Overview
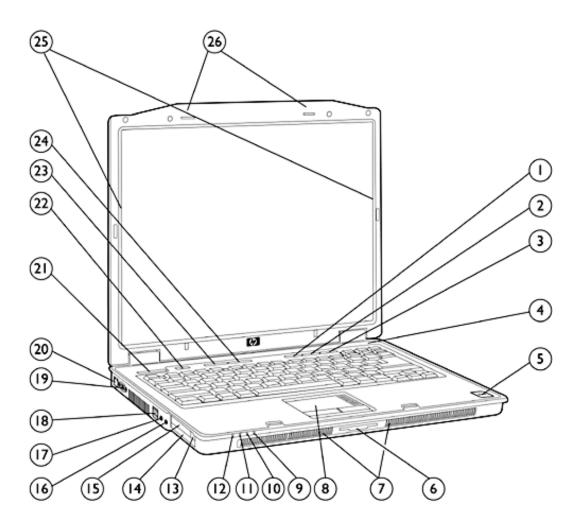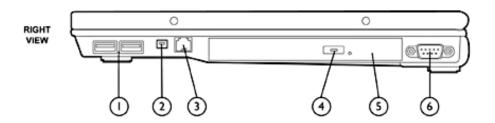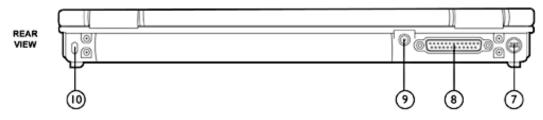

1. Volume Mute Button with LED
2. Volume Down Button
3. Volume Up Button
4. Integrated Microphone
5. HP Biometric Fingerprint Sensor
6. 7-in-1 Media Reader
7. Stereo Speakers
8. Touchpad with Scroll Zone
9. Hard Drive Activity LED
10. Battery Charging LED
11. Power/Standby LED
12. Wireless On/Off LED
13. PC Card Eject Button

14. ExpressCard Slot
15. PC Card Slot (or optional Smart Card Reader)
16. Microphone Jack
17. Headphone Jack
18. 2 USB 2.0 Ports
19. VGA/External Monitor Connector
20. RJ-45 Port (NIC)
21. Power Button with LED
22. HP Info Center Button
23. Wireless On/Off Button with LED
24. Presentation Mode Button
25. Dual-band Wireless LAN Antennas
26. WWAN Antennas (with WWAN option)

Overview

1. 2 USB 2.0 Ports
2. IEEE 1394a Port
3. RJ-11 Port (Modem)
4. Optical Drive Button
5. Optical Drive

6. Serial Port
7. S-Video TV Out
8. Parallel Port
9. DC Power Connector
10. Kensington Lock Slot

At A Glance

- Genuine Windows XP Professional,
  Genuine Windows XP Home Edition, or
  FreeDOS
- Intel® Core™ Duo Processors T2300 to T2600*, Intel Core Solo Processor T1300*
- Sleek industrial design starting at 5.7 lb/2.59 kg and 1.2-inch/30.3 mm thin at front
- Mobile Intel 945GM Express Chipset
- Up to 4GB** of 533- or 667-MHz DDR2 SDRAM, dual channel memory support
- Up to 100-GB 5400 rpm, user-removable hard drive
- Intel Graphics Media Accelerator 950
- Optional integrated HP ev2200 1xEV-DO Broadband Wireless module (nc6320, in US only)
- Optional integrated 802.11 a/b/g or 802.11 b/g wireless LAN module and Bluetooth®
- 7-in-1 Media Reader
- TPM 1.2 (North America only)
- Broadcom NetLink Gigabit Ethernet PCI Controller
- Choice of Touchpad with scroll zone or Pointstick
- Biometric Fingerprint Sensor (optional in Asia Pacific, Japan, and some other countries)
- Protected by one-year or three-year (depending on country and/or model) standard parts and labor warranty - certain restrictions and exclusions apply

* Intel's numbering system is not a measurement of higher performance.
** Above 3-GB, all memory may not be available due to system resource requirements.

