



Hardware Reference Guide

HP t505 Flexible Thin Client

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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.

If you have comments, feedback, or questions about this guide, please e-mail us at thinclientdocs@hp.com.

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1 Product Features

Standard Features

Thank you for purchasing an HP thin client. We hope you have years of use from our 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 client. For a complete list of the hardware and software installed on a specific model, visit <http://www.hp.com> and search for your specific thin client model.

The following features are common to all HP thin clients:

- no hard drives or diskette drives
- 5-minute hardware setup time
- central deployment and management using HP Management Solutions

Various options are available for your thin client. For more information about available options, visit the HP website at <http://www.hp.com> and search for your specific thin client model.

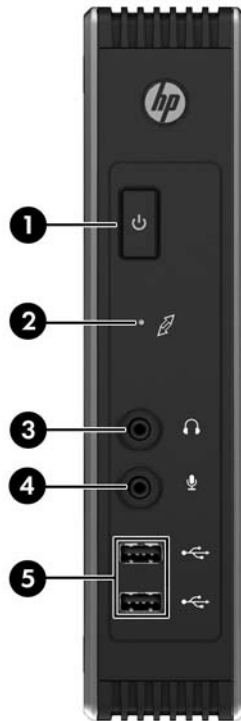


NOTE: Your thin client may look different from the model in the following illustrations.

Front Panel Components

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

Figure 1-1 Front panel components

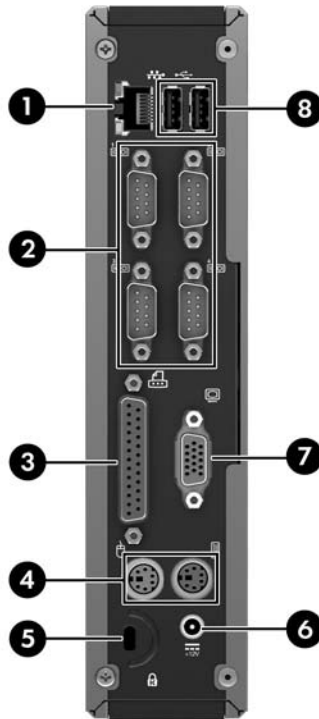


(1)	Power button	(4)	Line-in (microphone) connector
(2)	Flash activity LED	(5)	Universal serial bus (USB) connectors (2)
(3)	Line-out (headphone) audio connector		

Rear Panel Components

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

Figure 1-2 Rear panel components



(1)	Ethernet RJ-45 connector	(5)	Cable lock slot
(2)	Serial connectors (4)	(6)	Power connector
(3)	Parallel connector	(7)	VGA connector
(4)	PS/2 connectors (2)	(8)	Universal serial bus (USB) connectors (2)

Installing the Rubber Feet

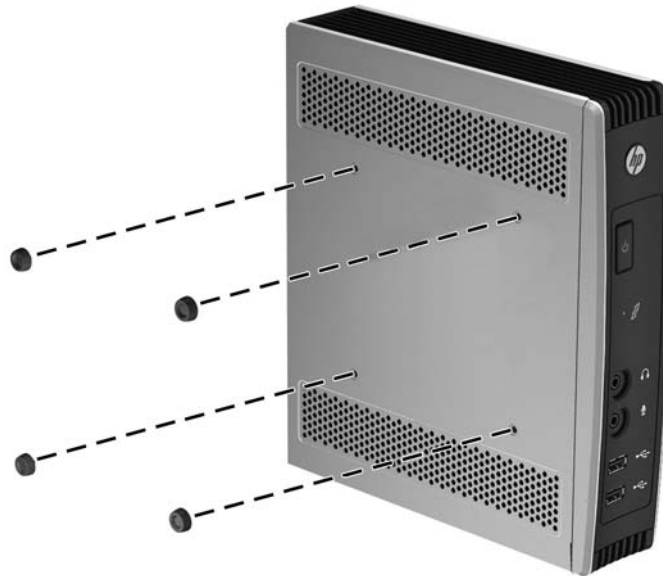
You may want to use your thin client in a horizontal orientation. You can install rubber feet on the left side of the unit to help keep the unit safely in place.

To install the rubber feet:

1. Locate the VESA (Video Electronics Standards Association) holes in the left side of the thin client.
CAUTION: If you use the thin client in a horizontal orientation without the rubber feet, it may slide and result in equipment damage.
2. Remove the feet from their backing.

