*Overview*

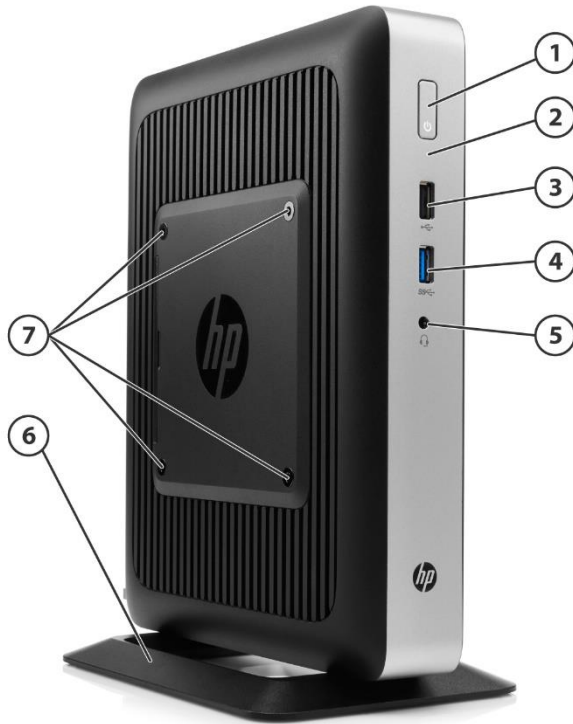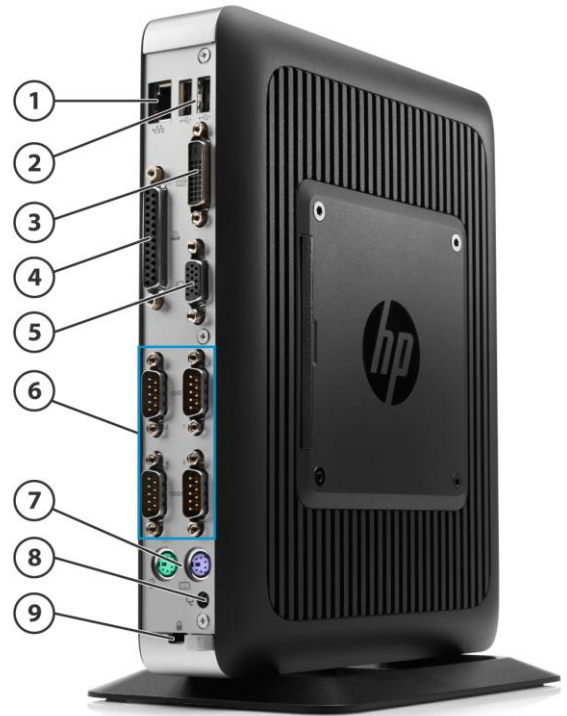## HP t628 Thin Client

**FRONT**

1. Power button (with integrated power indicator light)
2. Flash memory activity indicator light
3. Hi-Speed USB 2.0 port
4. SuperSpeed USB 3.0 port
5. 3.5 mm headset port
6. System Stand
7. VESA 100 mounting points

**BACK**

1. RJ45 connector (GbE network interface)
2. (2) Hi-Speed USB 2.0 ports
3. DVI-D video output
4. Parallel port
5. VGA video output
6. (4) Serial ports
7. PS/2 ports for keyboard and mouse
8. DC power input port
9. Security lock slot (cable lock sold separately)

# QuickSpecs

## *Overview*

### AT A GLANCE

- Intel® Celeron® Processor J1900; 2.0 GHz (base), 2.42 GHz (burst), 4 cores, 2M cache

- Intel® HD Graphics (integrated in processor)

- DDR3L SDRAM system memory; single SODIMM slot; up to 8 GB supported[1]

- Supports dual displays via (1) DVI-D video output (max. resolution of 1920 x 1280) and (1) VGA video output (max. resolution of 2560 x 1600)

- Solid-state NAND flash memory storage; M.2 form factor modules

- Optional 2.5" SATA hard disk drive (HDD)

- Active thermal management technology monitors component operating temperatures, throttles SOC operation if appropriate, and prevents unit thermal shutdown

- Realtek GbE network interface connection through an RJ45 port on the rear panel

- Optional Wi-Fi adapter including antennas integrated internally in the chassis[2]

- (1) SuperSpeed USB 3.0 and (1) Hi-Speed USB 2.0 on front, (2) Hi-Speed USB 2.0 on rear.

