycle) followed by a pause of 2 seconds (green LED) — repeated cycles of 3 blinks and a pause. ◦ S4 (Hibernation)= 4 blinks at 1Hz (50% duty cycle) followed by a pause of 2 seconds (green LED) — repeated cycles of 4 blinks and a pause. ◦ S5 (Soft Off) = LED is off.
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. PCI Express x16 Slot 1 – Sets Active State Power Management (ASPM) of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled. PCI Express x1 Slot 1 – Sets Active State Power Management (ASPM) of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled. Network Controller – Sets ASPM of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled. USB 3.0 Controller – Sets ASPM of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled.
Thermal	Fan idle mode—This bar graph controls the minimum permitted fan speed. **NOTE:** This setting only changes the minimum fan speed. The fans are still automatically controlled.

Computer Setup—Advanced

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

Table 4-6 Computer Setup—Advanced (for advanced users)

Option	Heading
Power-On Options	Allows you to set: • POST mode (QuickBoot, Clear Memory, FullBoot, or FullBoot Every x Days). • POST messages (enable/disable). Default is disabled. • Press the ESC key for Startup Menu (Enable/Disable). Controls display of the message at the bottom of the POST screen during boot. It This option does not control the actual ESC hotkey function. Default is enabled. • Option ROM Prompt (enable/disable). Enabling this feature will cause the system to display a message before loading option ROMs. Default is enabled. • 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. • Remote Wakeup Boot Source (remote server/local hard drive). Default is Local hard drive. • Bypass F1 Prompt on Configuration Changes (Enable/Disable). Allows you to set the computer not to confirm when changes were made. Default is disabled.
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.

Table 4-6 Computer Setup—Advanced (for advanced users) (continued)

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/Disable/Force). Use this option to manage integrated (UMA) graphics memory allocation. The value you choose is allocated 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. • 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.

Recovering the Configuration Settings

This method of recovery requires that you first perform the **Save to Removable Media** command with the Computer Setup (F10) Utility before **Restore** is needed. (See Save to Removable Media on page 34 in the Computer Setup—File table.)

NOTE: It is recommended that you save any modified computer configuration settings to a USB flash media device and save the device for possible future use.

To restore the configuration, insert the USB flash media device with the saved configuration and perform the **Restore from Removable Media** command with the Computer Setup (F10) Utility. (See Restore from Removable Media on page 34 in the Computer Setup—File table.)

NOTE: Do not install the USB key that you use for rRecovery in a USB3 (blue) port.

Changing BIOS Settings from the REPSETUP utility

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
Setup Language	English	Danish, Finnish, French, German, Italian, Japanese, Dutch, Norwegian, Portuguese, Swedish, Spanish
Removable Media Boot	Enable	Disable
SATA Emulation	IDE	AHCI
EFI Boot Order	USB Floppy/CD	USB Hard Drive, ATAPI CD-ROM Drive, ATAPI CD-ROM Drive, Other
Legacy Boot Order	USB Floppy/CD	Hard Drive, Network Controller, ATAPI CD-ROM Drive, PnP Device #1 - #10
Lock Legacy Resources	Disable	Enable
Network Server Mode	Disable	Enable
Setup Browse Mode	Disable	Enable
Password prompt on F9 & F12	Enable	Disable
Cover Removal Sensor	Disable	Notify User, Setup Password
Front USB Ports	Enable	Disable
Front USB Port 1 & 2	Disable	Enable
Rear USB Ports	Enable	Disable
Rear USB Port 1 & 2	Disable	Enable
Rear USB3 Port 1 & 2	Disable	Enable
Accessory USB Ports	Enable	Disable
Accessory USB Port 1	Disable	Enable
PCI Express x16 Slot 1	Disable	Enable
PCI Express x1 Slot 1	Disable	Enable
Embedded Security Device	Device available	Device hidden
System Audio	Device available	Device hidden
Network Controller	Device available	Device hidden
USB 3.0 Controller	Device available	Device hidden
SATA0	Device available	Device hidden