3. Align the feet with their holes and press them in securely.

Figure 1-3 Installing the rubber feet



Installing the Stand

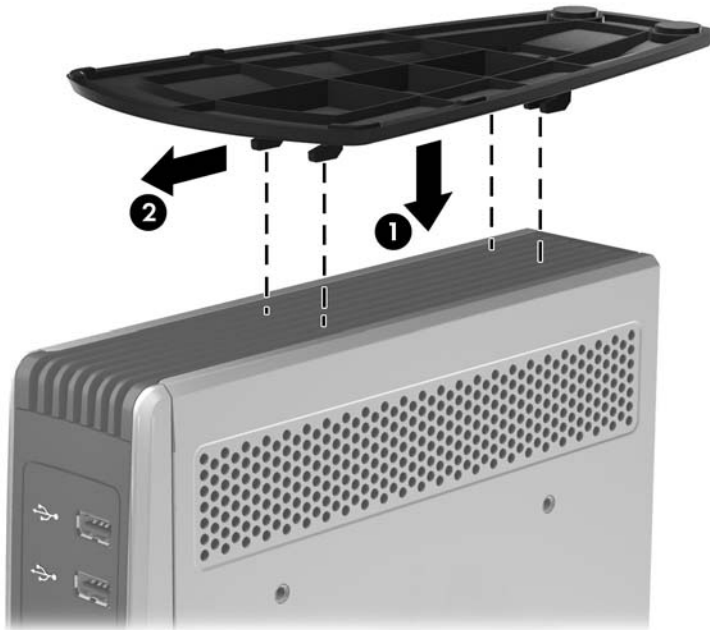
If you wish to use the thin client in a vertical orientation, you should install the stand for stability.

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. Position the stand with the wide part toward the front of the unit. Align the tabs on the widest part of the stand with the slots approximately 7.6 cm (3 inches) from the front of the unit and the tabs on the narrower part with the slots approximately 3.8 cm (1.5 inches) from the rear of the unit.

3. Insert the tabs into the slots and slide the stand forward until it locks into place.

Figure 1-4 Installing the stand

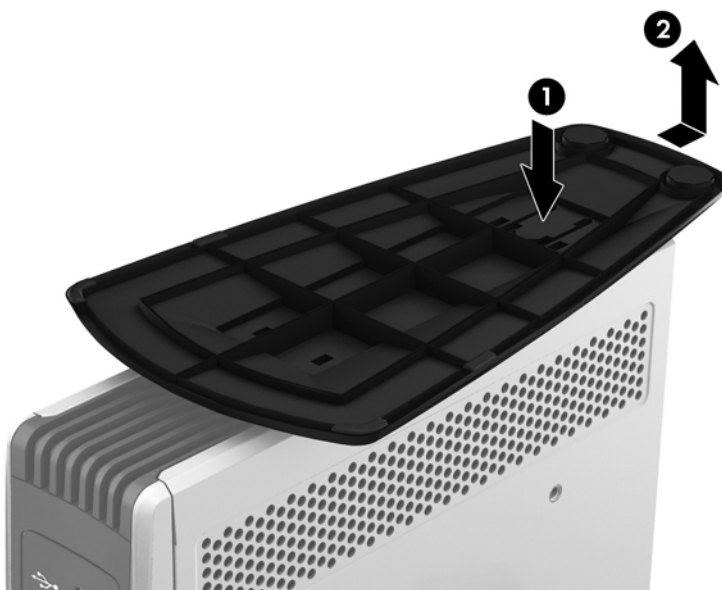


Removing the Stand

To remove the stand:

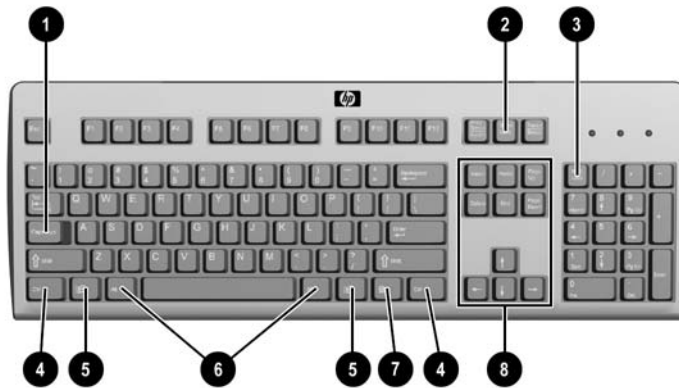
1. Turn unit upside down.
2. Press the tab (1), then slide the stand toward the rear of the thin client and lift it off the unit (2).