- Legacy ports include PS/2 keyboard and mouse, (4) serial ports and (1) parallel port

- Integrated PC speaker for basic audio playback; 3.5 mm headset port on front

- BIOS designed to address NIST SP 800-147 guidelines, cable lock slot, and power cord retention clip to prevent accidental disconnects

- Post-consumer recycled plastics content greater than 25% total unit plastics (by weight)

- Low halogen[3] material content

[1] If configured with a Windows Embedded 32-bit operating system, memory above 3.2 GB may not be available due to operating system limitations
[2] Wireless access point and Internet access is required; availability of public wireless access points is limited
[3] This product is low halogen except for power cords, cables and peripherals, as well as the optional Fiber Optic NIC module; service parts obtained aftermarket may not be low halogen

### Warranty

HP Customer Support: limited three-year hardware limited warranty in most regions; HP Care Packs are extended service contracts that go beyond your standard limited warranties; for more details visit http://www.hp.com/go/cpc

*Technical specifications*

## OPERATING SYSTEMS

HP Smart Zero Core
HP ThinPro
Windows Embedded Standard 7E
Windows 10 IoT Enterprise

## PROCESSOR / GRAPHICS

| CPU Model | CPU Frequency Max/Base | Cores | TDP | L2 Cache | Intel® HD GPU Max/Base | Memory |
|---|---|---|---|---|---|---|
| Intel® Celeron® J1900 | 2.42/2.0 GHz | 4 | 10W | 2 MB | 854/688 MHz | DDR3 |

## MEMORY

| Type: | DDR3L SDRAM |
|---|---|
| Data Transfer Rate: | Up to 1,333 MT/s |
| Number of Slots | 1 x SODIMM |
| Capacities: | 2 GB (1 x 2 GB)<br>4 GB (1 x 4 GB)<br>8 GB (1 x 8 GB) |
| Reserved for Graphics: | 256 MB, 512 MB (default) or 1 GB |

**NOTE:** The system's Graphics Processing Unit (GPU) uses part of the total system memory. System memory dedicated to graphics performance is not available for use by other programs

## STORAGE

| Primary Type: | NAND flash memory; non-volatile |
|---|---|
| Number of Sockets: | (1) M.2 |
| Capacities: | 8 GB, 16 GB, 32 GB, 64 GB |

Solid-state flash-based memory modules are the primary operating system storage media for thin clients supporting highly virtualized operating environments. Thin clients display a hosted session from a data center through standard IP networks which minimizes the required size of local flash-based storage. In a traditional thin client environment, data and application files are stored securely in the remote data center and not on the local storage device.

The HP t628 Thin Client uses two types of flash memory: MLC (2-bits per cell) and Ultra MLC (2-bits per cell, but only 1 is utilized). Because the classic thin client use cases seldom require writing to flash memory storage, a relatively low capacity MLC flash memory module is typically used to provide the best cost and performance. However, when the use case calls for writing to the local flash memory storage module careful consideration should be given to the selection of the proper storage module. A larger capacity and/or the use of Ultra MLC technology could be required to adequately support the usage being planned or expected from the thin client.

| Flash Memory Specification | MLC (Multi-level Cell) | UMLC (Ultra MLC) |
|---|---|---|
| Bits per cell | 2 | 2 (only 1 is used) |
| Terabytes Written (TBW) * | 5 TBW* – 8GB<br>10 TBW* – 16GB<br>20 TBW* – 32GB | 50 TBW* – 16GB<br>100 TBW* – 32GB |
| * Terabytes Written (TBW) calculated based on JESD-219 SSD Client workload | | |

