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| **HP 280 G2 Microtower Business PC** |
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|  | **Front** |
| 1. | Slim-height Bay - supporting an optical disk drive (optional) |
| 2. | Power Button  |
| 3. | PC Status LED |
| 4. | (2) USB 2.0 Ports |
| 5. | Microphone/Headphone Combo Jack |
| 6. | SD Media Card Reader (optional) |
|  |  |
|  | **Not Shown** |
| Slots | (1) PCI Express x16 Graphics Connector(1) PCI Express x1 Accessory Connector(1) PCI 2.1 (optional, select countries only) |
| Bays | (1) 3.5” internal storage drive bay(1) 3.5” internal storage drive bay (optional)  |
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| **HP 280 G2 Microtower Business PC** |
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|  | **Back** |
| 1.  | RJ-45 Network Connector | 6. | Audio Line Out; Audio Line In |
| 2. | (2) USB 2.0 Ports | 7. | Power Cord Connector |
| 3. | DVI-D Monitor Connector | 8. | Security Lock Slot |
| 4. | VGA port | 9. | (2) USB 2.0 Ports |
| 5. | (2) USB 3.0 Ports |  |  |
|  |  |  |  |
|  | **Not Shown** |
|  | Parallel Port (optional, select countries only)(2) Serial Ports (optional, select countries only)(2) PS/2 ports (Keyboard and Mouse) (optional, select countries only) |
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| **At A Glance** |
| * Windows 10 Pro , Windows 10 Home, Windows 7 Professional, NeoKylin Linux (selected countries only) or FreeDOS 2.0
* Intel® H110 chipset supporting Intel® 6th generation Intel® Celeron, Pentium, Core™ i3, i5 and i7 processors featuring Intel® HD Graphics
* Supports an optional discrete graphics card
* Integrated 10/100/1000 Ethernet Controller
* Supports Wake-on-LAN (WOL)
* Up to 32GB DDR4 Unbuffered Memory (UDIMM)
* Supports both Hard Disk and Solid State Drives
* Independent monitor support via VGA video interfaces
* TPM 1.2 support
* High definition audio
* 8 USB ports (including 2-USB 3.0 ports)
* Energy efficient internal power supply available (select countries only)
* Security cable lock supported (sold separately)
* Protected by HP Services; terms and conditions vary by country; certain restrictions and exclusions apply
 |

**NOTE: See important legal disclosures for all listed specs in their respective features sections.**

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| **CHIPSET** |
|   | Intel® H110 Chipset |