QuickSpecs

Standard Features

Processors	Intel Core Duo Processor T2600* (2.16-GHz, 667-MHz FSB, 2-MB L2 cache)	
	Intel Core Duo Processor T2500* (2.00-GHz, 667-MHz FSB, 2-MB L2 cache)	
	Intel Core Duo Processor T2400* (1.83-GHz, 667-MHz FSB, 2-MB L2 cache)	
	Intel Core Duo Processor T2300* (1.66-GHz, 667-MHz FSB, 2-MB L2 cache)	
	Intel Core Duo Processor T2300E* (1.66-GHz, 667-MHz FSB, 2-MB L2 cache)	
	Intel Core Duo Processor T2250* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache) (select countries only)	
	Intel Core Duo Processor T2050* (1.6-GHz, 533-MHz FSB, 2-MB L2 cache) (select countries only)	
	Intel Core Solo Processor T1350* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache) (select countries only)	
	Intel Core Solo Processor T1300* (1.66-GHz, 667-MHz FSB, 2-MB L2 cache)	
	Intel Celeron M Processor 430* (1.73-GHz, 533-MHz FSB, 1-MB L2 cache)	
	Intel Celeron M Processor 410* (1.46-GHz, 533-MHz FSB, 1-MB L2 cache)	

*   Intel's numbering is not a measurement of higher performance.

NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds n battery optimization mode.

Operating System	**Preinstalled**	Genuine Windows XP Professional SP2
		Genuine Windows XP Home Edition SP2
		FreeDOS
	Supported	Genuine Windows 2000 (drivers downloadable from http://www.hp.com)
	Certified	Novell Linux Desktop 9

Chipset	Mobile Intel 945GM Express Chipset with 667-MHz front side bus

Graphics	Intel Graphics Media Accelerator 950 with up to 128-MB shared system memory

Display	**Internal**	14.1-inch or 15.0-inch XGA (1024 x 768 resolution and 16 M colors)
		15.0-inch XGA BrightView** (1024 x 768 resolution and 16 M colors)
		15.0-inch SXGA+ wide viewing angle (1400 x 1050 resolution and 16 M colors)
	External	Up to 32-bit per pixel color depth
		VGA port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz
		NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

** On nx6320 only.

Standard Features

Memory	Standard	256-MB, 512-MB, 1024-MB or 2048-MB 533-MHz or 667-MHz DDR2 SDRAM; two SODIMM slots supporting dual channel memory
	Maximum	Upgradeable to 4096-MB maximum (2048-MB SODIMM in slots 1 and 2)
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Above 3-GB, all memory may not be available due to system resource requirements.

Communications

Integrated Broadcom NetLink Gigabit Ethernet PCI Controller (10/100/1000 NIC)*

56K V.92 modem** with digital line guard

* The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.

Wireless Devices

Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Integrated Bluetooth is also an option (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

	HP ev2200 1xEV-DO Broadband Wireless Module***	Integrated dual band 800-MHz (cellular) and 1900-MHz (PCS) WWAN module connects to the Verizon Wireless BroadbandAccess and NationalAccess networks (US only) Supports CDMA 1xEV-DO, 1xRTT connections **NOTE:** Separately purchased Verizon Wireless service is required. For details, go to http://www.hp.com/go/broadbandwireless. Two 800/1900-MHz antennas integrated in the top of the display panel for optimal reception
	All integrated wireless LAN options	Wi-Fi certified Cisco Compatible Extensions support (Version 3.0) Wired Equivalent Privacy (WEP) support up to 128-bit keys Wi-Fi Protected Access (WPA) and WPA2 support 802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP Advanced Encryption Standard (AES) support WiFi certified for WPA2, WMM Dual antennas integrated in the display enclosure
	Intel PRO/Wireless 3945ABG Network Connection	Intel Centrino mobile technology Integrated support for 802.11a, b and g Up to 54-mbps data rate
	Intel PRO/Wireless 3945BG Network Connection	Intel Centrino mobile technology Integrated support for 802.11 b and g Up to 54-mbps data rate
	Broadcom 4311AG WiFi Adapter	Integrated support for 802.11a, b and g Up to 54-mbps data rate
	Broadcom 4311BG WiFi Adapter	Integrated support for 802.11 b and g Up to 54-mbps data rate

Standard Features

	HP Integrated Module with Bluetooth 2.0 Wireless Technology	Bluetooth Specification v2.0 compliant Works with a wide range of Bluetooth devices

*** Broadband Wireless Module (WWAN) requires Microsoft Windows XP Professional and is currently available in the US only on the nc6320 only and requires one of the Intel PRO/Wireless (WLAN) modules.