SATA1	Device available	Device hidden
SATA2	Device available	Device hidden
Network Service Boot	Disable	Enable
Enter Ownership Tag	na	na
Enter UUID	na	na
Data Execution Prevention	Disable	Enable
SVM CPU Virtualization	Disable	Enable
Activate Embedded Security On Next Boot	Disable	Enable
Embedded Security Activation Policy	F1 to Boot	Allow user to reject, No Prompts
OS management of Embedded Security Device	Disable	Enable
Reset of Embedded Security Device through OS	Disable	Enable
Master Boot Record Security	Disable	Enable
Runtime Power Management	Enable	Disable
Idle Power Savings	Extended	Normal, Auto
Unique Sleep State Blink Rates	Disable	Enable
S5 Maximum Power Savings	Disable	Enable
SATA Power Management	Disable	Enable
Fan Idle Mode	+	++, +++, ++++, +++++, ++++++
POST Mode	QuickBoot	FullBoot, FullBoot Every 07 Days, 14 Days, 21 Days, 28 Days, Clear Memory
POST Messages	Disable	Enable
Press ESC for Startup Menu Prompt	Enable	Disable
Option ROM Prompt	Enable	Disable
Remote Wakeup Boot Source	Local Hard Drive	Remote Server
After Power Loss	Off	On Previous State

POST Delay (in seconds)	None	5, 10, 15, 20
Bypass F1 Prompt on Configuration Changes	Disable	Enable
Sunday – Saturday	Disable	Enable
BIOS Power-On Time (hh:mm)	00:00	na
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	Off	On
Integrated Video	Auto	Disable, Force
UMA Size	512M	32M, 64M, 256M, 512M, 1G
Internal Speaker	Enable	Disable
NIC Option ROM Download	PXE	Disable
Serial Port A	IO=3F8; IRQ=4	Disabled, IO=3F8; IRQ=3, IO=2F8; IRQ=4, IO=2F8; IRQ=3, IO=3E8; IRQ=4, IO=3E8; IRQ=3, IO=2E8; IRQ=4, IO=2E8; IRQ=3, IO=3F8; IRQ=6, IO=3F8; IRQ=5, IO=2F8; IRQ=6, IO=2F8; IRQ=5, IO=3E8; IRQ=6, IO=3E8; IRQ=5, IO=2E8; IRQ=6, IO=2E8; IRQ=5
Serial Port B	IO=2F8; IRQ=3	IO=3F8; IRQ=4, IO=3F8; IRQ=3, IO=2F8; IRQ=4, IO=3E8; IRQ=4, IO=3E8; IRQ=3, IO=2E8; IRQ=4, IO=2E8; IRQ=3, IO=3F8; IRQ=6, IO=3F8; IRQ=5, IO=2F8; IRQ=6, IO=2F8; IRQ=5, IO=3E8; IRQ=6, IO=3E8; IRQ=5, IO=2E8; IRQ=6, IO=2E8; IRQ=5
Parallel Port	IO=378; IRQ=7; DMA=1	Disable, IO=378; IRQ=7, IO=278; IRQ=7, IO=3BC; IRQ=7, IO=378; , IO=278; , IO=3BC, IO=378; IRQ=7; DMA=3, IO=278; IRQ=7; DMA=1, IO=278; IRQ=7; DMA=3, IO=3BC; IRQ=7; DMA=1, IO=3BC; IRQ=7; DMA=3
Default Setup	Leave Defaults As Is (No Update)	Save Current Settings as Default, Restore Factory Settings as Default
Apply Defaults and Exit	Do Not Apply	Apply
Power-On Password	na	na
Setup Password	na	na

NOTE: Settings that can be controlled from the operating system with repset can also be controlled remotely by sending the client an Altiris job that uses the repset tool to apply the setting changes.

5 Diagnostics and Troubleshooting

LEDs

Table 5-1 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 Green	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 VGA software.
3. Initializes and configures all PCI devices.
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 Administrator and power-on passwords

You can reset the Administrator 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.
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 t610 units.