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| **PROCESSOR\*** |
|   | **Intel®** **Celeron**® |
|   | Intel® Celeron® G3900 with Intel® HD Graphics 510 (2.8 GHz, 2 MB cache, 2 cores)Intel® Celeron® G3920 with Intel® HD Graphics 510 (2.9 GHz, 2 MB cache, 2 cores) |
|   | **Intel® Pentium®** |
|   | Intel® Pentium® G4400 with Intel® HD Graphics 510 (3.3 GHz, 3 MB cache, 2 cores)Intel® Pentium® G4500 with Intel® HD Graphics 530 (3.5 GHz, 3 MB cache, 2 cores)Intel® Pentium® G4520 with Intel® HD Graphics 530 (3.6 GHz, 3 MB cache, 2 cores) |
|   | **Intel® Core™ i3** |
|   | Intel® Core™ i3-6100 with Intel® HD Graphics 530 (3.7 GHz, 3 MB cache, 2 cores)Intel® Core™ i3-6300 with Intel® HD Graphics 530 (3.8 GHz, 4 MB cache, 2 cores)Intel® Core™ i3-6320 with Intel® HD Graphics 530 (3.9 GHz, 4 MB cache, 2 cores) |
|  | **Intel® Core™ i5** |
|  | Intel® Core™ i5-6500 with Intel® HD Graphics 530 (3.2 GHz, 6 MB cache, 4 cores)Intel® Core™ i5-6600 with Intel® HD Graphics 530 (3.3 GHz, 6 MB cache, 4 cores) |
|  | **Intel® Core™ i7** |
|  | Intel® Core™ i7-6700 with Intel® HD Graphics 530 (3.4 GHz, 8 MB cache, 4 cores) |
|  | \*Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel’s numbering is not a measurement of higher performance. |
|  **GRAPHICS** |
|  | **Integrated** |
|  | Intel® Integrated HD Graphics Varies by Processor |
|  | **Discrete** (optional for selected countries only) |
|  | AMD Radeon™ R5 320 1GB DH PCIe x8  |
|  | NVIDIA® GeForce® GT 720 2GB PCIe x8 |
| **MEMORY\*** |
|  | Both slots are customer accessible / upgradeable, Supports Dual Channel Memory |
|  | **Form Factor** | **Type** | **Maximum** | **# of Slots** |  |
|  | Microtower | DDR4-2133 (Transfer rates up to 2133 MT/s) | 32 GB capacity | 2 DIMM |  |
|  | 4GB DDR4-2133 DIMM (1x4GB) |  |
|  | 8GB DDR4-2133 DIMM (1x8GB)  |  |
|  | 8GB DDR4-2133 DIMM (2x4GB) (Dual Channel) |  |
|  | \*NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. Memory modules support data transfer rates up to 2133 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate. |  |
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| **STORAGE\*** |
|  | **SATA 3.5" 6Gb/s HDDs\*** |
|   | 500GB 7200 RPM SATA Hard Disk Drive |
|   | 1TB 7200 RPM SATA Hard Disk Drive |
|  | 2TB 7200 RPM SATA Hard Disk Drive |
|  | 2TB 7200 RPM SATA Hard Disk Drive (2nd HDD) (selected countries only) |
|  |  |
|  | **Solid State Drives 2.5” \*** |
|  | 128GB SATA 3D SSD |
|  |  |
|  | **SD Card Reader (optional)\*\*** |
|  | HP SD Media Card Reader (optional) |
|  | \***NOTE:** For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software. |
|  | \*\*Card sold separately |
| **OPTICAL DISC DRIVES\*** |
|  | HP 9.5mm Desktop G2 Slim DVD-ROM Drive |
|  | HP 9.5mm Desktop G2 Slim SuperMulti DVD Writer Drive |
|  | \*Optical drives are optional or add on features. Duplication of copyrighted material is strictly prohibited. Actual speeds may vary. Double Layer media compatibility will widely vary with some home DVD players and DVD-ROM drives. Note that DVD-RAM cannot read or write to 2.6GB Single Sided/5.2 Double Sided-Version 1.0 Media. |
| **AUDIO/MULTIMEDIA** |
|  | HD audio with Realtek ALC221 |
|  | Combo Microphone/Headphone Jack |
|  | Line-out and Line-in rear port (3.5mm) |
|  | Standard internal speaker |

**NETWORKING** |
|  | **Ethernet (RJ-45)** |
|   | Integrated 10/100/1000M Gigabit Ethernet Controller with Realtek RTL8111G-CGSupports Wake-on-LAN (WOL) |
|  | Intel® Ethernet I210-T1 PCIe x1 Gb Network Interface Card (optional, available in select countries only) |
|  | **Wireless\*** |
|  | Broadcom BCM943228Z 802.11n No Bluetooth® NIC  |
|  | \* Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited. |

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| **PORTS** |
|  | **Front I/O Ports** |
|  | Two (2) USB 2.0 ports  |
|  | One (1) Microphone/Headphone Combo Jack |
|  | **Rear I/O Ports** |
|  | Four (4) USB 2.0 ports |
|  | Two (2) USB 3.0 ports |
|  | One (1) RJ45 network connection |
|  | One (1) Audio Line out |
|  | One (1) Audio Line in |
|  | One (1) VGA |
|  | One (1) DVI-D |
|  | Two (2) PS/2 ports (Keyboard and Mouse) (optional, select countries only) |
|  | Two (2) Serial (optional, select countries only) |
|  | One (1) Parallel (optional, select countries only)  |
|  | **Internal I/O Ports** |
|  | One (1) PCIe x 16 (3.0) |
|  | One (1) PCIe x 1 (2.0) |
|  | One (1) PCI 2.1 (optional, select countries only) |