Figure 1-5 Removing the stand



Using the Keyboard

Figure 1-6 Keyboard features



(1)	Caps Lock key	Activates/deactivates the Caps Lock feature.
(2)	Scroll Lock key	Activates/deactivates the Scroll Lock feature.
(3)	Num Lock key	Activates/deactivates the Num Lock feature.
(4)	Ctrl key	Use in combination with another key; its function depends on the application software you are using.
(5)	Microsoft® Windows® Logo Key ^{1,2}	Opens the Start menu in Windows. Use in combination with other keys to perform other functions. For more information, see Windows Logo Key on page 7 .
(6)	Alt key	Use in combination with another key; its function depends on the application software you are using.
(7)	Application key ¹	Similar to the right mouse button, opens pop-up menus in a Microsoft Office application. May perform other functions in other software applications.
(8)	Editing keys	Includes the following: Insert , Home , Page Up , Delete , End , and Page Down . Hold Ctrl and Alt while pressing Delete to restart the thin client.

¹Available in select geographic regions.

²Applies to thin clients running Windows XP Embedded (XPe) and Windows Embedded Standard (WES) operating systems only.

Windows Logo Key

Use the Windows Logo Key in combination with other keys to perform certain functions available in Windows operating systems.

Windows Logo Key + Tab	Switch between open items.
Windows Logo Key + e	Open My Computer.
Windows Logo Key + f	Search for a file or folder.
Windows Logo Key + Ctrl + f	Search for computers.
Windows Logo Key + m	Minimize all windows.
Windows Logo Key + Shift + m	Undo minimize all.
Windows Logo Key + Break	Display the System Properties dialog box.
Windows Logo Key + r	Open the Run dialog box.

Additional Function Keys

The following key combinations also work on all thin clients regardless of operating system:

Alt + Esc	Cycles through minimized applications.
Alt + Tab	Cycles through open applications.
Alt + Shift + Tab	Switches to the previous session.

Special Mouse Functions

Most software applications support the use of a mouse. The functions assigned to each mouse button depend on the software applications you are using.

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 1-7 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 off the computer properly through the operating system, then turn off any external devices.
 - b. Disconnect the power cord from the power outlet and disconnect any external devices.
 - 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 35](#) for more information.

-
3. Remove the side access panel. See [Removing and Replacing the Side Access Panel on page 10](#) for more information.
 4. Remove any hardware that you will replace.
 5. Install or replace equipment. For removal and replacement procedures, see [Removing and Replacing the Battery on page 12](#).

 **NOTE:** Option kits include more detailed installation instructions.

-
6. Replace the side access panel. See [Removing and Replacing the Side Access Panel on page 10](#).
 7. Reconnect any external devices and power cords.
 8. Turn on the monitor, the thin client, and any devices you want to test.
 9. Load any necessary drivers.

 **NOTE:** You can download select hardware drivers from HP. Go to <http://www.hp.com> and search for your specific thin client model.

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10. Reconfigure the thin client, if necessary.

Removing and Replacing the Side Access Panel

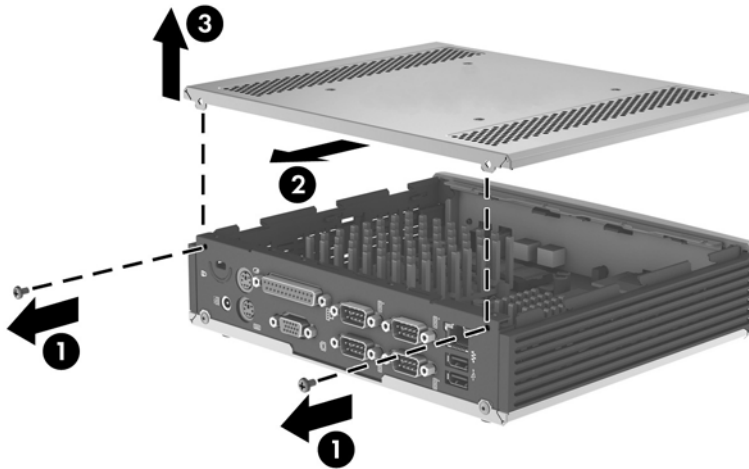
Removing the Side Access Panel

⚠ 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 access panel:

1. Lay the unit flat on a stable surface with the right side up and the left side down.
2. Remove the two screws that secure the access panel to the chassis (1).
3. Slide the access panel about 8.3 mm (1/3 inch) toward the rear of the unit (2), and then lift the access panel up and off the unit (3).