Keyboard	The 101/102-key compatible keyboard features an industry standard, full-pitch key layout with desktop keyboard features, such as the isolated inverted-T cursor control keys, editing keys, both left and right control and alt keys, and 12 function keys. US and International key layouts are available. Other features include an integrated numeric keypad, hotkeys for instant access to power conservation, brightness, and other features, 19-mm x 19-mm key pitch (center-to-center spacing), 2.5-mm stroke, comfort-dished keycaps, and bright key legends for improved visibility in low light conditions.

One-Touch Productivity Buttons	Provide one-touch access to the following features: HP Info Center, Wireless On/Off, Presentation Mode, Volume Up, Volume Down, and Volume Mute

---

Pointing Device	Touchpad with scroll zone, two soft-touch buttons or Pointstick, two soft-touch buttons

---

Expansion Card Slots	One Type I/II PC Card slot	Supports 32-bit CardBus and 16-bit PC Cards
	or	
	Optional Integrated Smart Card Reader	Compatible with ISO 7816 compliant Smart Cards PC/SC interface support
	Express Card slot	Express Card/34 or ExpressCard/54

Media Slots	7-in-1 Media Reader	Supports SD (Secure Digital), MMC (MultiMedia Card), Memory Stick, Memory Stick Pro, Memory Stick Duo*, Smart Media, xD-Picture card

*NOTE: Memory Stick Duo Adapters are required and sold separately. Inserting a Memory Stick Duo Card directly into your notebook could damage the memory card and/or notebook.

Storage	Hard Drives	40-, 60-, 80-, 100-GB 5400 rpm SMART SATA

NOTE: These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 8GB is reserved for the system recovery software.

	HP Mobile Data Protection System	Hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive and protecting it during normal use from shock and vibration.
	Fixed Optical Drives	CD-ROM DVD-ROM DVD/CD-RW Combo DVD+/-RW SuperMulti with Double Layer LightScribe DVD+/-RW with Double Layer

---

Standard Features

Interfaces	PC Card Slot	One Type I/II or optional Smart Card Reader
	Express Card Slot	Express Card/34 or ExpressCard/54
	External Monitor	One – VGA
	IEEE 1394a Port	One
	External Microphone	One
	Headphone/Line out	One
	Power Connector	One
	RJ-11 (Modem)	One
	RJ-45 (NIC)	One
	Serial Port	One
	S-Video TV Out	One (Support for NTSC/PAL)
	Parallel Port	One
	USB 2.0	Four
	Docking Connector	One
	Accessory Battery Connector	One
	LED Status Indicators	Twelve

Audio	ADI High Definition CODEC
	Integrated 16-bit Sound Blaster Pro compatible audio
	Integrated stereo speakers
	Integrated microphone
	External volume up, volume down, and mute buttons
	Stereo headphone/line out
	Stereo microphone in

Software	Preloaded Software Microsoft Windows XP	Adobe Acrobat Reader*
		HP Backup and Recovery Manager
		HP Help and Support Center*
		HP Mobile Print Driver*
		HP ProtectTools Security Manager*:
		BIOS Configuration for HP ProtectTools
		Embedded Security for HP ProtectTools
		Credential Manager for HP ProtectTools
		HP Quick Launch Buttons
		HP Wireless Assistant
		Sonic Digital Media Plus*:
		RecordNow! (for optional DVD+/-RW and DVD/CDRW drives)
		MyDVD (DVD Authoring for optional DVD+/-RW drives)
		Synaptics Touchpad Driver
		Symantec Norton Internet Security* with complimentary 60-day live update
		Intervideo WinDVD* – DVD Player (for optional DVD+/-RW, DVD/CDRW and DVD drives)
	Additional software available from the Web	HP Client Manager Software (nc6320)
		HP OpenView Radia Management Solutions (nc6320)
		SmartCard Security for HP ProtectTools
		Device Access Manager for HP ProtectTools