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|   **BAYS** |
|   | One (1) 1st 3.5" Hard Disc Drive Bay |
|  | One (1) 2nd 3.5" Hard Disc Drive Bay (optional) |
|  | One (1) 5.25" Optical Disc Drive Bay |
|  |  |

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| **KEYBOARDS AND POINTING DEVICES\*** |
|  | **Keyboards** |
|  | HP PS/2 Business Slim Keyboard (optional, select countries only) |
|  | HP PS/2 Keyboard (optional, select countries only) |
|  | HP USB Antimicrobial Keyboard (China only) |
|  | HP USB Business Slim Keyboard |
|  | HP USB Keyboard |
|  | Universal USB Wired Keyboard |
|   | **Mice** |
|  | HP PS/2 Mouse (optional, select countries only) |
|  | HP USB Antimicrobial Mouse (China only) |
|  | HP USB Hardened Mouse |
|  | HP USB Mouse |
|   | Universal USB Wired Optical Mouse |
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|  | \*Keyboards and mouse are optional or add-on features. |

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| **SERVICE AND SUPPORT** |
|   | On-site Warranty: One-year (1-1-1) limited warranty delivers, next business day service for parts and labor and includes free support 24 x 7. One-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing an optional HP Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.NOTE 3: Technical support applies only to HP-configured and third-party HP qualified hardware and software. 24 x 7 support may not be available in some countries. |

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| **OPERATING SYSTEMS** |
| **Preinstalled (Windows)** |  |
| Windows 10 Pro 64\*Windows 10 Home 64\*Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)\*\*Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)Windows 7 Professional 32\*\*\*Windows 7 Professional 64\*\*\***Pre-installed (Other)**FreeDOS 2.0NeoKylin Linux 32**Web-supported**Windows 10 Pro 64Windows 10 Home 64Windows 7 Professional 64Windows 7 Professional 32 |
| \*Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.microsoft.com. \*\*This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data. |

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| **SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS** |
| Preinstalled (varies by country)**BIOS**Power On Authentication**Multimedia**Cyberlink Power DVD, BDCyberlink Power2Go (Secure Burn)**HP Value Add Software**HP ePrint Driver1HP Recovery ManagerHP Support AssistantWindows 10 Welcome App**3rd Party**Foxit PhantomPDF Express for HP (optional, US only)**Microsoft Products**Buy OfficeBing Search Skype**Manageability**HP BIOS Config Utility (BCU)2Discover HP Touchpoint Manager3**Client Security Software** Microsoft Security Essentials4Microsoft Defender TPM 1.2 |
| 1. Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see [www.hp.com/go/businessmobileprinting](http://www.hp.com/go/businessmobileprinting).
2. Not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
3. Subscription required.
4. Opt in and internet connection required for updates.
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| **Unit Environment and Operating Conditions** |
| General Unit Operating Guidelines* Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
* Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
* Never restrict airflow into the computer by blocking any vents or air intakes.
* Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
* Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
* If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.
 |
|    Temperature Range | Operating: 50° to 95° F (10° to 35° C)\*Non-operating: -22° to 140° F(-30° to 60° C) |
|    Relative Humidity | Operating: 10% to 90% (non-condensing at ambient)Non-operating: 5% to 95% (non-condensing at ambient) |
|    Maximum Altitude    (unpressurized) | Operating: 10,000 ft (3048 m)Non-operating: 30,000 ft (9144 m) |
| \* Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed. |
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| **Power Supply\*** |
| * 180 W standard efficiency
* 180 W standard efficiency, active PFC
* 180 W, up to 85% efficient, active PFC
* 300W standard efficiency, active PFC
 |
| \*None: All power supplies are not available in every region. |
| **Dimensions AND WEIGHT (configured with 1 HDD and 1 ODD)** |
|    Chassis   (H x W x D) | 14.13 x 6.69 x 13.98 in35.88 x 17 x 35.5 cm |
|    System Weight | 13.47 lbs / 6.11 kg |
|  |
| **packaging dimensions and weight** |  |
| Dimensions  | 18.82 x 11.77 x 20.35 in47.8 x 29.9 x 51.7 cm |
|  Weight  | 18.98 lbs / 8.61 kg |
| **SECURITY FEATURES** |  |
|  | Trusted Platform Module (TPM) 1.2Security cable slot |  |