# QuickSpecs

## *Technical specifications*

| Secondary Type: | 500 GB 2.5" SATA Hard Disk Drive (HDD) |
|---|---|

## INPUT / OUTPUT

| Keyboard | USB or PS/2 |
|---|---|
| Mouse | USB or PS/2 |
| Printer | Local and/or network printers (RDP, ICA, LPD) |
| Display / Monitor | All models support dual displays via 1 x DVI-D digital video output (max. resolution of 1920 x 1280)  and 1 x VGA analog video output (max. resolution of 2560 x 1600) |

## I/O PORTS, EXPANSION SLOTS & CONNECTORS

(3) Hi-Speed USB 2.0 ports (one in front, two in rear)
(1) SuperSpeed USB 3.0 ports (in front)
(1) DVI-D digital video output (max. resolution of 1920 x 1280)
(1) VGA analog video output (max. resolution of 2560 x 1600)
(2) PS/2 keyboard/mouse ports
(4) Serial ports
(1) Parallel port
(1) RJ45 GbE network connector
(1) 3.5 mm headset port (front)

## AUDIO/VIDEO

| Audio Subsystem | • Internal amplified speaker system for basic audio playback<br>• 3.5 mm headset socket (front access) |
|---|---|
| Audio CODECs | • MP3<br>• AAC Stereo<br>• HE AAC<br>• Includes hardware acceleration support |
| Video CODECs | • MPEG-4 part 2 (DivX, Xvid)<br>• MPEG-4 part 10 (H.264, AVC)<br>• WMV 7/8/9 VC-1 & ASF Demuxer<br>• Includes hardware acceleration support |

## HARDWARE SECURITY

• Security lock slot (cable lock sold separately)
• Power cord retention clip

## ETHERNET NETWORKING

| Hardware Networking: | • Realtek Gigabit Ethernet(GbE); RJ45 connector access<br>• Wake on LAN (WOL)<br>• Preboot Execution Environment (PXE), Remote Program Load (RPL)<br>• TCP/IP with DNS and DHCP |
|---|---|

## Technical specifications

### WI-FI NETWORKING*

| | |
|---|---|
| **Wi-Fi Adapter Option:** | 802.11n Wi-Fi Adapter |

*Wireless access point and internet access required. Availability of public wireless access points limited.

### SOFTWARE SUPPORT

| Host Environment | Protocol | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|---|
| | | | WES 7E | WE 10 IoT |
| Microsoft Remote Desktop Services | Remote FX (RFX), RDP | ✓ | ✓ | ✓ |
| Citrix® | ICA, HDX | ✓ | ✓ | ✓ |
| VMware® Horizon | RDP, PCoIP | ✓ | ✓ | ✓ |

| Protocol Clients | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|
| | | WES 7E | WE 10 IoT |
| Citrix® Receiver | ✓ | ✓ | ✓ |
| Microsoft Remote Desktop Client | N/A | ✓ | ✓ |
| VMware™ Horizon View™ Client | ✓ | ✓ | ✓ |
| Remote Graphics Software (RGS) | via add-on | ✓ | ✓ |
| HP TeemTalk Terminal Emulator | ✓ | via add-on | via add-on |
| Free RDP | ✓ | N/A | N/A |

| Browser Support | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|
| | | WES 7E | WE 10 IoT |
| Mozilla Firefox | 36 | N/A | N/A |
| Internet Explorer | N/A | 11 | 11 |

| Security | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|
| | | WES 7E | WE 10 IoT |
| Smart Card | ✓ | ✓ | ✓ |
| Log-on Manager | ✓ | ✓ | ✓ |
| Read only Operating System | ✓ | ✓ | ✓ |