Standard Features

HP Backup and Recovery Manager	Each unit is shipped with HP Backup and Recovery Manager. HP Backup and Recovery Manager can provide data and system file protection for HP business PCs to enable fast recovery if the system becomes corrupted or if important information is accidentally deleted. HP Backup and Recovery Manager can perform scheduled or manual backups of the entire drive or individual files and folders. Up to 8GB of the hard drive is reserved for the system recovery software. HP Backup and Recovery Manager can also create software recovery CDs or DVDs (requires optional hardware).
HP OpenView Radia Management Solutions (nc6320)	HP OpenView Radia Management Solutions automate the management of software such as operating systems, software, software updates, content, and configuration settings to ensure that each computer is maintained in the correct configuration.
HP Client Management Interface (nc6320)	HP Client Management Interface is based on industry standards that include Microsoft Windows Management Interface (MS WMI), Web Based Enterprise Management (WBEM), System Management BIOS (SMBIOS), and Advanced Configuration and Power Interface (ACPI). HP CMI is a foundation technology utilized in HP Client Management Solutions.
SMBIOS Version 2.4	System Management BIOS, previously known as DMI BIOS, is used to store system management information.
HP ProtectTools Security Manager	HP ProtectTools Security Manager is the security platform for business notebooks and desktops. The HP ProtectTools Security Manager is an extensible client security console that delivers enhanced security capabilities through add-on software modules. Modules currently available are: - Smart Card Security for HP ProtectTools - BIOS Configuration for HP ProtectTools - Embedded Security for HP ProtectTools - Credential Manager for HP ProtectTools - Device Access Manager for HP ProtectTools

Standard Features

Security	Standard Features	HP ProtectTools Security Manager
		Configuration Control Hardware
		Memory Change Alert
		Ownership Tag
		Setup Password
		Power-On Password
		DriveLock
		TPM Enhanced DriveLock
		HP Disk Sanitizer
		Enabled for PC Smart Card options
		TPM 1.2 Embedded Security Chip (North America only)
		Kensington Lock Slot
		Support for Computrace / LoJack for Laptops (must be purchased separately)

	Optional Features	**Smart Card Reader** (replaces Type I/II PC Card slot)	Compatible with ISO 7816 compliant Smart Cards
			PC/SC interface support
		Biometric Fingerprint Sensor	Biometric sensor for fingerprint authentication (standard in all regions other than Asia Pacific/Japan)

For more information on HP security solutions refer to http://www.hp.com/go/security.

Power Supply	External 65-watt Smart AC adapter, 6-foot (1.8-meter) power cord included.
	Total length including External AC adapter is 12 feet (3.66 meter).
	HP Fast Charge Technology*

*Fast Charge Technology recharges your battery up to 90% within 90 minutes when the system is off. Fast Charge Technology does not apply to 12-cell Ultra-Capacity batteries.

Battery	Primary Battery	52Wh 6-cell high capacity Lithium-Ion
	Optional HP 8-Cell Extended Life Battery	52Wh 8-cell high capacity Lithium-Ion
	Optional HP 12-Cell Ultra-Capacity Battery	95Wh 12-cell high capacity Lithium-Ion

---

Battery Life	Primary Battery	Up to 4 hours and 45 minutes
	Primary Battery and optional HP 8-Cell Extended Life Battery	Up to 9 hours and 45 minutes
	Primary Battery and optional HP 12-Cell Ultra-Capacity Battery	Up to 14 hours and 45 minutes

NOTE: Battery life will vary depending on the product configuration, product model, applications loaded on the product, power management settings of the product, and the product features used by the customer. As with all batteries, the maximum capacity of this battery will decrease with time and usage.