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| **CERTIFICATIONS** |
|  | EPEAT® Silver\*CECP SEPA WEEE (Waste, Electric and electronic equipment)ENERGY STAR® 6.0CEL FCCUL |
|  | \*EPEAT® registered where applicable/supported. EPEAT registration varies by country. See www.epeat.net for registration status by country. |
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| **GRAPHICS** |
| **Intel® HD Graphics (integrated)** |
| **DisplayPort** | Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays (including the integrated panel) |
| **Maximum Graphics Memory** | Microsoft Windows 7 | Windows 8.1 | Windows 10 |
| Up to 1.7GB | Up to 1.8GB | >4 GB |
| Note: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer’s configuration. |
| **Maximum Color Depth** | 32 bits/pixel |
| **Graphics/Video API Support** | 6th Generation Core™ processors: * Next Generation Intel® Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience
	+ Encode/transcode HD content
	+ Playback of high definition content including Blu-ray Disc
	+ Superior image quality with sharper, more colorful images
* DirectX Video Acceleration (DXVA) support for accelerating video processing
	+ Full AVC/VC1/MPEG2/HEVC HW Decode
* Advanced Scheduler 2.0, 1.0
* Windows 7, Windows 8.1, Windows 10, Linux OS Support
* DirectX 12.1
* OpenGL 4.4
* Open CL 1.2 (Intel® HD Graphics 510)
* Open CL 1.2/2.0 (Intel® HD Graphics 530)
 |
| **Supported Display Resolutions and Refresh Rates****Note:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP |
| **Resolution** | **Refresh Rates** |
| 800x600 | 60 Hz |
| 1024x768 | 60 Hz |
| 1152x864 | 60 Hz |
| 1280x600 | 60 Hz |
| 1280x720 | 60 Hz |
| 1280x800 | 60 Hz |
| 1280x960 | 60 Hz |
| 1280x1024 | 60 Hz |
| 1360x768 | 60 Hz |
| 1366x768 | 60 Hz |
| 1400x1050 | 60 Hz |
| 1440x900 | 60 Hz |
| 1600x900 | 60 Hz |
| 1600x1200\* | 60 Hz |
| 1680x1050 | 60 Hz |
| 1920x1080 | 60 Hz |
| 1920x1200\* | 60 Hz |
| 1920x1440\* | 60 Hz |
| 2560x1440\* | 60 Hz |
| 2560x1600\* | 60 Hz |
| 3840x2160\* | 60 Hz |
| \* Only supported on displays connected to the external DisplayPort connector. |

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| **AMD® Radeon™ R5 320 1GB DH PCIe x8 Graphics Card** (China only) |
| **Engine Clock**  | 775MHz  |
| **Memory Clock** | 800 MHz |
| **Memory Size(width)**  | 1GB (64-bit)  |
| **Memory Type**  | 128 M x 32 GDDR5 @2 |
| **Max. Resolution(Analog VGA)**  | 2048x1536x32bpp@75Hz  |
| **Max. Resolution(HDMI)**  | 1920x1080 @60Hz(HDMI1.4)  |
| **Max. Resolution(DP)**  | 3840×2160×30bpp@30Hz(DP1.2)  |
| **Multi Display Support**  | DP+HDMI+VGA  |
| **HDCP Compliance**  | Yes  |
| **Rear I/O connectors(bracket)**  | DP+HDMI+VGA (Fly cable)  |
| **Cooling(active/passive)**  | Active fan-sink(Active cooling with dynamic speed)  |
| **Total power consumption(W)**  | <35Wmax  |
| **PCB form-factor with bracket**  | PCIex16LP(half height)PCB with FH bracket |