## Technical specifications

| | | | |
|---|---|---|---|
| 802.1x | ✓ | ✓ | ✓ |
| Operating System Write Filter | N/A | EWF, FBWF | UWF |
| Microsoft Firewall | N/A | ✓ | ✓ |

| Management Tools | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|
| | | WES 7E | WE 10 loT |
| HP Device Manager | ✓ | ✓ | ✓ |
| HP ThinUpdate | ✓ | ✓ | ✓ |
| HP Easy Tools | ✓ | via add-on | N/A |
| HP Smart Zero Client Services | ✓ | N/A | N/A |
| Microsoft SCCM/EDM agent | N/A | ✓ | ✓ |

| Additional Components | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|
| | | WES 7E | WE 10 loT |
| HP Velocity | ✓ | ✓ | ✓ |
| HP Easy Shell | ✓ | ✓ | ✓ |
| HP Universal Print Driver | N/A | ✓ | ✓ |
| Windows Media Player | N/A | 12 | 12 |
| Microsoft Direct Access | N/A | N/A | ✓ |
| Microsoft BranchCache | N/A | N/A | ✓ |
| Microsoft AppLocker | N/A | N/A | ✓ |
| Microsoft Sideloading | N/A | N/A | ✓ |

**NOTE:** Other add-on software available (see: http://www.hp.com/support for latest list of available add-ons). Software performance and support may vary depending on customer environment and backend.

| Audio/Video CODECs | HP ThinPro Smart Zero Core | Microsoft Windows Embedded | |
|---|---|---|---|
| | | WES 7E | WE 10 loT |
| MP3 | ✓ | ✓ | ✓ |
| WMA stereo | ✓ | ✓ | ✓ |
| AAC stereo & HE AAC | ✓ | N/A | N/A |
| Microsoft AC3 encoder | N/A | ✓ | ✓ |

## *Technical specifications*

| | | | |
|---|---|---|---|
| MPEG-1 | ✓ | N/A | N/A |
| MPEG-4 part 2 (DivX, Xvid, H.263) | ✓ | ✓ | ✓ |
| MPEG-4 part 10 (H.264, AVC) | ✓ | ✓ | ✓ |
| WMV 7/8/9/ VC-1 & ASF Demuxer | ✓ | ✓ | ✓ |

## TEXT AND GRAPHICS TERMINAL EMULATIONS

*(provided by HP TeemTalk 7 in HP ThinPro & WES 7 operating systems)*

| Emulation | Terminal ID |
|---|---|
| HP 700-92/96 | 70092, 70094, 70096, 2392A, 2622A |
| IBM3151 | Mod11, Mod31 |
| IBM3270 | 3278-2 (24x80), 3278-3 (32x80), 3278-4 (43x80), 3278-5 (27x132), 3278-2-E (24x80), 3278-3-E (32x80), 3278-4-E (43x80), 3278-5-E (27x132), 3279-2 (24x80), 3279-3 (32x80), 3279-4 (43x80), 3279-5 (27x132), 3287-1 |
| IBM5250 | 5291-1, 5292-2, 5251-11, 3179-2, 3196-A1, 3180-2, 3477-FC (27x132), 3477-FG (24x80), 3486-BA, 3487-HA, 3487-HC, 3812-1 |
| VT52, VT100, VT100+, VT500 (7- or 8-bit) | VT100, VT101, VT102, VT125, VT131, VT132, M2200, VT220, VT240, VT320, VT340, VT420, VT510, VT520, VT525 |
| VT HP220, VT UTF8 | VT100, VT101, VT102, VT125, VT220, VT240, VT320, VT340, VT420, VT131, VT132, M2200, VT510, VT520, VT525 |

**NOTE:** Wireless features, performance and support may vary depending on environmental variables such placement, settings and firmware of your access points. Please contact your wireless vendor for support of your wireless environment

# QuickSpecs

HP t628 Thin Client

## *Technical specifications*

### WEIGHTS & DIMENSIONS

| H x W x D:<br>(vertical orientation) | 245mm x 52.3mm x 200mm<br>9.7in x 2.1in x 7.9in |
|---|---|
| **Volume:** | 2.6 liter |
| **System Weight** | 1350 grams<br>2.98 lbs. |