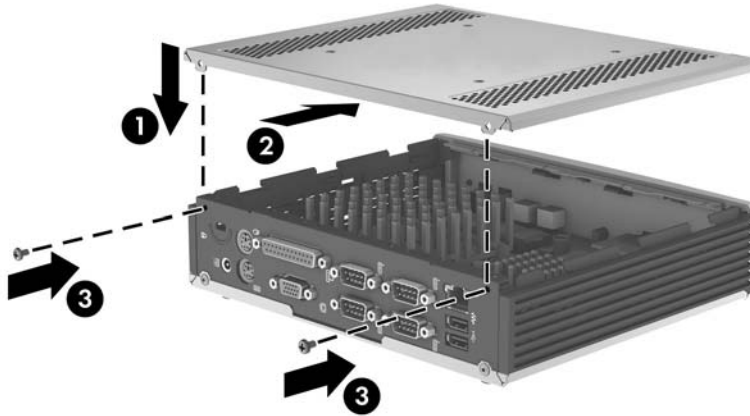
Figure 2-1 Removing the side access panel



Replacing the Side Access Panel

To replace the access panel:

1. Align the tabs on the access panel with the slots in the both sides of the chassis and place the access panel on the side of the unit, offset about 8.3 mm (1/3 inch) toward the top of the unit (1).
2. Slide the panel toward the front of the unit until the panel is flush with the bottom panel of the chassis (2).
3. Insert and fasten the two screws to secure the side access panel to the chassis.



Installing Thin Client Options

Various options can be installed on the thin client:

- [Removing and Replacing the Battery on page 12](#)
- [External Drives on page 13](#)

Removing and Replacing the Battery

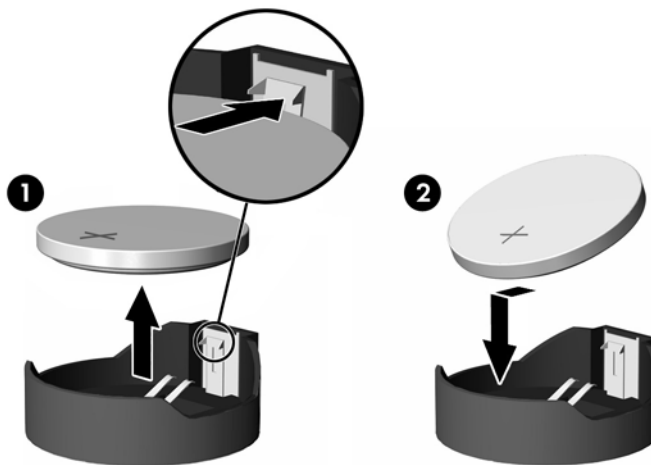
Before beginning the replacement process, review [General Hardware Installation Sequence on page 9](#) for procedures you should follow before and after installing or replacing hardware.

⚠ WARNING! 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 release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out (1).

Figure 2-2 Removing and replacing the internal battery



3. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up (2). Push the other edge down until the clamp snaps over the other edge of the battery.

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

External Drives

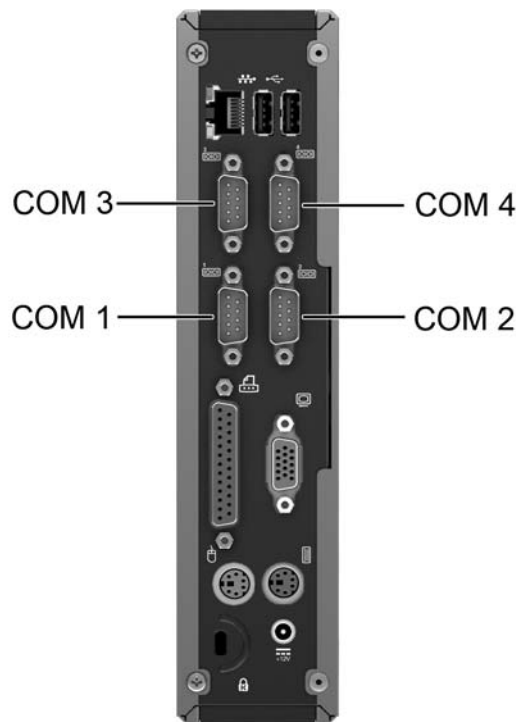
Various external USB drives are available as options for these thin clients. For more information about these drives, visit <http://www.hp.com> and search for your specific thin client model, or refer to the instructions that accompany the option.