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| **NVIDIA® GeForce® GT 720 2GB PCIe x8 Graphics Card** (China only) |
| **Engine Clock**  | 797MHz  |
| **Memory Clock** | 900 MHz  |
| **Memory Size(width)**  | 2GB (64-bit)  |
| **Memory Type**  | 256Mx16 DDR3(Micron) @4pcs  |
| **Max. Resolution(Analog VGA)**  | 2048x1536x32bpp @75Hz  |
| **Max. Resolution(HDMI)**  | 1920x1080 @60Hz (HDMI1.4)  |
| **Max. Resolution(DP)**  | 3840×2160×30bpp @30Hz (DP1.2)  |
| **Multi Display Support**  | DP+HDMI+VGA  |
| **HDCP Compliance**  | Yes |
| **Rear I/O connectors(bracket)**  | DP+HDMI+VGA (Fly cable)  |
| **Cooling(active/passive)**  | Active fan-sink(Active cooling with dynamic speed)  |
| **Total power consumption(W)**  | <25W max  |
| **PCB form-factor with bracket**  | PCIex8LP(half height) PCB with FH bracket  |

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| **2TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive** |
| **Unformatted Capacity** | 2 TB |
| **Rotational Speed** | 7,200 rpm |
| **Interface** | SATA 6 Gb/s |
| **Cache, Multi-segmented (MB)** | 64 MB |
| **Seek Time** (average) | Read | <8.5 ms |
| Write | <9.5 ms |
| **Height**  | 1.028 in/26.11 mm |
| **Width**  | 4.0 in/101.6 mm |
| **Depth** | 5.787 in/146.99 mm |
| **Weight** | 1.38 lb/626 g |
| **Operating Temperature** | 41° to 131° F (5° to 55° C) |

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| **1TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive** |
| **Capacity** | 1,000,204,886,016 bytes  |
| **Rotational Speed** | 7,200 rpm |
| **Interface** | Serial ATA 3.0 (6.0 Gb/s) |
| **Buffer Size** | 32 MB |
| **Logical Blocks** | 1,953,525,168 |
| **Seek Time** (typical reads, includes controller overhead, including settling) | Single Track: | 2.0 ms |
| Average: | 11 ms |
| Full-Stroke: | 21 ms |
| **Height** (nominal) | 1 in/2.54 cm |
| **Width** (nominal) | Media diameter: 3.5 in/8.89 cm |
| Physical size: 4 in/10.2 cm |
| **Operating Temperature** | 41° to 131° F (5° to 55° C) |

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| **500GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive** |
| **Capacity** | 500,107,862,016 bytes |
| **Rotational Speed** | 7,200 rpm |
| **Interface** | Serial ATA 3.0 (6.0 Gb/s) |
| **Buffer Size** | 16 MB |
| **Logical Blocks** | 976,773,168 |
| **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track:** | 2.0 ms |
| **Average:** | 11 ms |
| **Full-Stroke:** | 21 ms |
| **Height** (nominal) | 1 in/2.54 cm |
| **Width** (nominal) | Media diameter: 3.5 in/8.89 cm |
| Physical size: 4 in/10.2 cm |
| **Operating Temperature** | 41° to 131° F (5° to 55° C) |

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| **128GB SATA 2.5” 3D Non-SED Solid State Drive** |
| **Unformatted Capacity** | 128 GB250,069,680 (User Addressable Sectors) |
| **Architecture** | Solid State Drive with 3D NAND Flash and SATA interface.Fully complies with ATA/ATAPI-7 Standard (Partially Complies with ATA/ATAPI-8)Power Saving Modes: DIPM (Partial / Slumber mode)Support NCQ : Up to 32 depthSynchronous Signal Recovery |
| **Interface** | Serial ATA (6.0 Gb/s) |
| **Form Factor** | 2.5 inch |
| **Height** | 6.80 mm ± 0.20 |
| **Width** | 69.85 mm ± 0.25 |
| **Length** | 100.20 mm ± 0.25 |
| **Weight** | Up to 54 g |
| **Bandwidth Performance** | Sustained Sequential Read: | Up to 530 MB/s |
| Sustained Sequential Write: | Up to 140 MB/s |
| **Power** | Power consumption: | Active: Typical 250mW; Idle: Typical 50mW  |
| **Mean Time Between Failure (MTBF)** |  1,500,000 hours |
| **Environmental**(all conditions, non-condensing) | Operating Temperature: | 32° to 158° F (0° to 70° C) |
| Relative Humidity: | 5% to 95% |
| Shock: | 1,500 G/0.5 ms |