Table 5-2 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 5-3 Diagnostic Front Panel LEDs and Audible Codes

Activity	Beeps	Possible Cause	Recommended Action
Green Power LED On.	None	Computer on.	None
Green 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.
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.

Table 5-3 Diagnostic Front Panel LEDs and Audible Codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
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.
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 green, 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 5-4 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.

Table 5-4 Numeric Codes and Text Messages (continued)

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. Enter Computer Setup and run the Drive Protection System test under **Storage** > **DPS Self-test**. 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.
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 5-5 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.

Table 5-5 Power-On Troubleshooting (continued)

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 5-6 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.**

6 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, Windows Vista, or Windows 7.
- One or more HP t610 Series Thin Clients
- 4-GB USB flash device for Microsoft Windows Embedded Standard 2009 (WES) (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.
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

1. Click **Deployment**.
2. When prompted, select the destination directory for the imaging tools and image.

The components that comprise DSKIMG.BIN are then unbundled. When this process is complete, there are three new files: IBR.EXE (the image restoration utility), FLASH.xx (the OS image), and README.TXT

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

Deploying with PXE

1. Ensure that IBR.exe and Flash.img are stored in the same directory on the server.
2. Add `[full path]\IBR.exe -y [full path]\Flash.img hd0` to the PXE command file, and then run it.

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

Refer to Configuring a PXE Server on page 62 for instructions about setting up a PXE Server using Microsoft RIS. See your documentation if using a different PXE server, such as Altiris Deployment Solution.

A Specifications

Table A-1 HP t610 Thin Client

Dimensions		
Width (front to back)	220 mm	8.7 in.
Height (top to bottom, without stand)	240 mm	9.4 in
Depth (side to side)	40 mm	1.6 in.
Approximate Weight (without stand)	1.49 kg	3.29 lb
Temperature Range (fanless design)*		
Operating**	10° to 40° C	50° to 104° F
(max. rate of change is 10° C per hour or 18° F per hour)		
Nonoperating	-30° to 60° C	-22° 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/300m (1.8° F/1000ft) to a maximum of 3km (10,000ft), 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 50° to 95° F (10° to 35° C).	
Relative Humidity (non-condensing)		
Operating	10–90%	10–90%
(max. wet bulb temperature is 28° C or 84.2° F)		
Nonoperating	5–95%	5–95%
(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 457 m per minute or 1500 ft per minute)		
Nonoperating	9,144 m	30,000 ft
(max. allowed rate of change is 457 m per minute or 1500 ft per minute)		

Table A-1 HP t610 Thin Client (continued)

Power Supply		
Operating Input Voltage Range	100–240 VAC	100–240 VAC
Rated Line Frequency	50–60 Hz	50–60 Hz
Power Output (maximum)	65 W	65 W

Table A-2 HP t610 PLUS Thin Client

Dimensions		
Width (front to back)	220 mm	8.7 in.
Height (top to bottom, without stand)	240 mm	9.4 in
Depth (side to side)	65 mm	2.6 in.
Approximate Weight (without stand)	1.98 kg	4.37 lb
Temperature Range (fanless design)*		
Operating** (max. rate of change is 10° C per hour or 18° F per hour)	10° to 40° C	50° to 104° F
Nonoperating (max. rate of change is 20° C per hour or 36° F per hour)	-30° to 60° C	-22° to 140° F
*Specifications are at sea level with altitude derating of 1° C/300m (1.8° F/1000ft) to a maximum of 3km (10,000ft), 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 50° to 95° F (10° to 35° C).	
Relative Humidity (non-condensing)		
Operating (max. wet bulb temperature is 28° C or 84.2° F)	10–90%	10–90%
Nonoperating (max. wet bulb temperature is 38.7° C or 101.6° F)	5–95%	5–95%
Maximum Altitude (unpressurized)		
Operating (max. allowed rate of change is 457 m per minute or 1500 ft per minute)	3048 m	10,000 ft
Nonoperating (max. allowed rate of change is 45 7m per minute or 1500 ft per minute)	9,144 m	30,000 ft

Table A-2 HP t610 PLUS Thin Client (continued)

Power Supply		
Operating Input Voltage Range	100–240 VAC	100–240 VAC
Rated Line Frequency	50–60 Hz	50–60 Hz
Power Output (maximum)	85 W	85 W

B 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.