For more information about available options, visit the HP website <http://www.hp.com> and search for your specific thin client model.

Configuring Powered Serial Ports

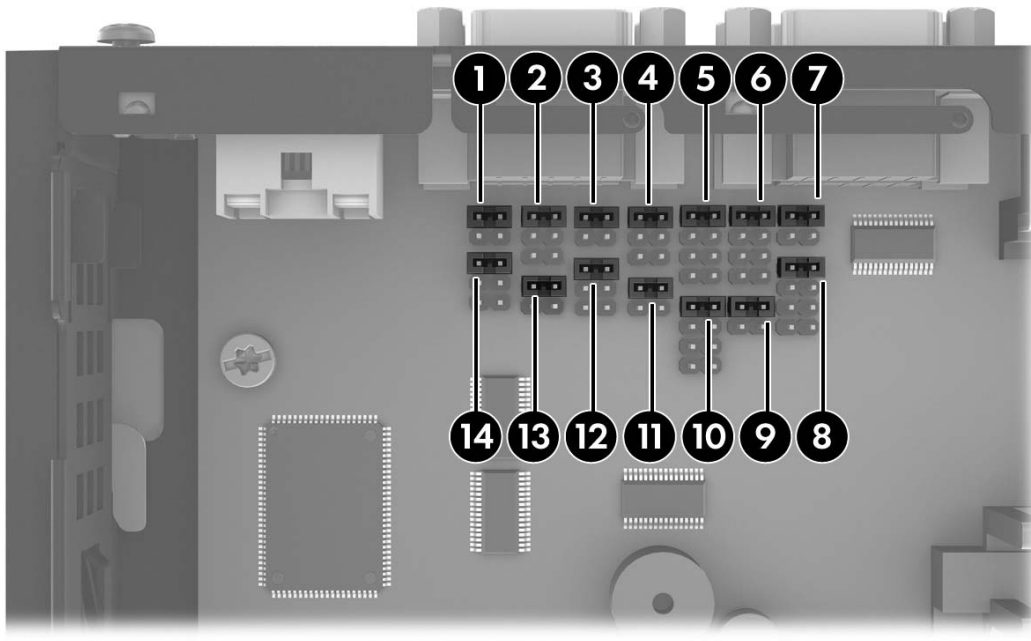
Three configurable, powered serial ports, COM 2, COM 3, and COM 4, are standard on the thin client. COM 1 is a standard, non-powered serial port that cannot be configured. Some devices use a powered serial port. If the serial port is configured as a powered port, devices that support a powered serial interface do not require an external power source.

Figure 2-3 Powered Serial Ports



The serial port jumpers on the system board are located as shown in the following illustration:

Figure 2-4 Serial Port Jumper Locations on the System Board



Item	Jumper
1	COM3 SP33
2	COM3 SP31
3	COM4 SP43
4	COM4 SP41
5	COM2 SP28
6	COM2 SP23
7	COM2 SP21
8	COM2 SP22
9	COM2 SP24
10	COM2 SP29
11	COM4 SP42
12	COM4 SP44
13	COM3 SP32
14	COM3 SP34

Before beginning the configuration process, review [General Hardware Installation Sequence on page 9](#) for procedures you should follow before and after installing or replacing hardware.

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 configure the serial ports:

1. Locate the serial port and jumper.
2. Place jumpers on the appropriate pins. (See [Table 2-3 Configuring Serial Port Power on page 16](#) to determine the appropriate pins.)

⚠ CAUTION: An unsupported configuration can cause severe equipment damage. Carefully verify COM Port Jumper locations and supported configurations before you configure a serial port. See [Figure 2-4 Serial Port Jumper Locations on the System Board on page 14](#) and [Table 2-3 Configuring Serial Port Power on page 16](#) for Jumper locations and supported configurations.