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| **HP 9.5mm Desktop G2 Slim SuperMulti DVD Writer Drive** |
| **Height** | 9.5 mm height |
| **Orientation** | Either horizontal or vertical |
| **Interface type** | SATA/ATAPI |
| **Disc recording capacity** | Up to 8.5 GB DL or 4.7 GB standard |
| **Dimensions** (W x H x D) | 5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel |
| **Weight** (max) | 0.31 lb (140 g) |
| **Write speeds** | DVD-RAM | Up to 5X |
| DVD-R DL | Up to 6X |
| DVD+R | Up to 8X |
| DVD+RW | Up to 8X |
| DVD+R DL | Up to 6X |
| DVD-R | Up to 8X |
| DVD-RW | Up to 6X |
| CD-R | Up to 24X |
| CD-RW | Up to 10X |
| **Read speeds** | DVD-RAM | Up to 5X |
| DVD-RW, DVD+RW | Up to 8X |
| DVD-R DL, DVD+R DL | Up to 8X |
| DVD+R, DVD-R | Up to 8X |
| DVD-ROM DL, DVD-ROM | Up to 8X |
| CD-ROM, CD-R | Up to 24X |
| CD-RW | Up to 24X |
| **Access time** (typical reads, including settling) | Random | DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) |
| Full Stroke | DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) |
| Stop Time | 6 seconds (typical) |
| **Power** | Source | Slimline SATA DC power receptacle |
| DC Power Requirement | 5 VDC ± 5%-100 mV ripple p-p |
|  |
| DC Current | 5 VDC (< 1000 mA typical, 1600 mA maximum) |
|  |
| **Environmental conditions** (operating - non-condensing) | Temperature | 41° to 122° F (5° to 50° C) |
| Relative Humidity | 10% to 80% |
| Maximum Wet Bulb Temperature | 84° F (29° C) |

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| **HP 9.5mm Desktop G2 Slim DVD-ROM Drive** |
| **Height** | 9.5mm |
| **Orientation** | Either horizontal or vertical |
| **Interface type** | SATA/ATAPI |
| **Dimensions** (W x H x D) | 5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel |
| **Weight** (max) | Up to 0.31 lb (140g) without bezel |
| **Read speeds** | DVD+R/-R/+RW/-RW/+R DL /-R DL | Up to 8X |
| DVD-ROM | Up to 8X |
| CD-ROM, CD-R | Up to 24X |
| CD-RW | Up to 24X |
| **Access time** (typical reads, including settling) | Random  | DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) |
| Full Stroke | DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) |
| **Power** | Source | Slimline SATA DC power receptacle |
| DC Power Requirement | 5 VDC ± 5%-100 mV ripple p-p |
| DC Current | 5 VDC - <1000 mA typical, < 1600 mA maximum |
| **Environmental** (all conditions non-condensing) | Temperature | 41° to 122° F (5° to 50° C) |
| Relative Humidity | 10% to 80% |
| Maximum Wet Bulb Temperature (operating) | 84° F (29° C) |

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| **High Definition Audio** |
| **Type** | Integrated |
| **HD Stereo Codec** | Realtek 2-channel ALC221 codec |
| **Audio I/O Ports** | Front microphone-In (150-K ohm Input Impedance) |
| Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) |
| Rear Line-Out\* (190 ohms Output Impedance, expects at least a 10-K ohm load) |
| Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load)Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. |
| All ports are 3.5mm  |
| **Internal Speaker Amplifier** | 1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In. |
| **Multi-streaming Capable** | Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. |
| **Sampling** | 8 kHz - 192 kHz |
| **Wavetable Syntheses** | Yes – Uses OS soft wavetable |
| **Analog Audio** | Yes |
| **# of Channels on Line-Out** | Stereo (Left & Right channels) |
| **Internal Speaker** | Yes |
| **External Speaker Jack** | Yes |