System Standby Time	Up to 1 week

Standard Features

Power Conservation	Supports enhanced Intel SpeedStep technology with Intel Core Duo processors (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)
	Intel Display Power Saving technology
	Hibernation
	Standby
	ACPI compliance

Docking	HP Docking Station HP Advanced Docking Station HP Adjustable Notebook Stand
	HP's shared docking solutions provide simple and convenient port replication and cable management. Features include Gigabit NIC pass through, modem pass through, legacy parallel and serial ports, S-video TV out, USB 2.0 ports, integrated security mechanism*, integrated MultiBay II and ExpressCard** slots. These docking solutions are compatible across multiple Business Notebook platforms enabling a lower total cost of ownership.
	* HP/Kensington Cable Lock required (purchased separately) ** HP Advanced Docking Station only

Service and Support	HP Services includes a one-year or three-year (depending on country and/or model) standard parts and labor warranty, pick-up or carry-in, and toll-free 7 x 24 hardware technical phone support. On-site service and warranty upgrades are also available.
	NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details. http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp.

Options

Memory	256-MB 533-MHz DDR2 SDRAM	PE830A
	512-MB 533-MHz DDR2 SDRAM	PE831A
	1024-MB 533-MHz DDR2 SDRAM	PE832A
	512-MB 667-MHz DDR2 SDRAM	EM993AA
	1024-MB 667-MHz DDR2 SDRAM	EM994AA
	2048-MB 667-MHz DDR2 SDRAM	EM995AA

MultiBay II Storage (9.5-mm) NOTE: Requires HP Advanced Docking Station or HP External MultiBay II	8X DVD-ROM MultiBay II Drive	PA849A
	24X Combo DVD/CD-RW MultiBay II Drive	PA850A
	2X DVD+/-RW Dual Format MultiBay II Drive	PA851A
	80-GB 5400 rpm MultiBay II Hard Drive	PH357A

Other Storage	80-GB 5400 rpm Primary SATA Hard Drive	ET354AA
	HP USB Digital Drive + 128-MB Secure Digital Card	DL702A
	HP USB Digital Drive + 256-MB Secure Digital Card	DL702AA
	HP USB Diskette Drive	DC361B

| Communications | Intel PRO/Wireless 3945ABG 802.11 a/b/g WLAN option kit | EX150AA#xxx |

Expansion Solutions	HP Docking Station	EN488AA#xxx
	HP Advanced Docking Station	EN489AA#xxx
	HP Monitor Stand	PA507A
	HP Adjustable Notebook Stand	PA508A
	HP External MultiBay II (9.5-mm)	PA509A#xxx
	HP 4-port USB 2.0 Hub	DG954A

Power	HP 2-bay Battery Charging Station	DT533A#xxx
	HP 10-bay Battery Charging Station	DT534A#ABA
	Battery Adapter kit #1	PK402A
	65W Smart AC Adapter	ED494AA#xxx
	90W Smart AC Adapter	ED495AA#xxx
	90W Smart Auto Adapter	ED493AA
	65W Air/Auto/AC Combo Adapter	ED993AA#xxx
	90W Aircraft Cables	DC899A
	Primary 6-cell Battery Pack	PB994A
	HP 8-cell Extended Life Battery	PB993A
	HP 12-cell Ultra-Capacity Battery	EJ092AA

Options

Carrying Cases	HP Entry Value Case	DL617A
	HP Top Load Nylon	DC915A
	HP Executive Leather case	PA847A
	HP Sport Backpack	DG102A

Security	HP PCMCIA Smart Card Reader	DC350B
	HP/Kensington Cable Lock	PC766A

Input/Output Devices	USB/PS2 Keyboard	DC852A#xxx
	USB/PS2 Optical Mouse	DC369A
	HP USB Optical Travel Mouse	F2100A

QuickSpecs

Memory

Support for up to 4096 MB* of 533- or 667-MHz DDR2 SDRAM
Two DIMM slots
DIMM sizes supported: 256 MB, 512 MB, 1024 MB, and 2048 MB