Table 2-1 COM Port Default Configuration

pin #	COM1	COM2	COM3	COM4
pin 1	DCD	+5V	+5V	+5V
pin 2	RXD	RXD	RXD	RXD
pin 3	TXD	TXD	TXD	TXD
pin 4	DTR	DTR	DTR	DTR
pin 5	GND	GND	GND	GND
pin 6	DSR	DSR	DSR	DSR
pin 7	RTS	RTS	RTS	RTS
pin 8	CTS	RXD (TTL)	CTS	CTS
pin 9	RI	TXD (TTL)	RI	RI

Table 2-2 COM Port Functionality

pin #	COM1 (Standard)	COM2–Cable Connection (Customized)	COM3 (Customized)	COM4 (Customized)
pin 1	DCD	+5V/DCD	+5V/+12V/DCD	+5V/+12V/DCD
pin 2	RXD	RXD/TXD/RXD (TTL)/ TXD (TTL)	RXD/TXD	RXD/TXD
pin 3	TXD	TXD/RXD/TXD (TTL)/ RXD (TTL)	TXD/RXD	TXD/RXD
pin 4	DTR	DTR/+5V	DTR/+5V/+12V	DTR/+5V/+12V
pin 5	GND	GND	GND	GND
pin 6	DSR	DSR	DSR	DSR
pin 7	RTS	RTS	RTS	RTS
pin 8	CTS	RXD/TXD/RXD (TTL)/ TXD (TTL)	CTS	CTS
pin 9	RI	TXD/RXD/TXD (TTL)/ RXD (TTL)	RI	RI

CAUTION: To prevent severe equipment damage, carefully verify the location of the COM Port Jumper before you configure it. See [Figure 2-4 Serial Port Jumper Locations on the System Board on page 14](#) for locations.

NOTE: The jumpers in the following table are in the same orientation illustrated in [Figure 2-4 Serial Port Jumper Locations on the System Board on page 14](#).

Table 2-3 Configuring Serial Port Power



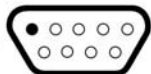


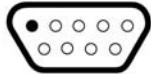
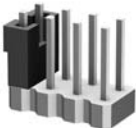
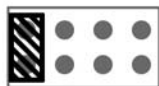
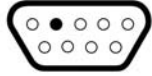


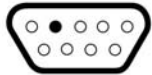


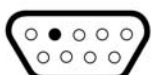


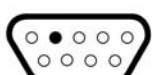
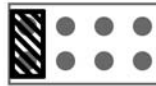
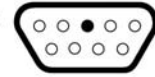
COM 2 - SP21			
		Pin1:+5V (Default)	
		Pin1:DCD	
COM 2 - SP22			
		Pin2:RXD (Default)	
		Pin2:TXD	
		Pin2:RXD_TTL	
		Pin2:TXD_TTL	

Table 2-3 Configuring Serial Port Power (continued)

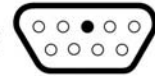
COM 2 - SP23



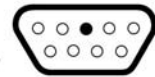
Pin3:TXD
(Default)



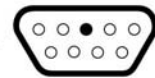
Pin3:RXD



Pin3:TXD_TTL



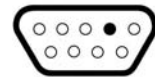
Pin3:RXD_TTL



COM 2 - SP24



Pin4:DTR (Default)



Pin4:+5V

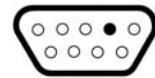


Table 2-3 Configuring Serial Port Power (continued)



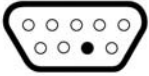
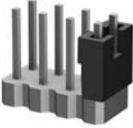
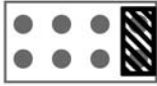
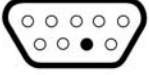

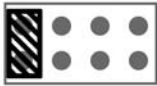
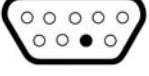


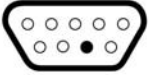


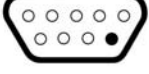


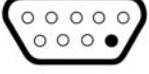

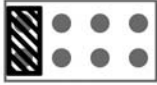
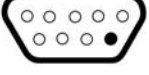


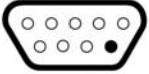
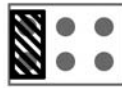
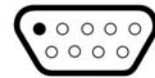
COM 2 - SP28			
		Pin8:RXD	
		Pin8:TXD	
		Pin8:RXD_TTL (Default)	
		Pin8:TXD_TTL	
COM 2 - SP29			
		Pin9:TXD	
		Pin9:RXD	
		Pin9:TXD_TTL (Default)	
		Pin9:RXD_TTL	

Table 2-3 Configuring Serial Port Power (continued)

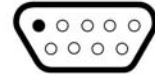
COM 3 - SP31



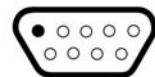
Pin1:+5V(Default)



Pin1:+12V



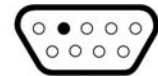
Pin1:DCD



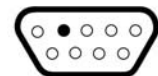
COM 3 - SP32



Pin2:RXD(Default)