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| **Realtek RTL8111G-CG GbE** |
| **10/100/1000 NIC** | **Ethernet Features** | 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)Auto-Negotiation (Automatic Speed Selection)Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/sIEEE 802.1p QoS (Quality of Service) SupportIEEE 802.1q VLAN supportIEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)IEEE 802.3az EEE (Energy Efficient Ethernet)Jumbo Frame 9KAuto MDI/MDIX Crossover cable detection |
| **Power** **Management** | ACPI compliant – multiple power modesSituation-sensitive features reduce power consumptionAdvanced link down power saving for reducing link down power consumption |
| **Performance** **Features** | TCP/IP/UDP Checksum Offload (configurable)Protocol Offload (ARP & NS)Large send offload and Giant send offloadReceiving Side Scaling |
| **Manageability** | Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)PXE 2.1 Remote BootStatistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))Comprehensive diagnostic and configuration software suiteVirtual Cable Doctor for Ethernet cable status |
| **Interface** | PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ |
| **NIC Device Driver Name** | PCIe GBE Ethernet Family Controller |

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| **Broadcom BCM943228Z 802.11n 2x2 DualBand No Bluetooth® NIC PCIe x1 Card**  |
|  | **Wireless LAN Standards** | IEEE 802.11aIEEE 802.11bIEEE 802.11gIEEE 802.11n |
| **Interoperability** | Wi-Fi certified |
| **Frequency Band** | 802.11b/g/n* 2.402 – 2.482 GHz

Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels. |
| 802.11a/n* 4.9 - 4.95 GHz (Japan)
* 5.15 - 5.25 GHz
* 5.25 - 5.35 GHz
* 5.47 - 5.725 GHz

5.825 - 5.850 GHz  Note: Indonesia no support this band) |
| **Antenna Structure** | 2 transmit; 2 receive (2x2) |
| **Data Rates** | 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps802.11b: 1, 2, 5.5, 11 Mbps802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) |
| **Modulation** | Direct Sequence Spread SpectrumCCK, BPSK, QPSK, 16-QAM, 64-QAM |
| **Security1** | * IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only
* AES-CCMP: 128 bit in hardware
* 802.1x authentication
* WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
* WPA2 certification
* IEEE 802.11i
* Cisco Certified Extensions, all versions through CCX4 and CCX Lite
* WAPI
 |
| **Sub-channels** | Multinational support with frequency bands and channels compliant to local regulations. |
| **Network Architecture Models** | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) |
| **Roaming** | IEEE 802.11 compliant roaming between band Access Points |
| **Output Power**2 | * 802.11b : +16dBm minimum
* 802.11g : +14dBm minimum
* 802.11a : +14dBm minimum
* 802.11n HT20(2.4GHz) : +13dBm minimum
* 802.11n HT40(2.4GHz) : +13dBm minimum
* 802.11n HT20(5GHz) : +12dBm minimum
* 802.11n HT40(5GHz) : +12dBm minimum
 |
| **Power Consumption** | Transmit: 2.0 W (max)Receive: 1.6 W (max)Idle mode (PSP): 180 mW (WLAN Associated)Idle mode: 60 mW (WLAN unassociated)Radio disabled: 30 mW |
| **Power Management** | ACPI and PCI Express compliant power management 802.11 compliant power saving mode |
|  | **Receiver Sensitivity**4 | 802.11b, 1Mbps : -94dBm maximum802.11b, 11Mbps : -86dBm maximum802.11g, 6Mbps : -88dBm maximum802.11g, 54Mbps : -74dBm maximum802.11a, 6Mbps : -86dBm maximum802.11a, 54Mbps : -72dBm maximum802.11n, MCS07 : -69dBm maximum802.11n, MCS15 : -66dBm maximum |
| **Antenna type** | High efficiency antenna with spatial diversity, mounted in the display enclosureTwo embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO and Bluetooth® communications |
| **Form Factor** | PCI-Express M.2 MiniCard |
| **Dimensions** | Type 2230 : 2.3 x 22.0 x 30.0 mmOr Type 1630 : 2.3 x 16.0 x 30.0 mm |
| **Weight** | Type 2230 : 2.8gOrType 1630 : 2g |
| **Operating Voltage** | 3.3v +/- 9% |
| **Temperature** | Operating Non-operating | 14° to 158° F (-10° to 70° C)-40° to 176° F (-40° to 80° C) |
| **Humidity** | Operating Non-operating | 10% to 90% (non-condensing)5% to 95% (non-condensing) |
| **Altitude** | Operating Non-operating | 0 to 10,000 ft (3,048 m)0 to 50,000 ft (15,240 m) |
| **LED Activity** | LED Amber - Radio OFF; LED White - Radio ON |
| 1. Check latest software/driver release for updates on supported security features.2. Maximum output power may vary by country according to local regulations.3. In Power Save Polling mode and on battery power.4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista. |