C Configuring a PXE Server

Prerequisites

NOTE: This Troubleshooting section is not intended to enable HP Service to support PXE software. 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 2000: http://support.microsoft.com/kb/891275

– For Windows 2003: 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. Active Directory DHCP
3. Remote Installation Services (RIS) on Microsoft Windows 2000 Server

This documentation covers RIS setup, and assumes that servers 1, 2, and 3 (above) are already set up. The RIS PXE Server must be equipped with two or more hard drives. Remote Installation Services and Windows 2000 Server cannot be installed on the same drive; nor will RIS work on a double partition of Windows 2000 Server. You must first format the drive on which RIS is installed using NTFS.

Installing Remote Installation Services (RIS PXE Server)

1. From the Windows 2000 Server, log on to the domain using an account that has Administrator privileges on the server.
2. From the Windows Control Panel, double-click on **Add/Remove Programs**.
3. Double-click **Add/Remove Windows Components**.
4. Select **Remote Installation Services**, then click **Next**. (Insert Windows Server CD into the CD-ROM drive, if prompted.)
5. Restart the computer after the wizard has finished installing the service.

Authorizing Remote Installation Services (RIS PXE Server)

If you have installed RIS on a server other than the server running DHCP, authorize PXE with DHCP as follows:

1. Record the IP address of the RIS PXE Server.
2. Log on to the DHCP Server as administrator.
3. From the Control Panel, double-click **Administrative Tools**.
4. Double-click **DHCP**.
5. Right-click **DHCP** (just above the domain name) and select **Manage Authorized Servers**.
6. Click **Authorize**.
7. Type the IP address of your RIS PXE server and click **OK**.
8. Click **OK**.
9. Log off from the DHCP Server.

Configuring Remote Installation Services

Use the default option to have RIS install on second hard drive (D:\ or E:\).

1. Click **Start > Run**.
2. Type `Risetup.exe` and click **Next**.
3. Click **Next**.
4. Select **Respond to client computers requesting service.**
5. Click **Next**.
6. Insert the Windows 2000 Professional CD into the CD-ROM drive and enter the path to the CD-ROM drive (usually drive D:\ or E:\).
7. Click **Next**.
8. Click **Next**.
9. Click **Next**.
10. When the installation is complete, click **Finish**.

Set User Permissions on the Active Directory Server

On the active directory server:

1. Click **Start** > **Programs** > **Administrative Tools**.
2. Click **Active Directory Users and Computers**.
3. Right-click on the appropriate domain name

4. Click **Delegate Control**.
5. Click **Next**.
6. Click **Add** to add users.
7. Highlight **Everyone** and click **Add**.
8. Click **OK**.
9. Click **Next**.
10. Select **Join a Computer to the Domain**.
11. Click **Next**.
12. Click **Finish**.

RIS Menu

1. Install the RIS menu of your choice.
2. Configure the RIS menu.
3. Refer to the help file provided by the RIS menu for instructions on creating a network bootable diskette and RIS menu for PXE.

Creating Network Bootable Disk to Map Drives

Create a network boot disk to map drives. (Refer to the Microsoft Web site for instructions about creating a network bootable diskette.)

For More Information

HP thin client documentation (including white papers discussing software deployment methods): http://welcome.hp.com/country/us/en/support.html?pageDisplay=support. Type your model number into the **for product** box and navigate to the **Manuals** link.

Altiris Deployment Solution Documentation: http://www.altiris.com/support/documentation/

D System BIOS

Updating or restoring a BIOS

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 .

HPQFlash.exe is a utility designed to flash the System BIOS within a Microsoft Windows environment. To display the available options for this utility, type **[Path]\HPQFlash -?** at a command prompt or local search box. If the system has a BIOS Setup password enabled, then HPQFlash will prompt for you to enter the password before completing the flash process.