Standard Memory	
	• 256 MB (256 MB x 1)
	• 512 MB (512 MB x 1 or 256 MB x 2)
	• 1024 MB (1024 MB x 1 or 512 MB x 2)
	• 2048 MB (1024 MB x 2)

Optional Memory Upgrades

Support for up to 4096 MB* of memory is available (with the installation of optional DDR2 SDRAM memory kits). Both memory slots are user accessible. Please refer to the Hardware and Software Guide for installation procedures. Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

Up to	Slot 1	Slot 2
768 MB	512 MB	256 MB
1024 MB	1024 MB	Empty
1024 MB	512 MB	512 MB
1280 MB	1024 MB	256 MB
1536 MB	1024 MB	512 MB
2048 MB	1024 MB	1024 MB
4096 MB*	2048 MB	2048 MB

NOTE: This chart does not represent all possible memory configurations. Due to the non-industry standard nature of some third-party memory modules, we strongly recommend using only HP branded memory modules to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

Memory Upgrades		
	256-MB 533-MHz DDR2 SDRAM	PE830A
	512-MB 533-MHz DDR2 SDRAM	PE831A
	1024-MB 533-MHz DDR2 SDRAM	PE832A
	512-MB 667-MHz DDR2 SDRAM	EM993AA
	1024-MB 667-MHz DDR2 SDRAM	EM994AA
	2048-MB 667-MHz DDR2 SDRAM	EM995AA

* Above 3-GB, all memory may not be available due to system resource requirements.

QuickSpecs

Storage

Removable Media Drive Support

	Quantity Supported	Drive Bay
LightScribe DVD+/-RW Drive with Double Layer Drive	One	Fixed optical drive bay
DVD+/-RW SuperMulti Drive with Double Layer	One	Fixed optical drive bay
DVD/CD-RW Combo Drive	One	Fixed optical drive bay
DVD-ROM Drive	One	Fixed optical drive bay
CD-ROM Drive	One	Fixed optical drive bay

Hard Drive Support

	Quantity Supported	Drive Bay
Primary Hard Drives		
100-GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
80-GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
60-GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
40-GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay

Technical Specifications

System Unit	**Dimensions** (HxWxD)	nx6320 and nc6320 without WWAN	1.2 in (at front) x 12.9 in x 10.5 in 30.3 mm (at front) x 328.6 mm x 266.7 mm
		nc6320 with WWAN	1.2 in (at front) x 12.9 in x 10.8 in 30.3 mm (at front) x 328.6 mm x 274.3 mm
	Weight	with 14.1-inch display	5.7 lb (2.59 kg)
		with 15.0-inch display	6.1 lb (2.77 kg)

NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 6-cell battery, 60-GB hard drive, 256-MB memory, and CD-ROM drive. Weight varies by configuration and components.

	Stand-Alone Power Requirements	Normal Operating Voltage	18.5 V
		Average Operating Power	12.5 W
		Max Operating Power	< 65 W
	Temperature	Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Relative Humidity	Operating	10% to 90%, non-condensing
		Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
	Shock	Operating	125 G, 2 ms, half-sine
		Non-operating	200 G, 2 ms, half-sine
	Random Vibration	Operating	0.75 grms
		Non-operating	1.50 grms
	Altitude (unpressurized)	Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
		Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
	Industry Standard Certifications	UL	Yes
		CSA	Yes
		FCC Compliance	Yes
		Energy Star Compliant	Yes
		ICES	Yes
		GS	Yes
		Australia / NZ A-Tick Compliance	Yes
		CCC	Yes
		Japan VCCI Compliance	Yes
		MIC	Yes
		BSMI	Yes
		CE Marking Compliance	Yes
		BNCI or BELUS	Yes
		CIT	Yes
		GOST	Yes
		Saudi Arabian Compliance (ICCP)	Yes
		SABS	Yes

Technical Specifications

	UKRSERTCOMPUTER	Yes

HP 65W Smart AC Adapter	Dimensions	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	83% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	Output power 65W	65W
		DC output	18.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32° to 104° F (0° to 40° C)
		Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF – over 200,000 hours at 25°C ambient condition.	
	Option Kit Contents	65W AC Adapter, power cable, warranty booklet	