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| **Intel® Ethernet I210-T1 Gigabit Network Adapter** (selected countries only) |
| **Connector** | RJ-45 |
| **System Interface** | PCI Express x1 |
| **Controller** | Intel® I210 Gigabit Ethernet Controller |
| **Memory** | Integrated Dual 48K configurable transmit receive FIFO Buffers |
| **Data rates supported** | 10/100/1000 Mbps |
| **IEEE Compliance** | 802.1P802.1Q802.2802.3802.3AB802.3u802.3x flow control |
| **Bus architecture** | PCI-E 2.1 |
| **Data path width** | X1, 250 MB/s, Bi-directional interface |
| **Data transfer mode** | Bus-master DMA |
| **Hardware certifications** | FCC, B, CE, TUV-c, TUVus Mark Canada and United States, TUV-GS Mark for European Union |
| **Power requirement** | Aux 3.3 V, 3.0 Watts in 1000 base-T and 1.0 Watts in 100 Base-T |
| **Boot ROM support** | Yes10BASE-T (half-duplex) 10 Mbps10BASE-T (full-duplex) 20 Mbps |
| **Network transfer rate** | 10BASE-T (half-duplex) 10 Mbps |
| 10BASE-T (full-duplex) 20 Mbps |
| 100BASE-TX (half-duplex) 100 Mbps |
| 100BASE-TX (full-duplex) 200 Mbps |
| 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI bus) |
| **Environmental** | Operating Temperature: | 32° to 132° F (0° to 55° C ) |
| Operating Humidity: | 85% at 131° F (55° C) |
| **Management** | WOL, PXE, DMI, WFM 2.0 |

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| ***Type*** | ***Description*** | ***Part #*** |
| ***Memory***  | HP 4GB DDR4-2133 DIMM | P1N51AA |
|  | HP 8GB DDR4-2133 DIMM | P1N52AA |
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| ***Storage*** | HP 500GB SATA 6.0Gb/s Hard Drive | QK554AA |
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| ***Graphics*** | NVIDIA GeForce GT 720 2GB PCIe x8 Card (select countries only) | T4E57AA |
|  | AMD Radeon R5 320 1GB GDDR5 PCIe x8 Card (select countries only) | T9F48AA |
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| ***Security*** | HP UltraSlim Cable Lock Kit | H4D73AA |
|  | HP Business PC Security Lock Kit  | PV606AA |
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| ***Adapters*** | HP Serial Port Adapter | PA716A |
|  | HP USB to Serial Adapter | J7B60AA |
|  | HP Parallel Port Adapter | KD061AA |
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| ***Networking*** | Intel Ethernet I210-T1 GbE NIC Card (select countries only) | E0X95AA |
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| ***Multimedia*** | HP Business Headset | QK550AA |
|  | HP USB Business Speakers | D9J19AA |
|  | HP USB HD 720P v2 Business Webcam | D8Z08AA  |
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| ***Input*** | HP USB Keyboard | QY776AA |
|  | HP Conferencing Keyboard | K8P74AA |
|  | HP USB Conferencing Keyboard | N8N57AA |
|  | HP USB Business Slim Keyboard | N3R87AA |
|  | HP USB Business Slim Keyboard and Mouse and Mousepad | T4E63AA |
|  | HP PS/2 Business Slim Keyboard and Mouse and Mousepad | T4E66AA |
|  | HP USB Antimicrobial Keyboard and Mouse (China Only) | K7X25AA |
|  | HP USB Grey Mouse | K7W54AA |
|  | HP PS/2 Mouse | QY775AA |
|  | HP USB Hardened Mouse | P1N77AA |
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| **Date of change:** | **Version History:** |  | **Description of change:** |
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