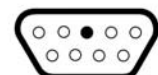
Pin2:TXD



COM 3 - SP33



Pin3:TXD(Default)



Pin3:RXD

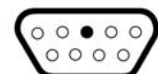


Table 2-3 Configuring Serial Port Power (continued)

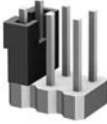

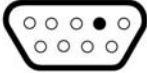


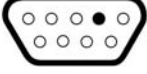


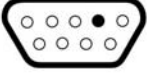
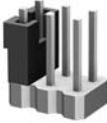
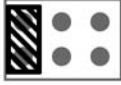
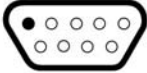


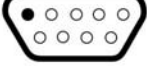


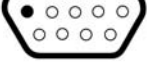
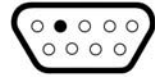
COM 3 - SP34			
		Pin4:DTR(Default)	
		Pin4:+5V	
		Pin4:+12V	
COM 4 - SP41			
		Pin1:+5V(Default)	
		Pin1:+12V	
		Pin1:DCD	

Table 2-3 Configuring Serial Port Power (continued)

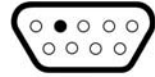
COM 4 - SP42



Pin2:RXD(Default)



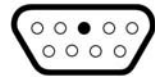
Pin2: TXD



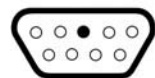
COM 4 - SP43



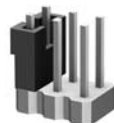
Pin3:TXD (Default)



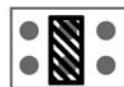
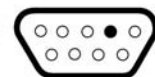
Pin3: RXD



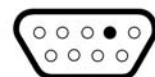
COM 4 - SP44



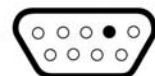
Pin4:DTR(Default)



Pin4:+5V



Pin4:+12V



A Specifications

Table A-1 HP t505 Flexible Thin Client

Dimensions		
Width	50.00 mm	1.97 in.
Height (without stand)	220.00 mm	8.66 in
Height (with stand)	228.50 mm	9.00 in
Depth	194.00 mm	7.74 in.
Approximate Weight (without adapter)		
Adapter	0.336 kg	0.74 lb
Temperature Range (fanless design)*		
Operating**	10° to 35° C	50° to 95° 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/300 m (1.8° F/1000 ft) to a maximum of 3 Km (10,000 ft), with no direct, sustained sunlight. Upper limit may be limited by the type and number of options installed.		** The operating temperature range when the thin client is attached to a flat panel using the HP Quick Release is 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	9144 m	30,000 ft
(max. allowed rate of change is 457 m per minute or 1500 ft per minute)		
Power Supply		
Operating 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-1 HP t505 Flexible Thin Client (continued)

Rated Output Current (maximum)	3.42 A	3.42 A
Output Voltage	+19 V DC	+19 V DC

B Security Provisions

Securing the Thin Client

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

1. Locate the cable lock slot on the back panel.
2. Insert the cable lock into the slot, and then use the key to lock it.

Figure B-1 Securing the thin client



C Mounting the Thin Client

HP Quick Release

This thin client incorporates four mounting points on each 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 10 mm screws supplied with the HP Quick Release.

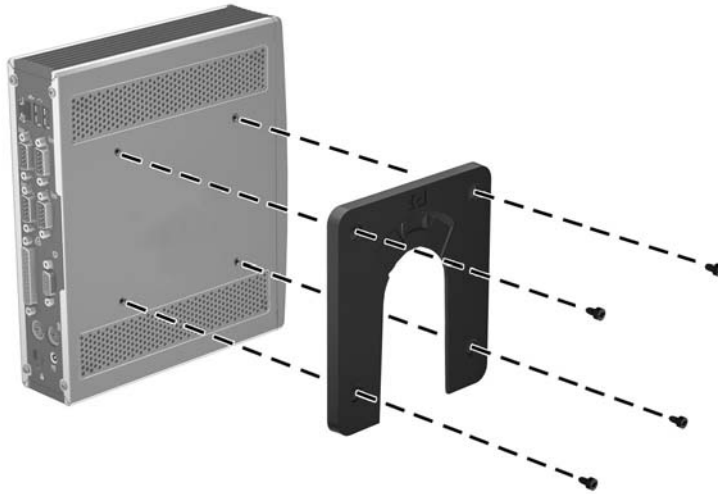
Figure C-1 HP Quick Release



To use the HP Quick Release:

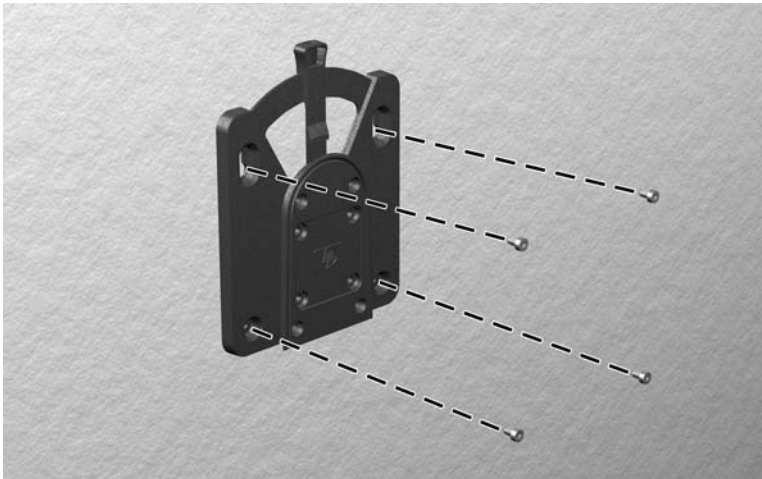
1. Using four 10 mm screws included in the mounting device kit, attach one side of the HP Quick Release to the thin client as shown in the following illustration.

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



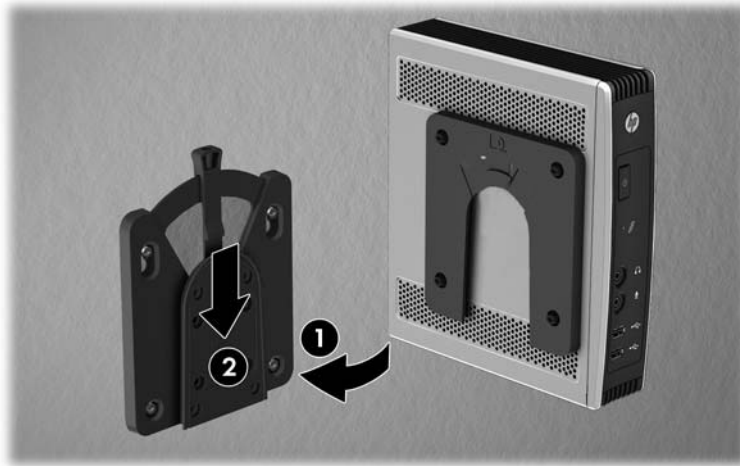
2. Using four screws included in the mounting device kit, attach the other side of the HP Quick Release to the device to which you will mount the thin client. Make sure the release lever points upward.

Figure C-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 C-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 and not supported mounting options for the mounting bracket.

Figure C-5 Thin client mounted with flat panel on wall



Figure C-6 Thin client mounted on back of monitor stand



Figure C-7 Thin client mounted on wall



Figure C-8 Thin client mounted under desk



Non-supported Mounting Option

CAUTION: Mounting a thin client in a non-supported manner could result in failure of the HP Quick Release and damage to the thin client and/or other equipment.

Do not mount the thin client on a flat panel monitor stand, between the panel and the stand.

Figure C-9 Unsupported mounting position—thin client between stand and monitor



D Thin Client Operation

Routine Thin Client Care

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

- Never operate the thin client with the outside panel removed.
- Keep the thin client away from excessive moisture, direct sunlight, and extreme heat and cold. For information about the recommended temperature and humidity ranges for the thin client, see [Specifications on page 22](#).
- Keep liquids away from the thin client and keyboard.
- Turn off the thin client and wipe the exterior with a soft, damp cloth as needed. Using cleaning products may discolor or damage the finish.

Supported Placement

HP supports placement of the thin client as follows:

CAUTION: You must adhere to HP-supported placement to ensure your thin clients function properly.

Figure D-1 Vertical placement using the supplied stand



Figure D-2 Horizontal placement on rubber feet



Figure D-3 Under monitor stand with at least one inch clearance



Non-supported Placement

HP does not support placement of the thin client as follows.

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

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

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

Figure D-4 Do not put thin clients in drawers or other sealed enclosures



Figure D-5 Do not place a monitor on the thin client



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.

F Shipping Information

Shipping Preparation

Follow these suggestions when preparing to ship the thin client:

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



NOTE: For environmental nonoperating ranges, see [Specifications on page 22](#).

Important Service Repair Information

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

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

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

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