**NOTE:** All measurements are approximate; the addition of optional modules will increase the weight

### EXTERNAL POWER SUPPLY

| 45W external power adapter<br>Worldwide auto-sensing 100-240 VAC, 50-60 Hz<br>Rated output current (maximum): 2.31 A<br>Output voltage: +19.5 V dc<br>Energy-saving automatic power-down<br>Surge-tolerant |
|---|

### ENVIRONMENTAL

| **Operating Temperature Range:** | No HDD installed | 10°C to 40°C<br>50°F to 104°F |
|---|---|---|
| | HDD installed | 10°C to 35°C<br>50°F to 95°F |
| **Non-operating Temperature Range:** | -30°C to 60°C<br>-22°F to 140°F<br>**NOTE:** maximum rate of change is 20°C/h or 36°F/h | |
| **Operating Humidity:** | 10% to 90%<br>**NOTE:** maximum bulb temperature is 28°C or 84.2°F | |
| **Non-operating Humidity:** | 5% to 95%<br>**NOTE:** maximum bulb temperature is 38.7°C or 101.6°F | |

**NOTE:** Specifications are at sea level with altitude derating of 1° C/300m (1.8° F/1000ft) 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.

## *Technical specifications*

| Environmental Data | Eco-Label Certifications & declarations | This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: |
|---|---|---|

- US ENERGY STAR®
- EPEAT® Gold registered in the China. See http://www.epeat.net for registration status in your country.

**Energy Consumption (in accordance with US ENERGY STAR® test method)**

| | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 60Hz |
|---|---|---|---|
| Normal Operation (Short idle) | 7.22 W | 7.42 W | 7.23 W |
| Normal Operation (Long idle) | 6.58 W | 6.80 W | 6.58 W |
| Sleep | 1.02 W | 1.05 W | 1.03 W |
| Off | 0.72 W | 0.75 W | 0.73 W |

**Heat Dissipation***

| | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 60Hz |
|---|---|---|---|
| Normal Operation (Short idle) | 25 BTU/hr | 25 BTU/hr | 25 BTU/hr |
| Normal Operation (Long idle) | 23 BTU/hr | 23 BTU/hr | 23 BTU/hr |
| Sleep | 3 BTU/hr | 4 BTU/hr | 4 BTU/hr |
| Off | 2 BTU/hr | 3 BTU/hr | 2 BTU/hr |

**\*NOTE:** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

**Additional Information**

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive -2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the <gold> level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 17.5% post-consumer recycled plastic (by wt.)
- This product is 93.9% recycle-able when properly disposed of at end of life.

**Packaging Materials**

| | External: | PAPER/Corrugated | 1101 g |
|---|---|---|---|
| | Internal: | PLASTIC/EPE (Expanded Polyethylene) | 98 g |
| | | PLASTIC/Polyester | 76 g |

**RoHS Compliance**

HP Inc. is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is

## Technical specifications

widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

**Material Usage**

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

**Packaging**

HP follows these guidelines to decrease the environmental impact of product packaging:
- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

## *Technical specifications*

| | |
|---|---|
| **End-of-life Management and Recycling** | HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities.  This information (product disassembly instructions) is posted on the HP Inc. web site at:  http://www.hp.com/go/recyclers.  These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment. |
| **HP Inc. Corporate Environmental Information** | For more information about HP's commitment to the environment:

Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
 ISO 14001 certificates:
http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf |

## *Summary of Changes*

| Date of change: | Version History: | Type of change | Description of change: |
|---|---|---|---|
| May 19, 2016 | From v1 to v2 | Added | Environmental info |
| March 17 | From v 2 to v3 | Added | Max resolution in I/O Ports DVI and VGA connectors |
| | | Changed | Display support in At a Glance section, Input/output sections |