You can also run HPQFlash.exe from a USB storage device, including flash memory devices and external hard drives. To do this, insert the device and take note of the assigned drive letter. Copy HPQFlash.exe and ROM.CAB to the root of the drive indicated by the drive letter, or a folder on that drive. You can then execute HPQFlash from its location on the USB device. If the system has a BIOS Setup password enabled, then HPQFlash will prompt for you to enter the password before completing the flash process.

For more information, view Readme.txt or HPQFlash.txt, both located in the HPQFlash folder in the SoftPaq.

Startup Menu / F10 Setup BIOS Flashing

A BIOS upgrade option is available through both the Startup Menu and the F10 Setup utility using the "Flash System ROM" feature. Reboot the computer and press the Esc key to display the Startup Menu. Use the arrow keys to select **Utilities**, and then select the **Flash System ROM** option. Alternatively, reboot the PC and press F10 to access the BIOS Setup utility. In the **File** menu, select **Flash System ROM**. Either method requires that removable media be present that contains the BIOS binary image file in the root directory. You can find the binary image file in the DOS Flash folder. The image is named xxx_MMmm.bin, where "xxx" is the BIOS family, "MM" is the major version number, and "mm" is the minor version number. To create a CD for updating the BIOS, use a blank CD-R or CD-RW disk on a system with a CD-RW or DVD+RW drive, and write the binary to the disk using any CD-burning software. If a BIOS Setup password is set, the password is required before you can access the **Flash System ROM** menu. You are notified when the process completes. The new BIOS code will not take effect until you restart the PC.

USB Device BIOS Flashing in DOS

DOS Flash (DOSFlash.exe, FlshUefi.cpu) is the DOS-compatible System BIOS flash utility that you can use from a DOS bootable storage device (where "DOS" refers to any of a number of compatible operating systems such as FreeDOS, MS-DOS or DR-DOS). FlshUefi.cpu is the required driver for DOSFlash.exe. To flash the System BIOS from a bootable USB storage device, copy the contents of

the DOS Flash folder to the USB device, boot the computer from the USB device, and execute the DOSFlash application.

To see a more complete description of the DOS flash utilities, view DOSFlash.txt located in the DOS Flash folder of the SoftPaq. This folder also contains the required binary image of the BIOS. The binary image file is named xxx_MMmm.bin where "xxx" is the BIOS family, "MM" is the major version number, and "mm" is the minor version number. You can copy this file to the root directory of any USB removable medium for use with the F10 setup "Flash System ROM" option or BootBlock Emergency Recovery Mode.

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.

System Software Management (SSM) BIOS Flashing

Use this SoftPaq with System Software Manager (SSM) to update the System BIOS on target computers on a network. Place this SoftPaq in your SSM Filestore folder and then update the database. SSM is a free utility provided by Hewlett-Packard Company. For information on SSM, see http://www.hp.com/go/ssm.

HP Client Manager Software (HPCMS) BIOS Flashing

Use this Softpaq with HP Client Manager Software (HPCMS) and Altiris Notification Server to remotely target, distribute, and update the System BIOS on network PCs. Place this SoftPaq in your HPCMS Filestore folder and then update the database. HPCMS is a free managment application provided by Altiris and Hewlett-Packard Company. For more information, see http://www.hp.com/go/EasyDeploy.

Network BIOS Flashing

We designed the DOS Flash utility to support System BIOS flashing from a remote network boot using PXE. DOS Flash uses a small memory footprint that is compatible with the limited DOS memory available and the DOS extended environment that may exist while running Altiris eXpress. To see a more complete description of the network BIOS flashing utilities, view the DOSFlash.txt file located in the DOS Flash folder.

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.

E Electrostatic discharge

A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing electrostatic damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded Thin Client chassis. Wrist straps are flexible straps of 1 megohm +/- 10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.
- Use heelstraps, toestraps, or bootstraps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, contact an HP authorized dealer, reseller, or service provider.

NOTE: For more information about static electricity, contact an HP authorized dealer, reseller, or service provider.

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