Optional HP 12-Cell Ultra-Capacity Battery	Dimensions (H x W x L)	1.3 x 6.0 x 10.6 in (3.33 x 15.25 x 26.88 cm)	
	Weight	1.77 lb (0.803 kg)	
	Cells/Type	12-cell Lithium-Ion	
	Energy	Voltage	14.8V
		Watt-hour Capacity	95Wh
		Amp-hour Capacity	6.45Ah
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	Smart Adapter	3 to 4 hours
		System ON	4 to 5 hours (depending on system power consumption)
	Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery	

Technical Specifications

Optional HP 8-Cell Extended Life Battery	Dimensions (H x W x L)	1.0 x 3.9 x 8.7 in (2.5 x 10.0 x 22.0 cm)	
	Weight	1.00 lb (0.455 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Voltage	14.4V
		Watt-hour Capacity	52Wh
		Amp-hour Capacity	3.6Ah
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	3 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF
	Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery	

52Wh Primary 6-Cell Battery	Dimensions (H x W x L)	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3 cm)	
	Weight	0.737 lb (0.335 kg)	
	Cells/Type	6-cell Lithium-Ion	
	Energy	Voltage	10.8V
		Watt-hour Capacity	52Wh
		Amp-hour Capacity	4.8Ah
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF Mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 1.5 hours when system is OFF

Technical Specifications

15.0-Inch Color TFT SXGA+ Wide Viewing Angle Display			
Active Area (W x H)	12.0 x 9.0 in (30.4 x 22.8 cm)		
Diagonal Size	15.0 in (38.0 cm)		
Surface Treatment	Anti-glare		
Number of Colors	Up to 16M		
Contrast Ratio	300:1 (typical)		
Refresh Rate	60 Hz		
Brightness	170 nit (typical)		
Pixel Resolution	Pitch	0.217 mm	
	Format	1400 x 1050	
	Configuration	RGB Stripe	
Backlight	CCFL		
PPI	117		
Viewing Angle	±60° Horizontal, +40°/-45° Vertical (typical)		

15.0-Inch Color TFT XGA BrightView Display			
Active Area (W x H)	12.0 x 9.0 in (30.4 x 22.8 cm)		
Diagonal Size	15.0 in (38.0 cm)		
Surface Treatment	BrightView		
Number of Colors	Up to 16M		
Contrast Ratio	300:1 (typical)		
Refresh Rate	60 Hz		
Brightness	150 nit (typical)		
Pixel Resolution	Pitch	0.296 mm	
	Format	1024 x 768	
	Configuration	RGB Stripe	
Backlight	CCFL		
PPI	86		
Viewing Angle	±45° Horizontal, ±25° Vertical (typical)		

15.0-Inch Color TFT XGA Display			
Active Area (W x H)	12.0 x 9.0 in (30.4 x 22.8 cm)		
Diagonal Size	15.0 in (38.0 cm)		
Surface Treatment	Anti-glare		
Number of Colors	Up to 16M		
Contrast Ratio	300:1 (typical)		
Refresh Rate	60 Hz		
Brightness	150 nit (typical)		
Pixel Resolution	Pitch	0.296 mm	
	Format	1024 x 768	
	Configuration	RGB Stripe	
Backlight	CCFL		
PPI	86		
Viewing Angle	±45° Horizontal, ±25° Vertical (typical)		

QuickSpecs

Technical Specifications

14.1-Inch Color TFT XGA Display	Active Area (W x H)	11.2 x 8.4 in (28.6 x 21.4 cm)	
	Diagonal Size	14.1 in (35.7 cm)	
	Surface Treatment	Anti-glare	
	Number of Colors	Up to 16M	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	170 nit (typical)	
	Pixel Resolution	Pitch	0.279 mm
		Format	1024 x 768
		Configuration	RGB Stripe
	Backlight	CCFL	
	PPI	91	
	Viewing Angle	±45° Horizontal, ±25° Vertical (typical)	

Hard Drives

100-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	100 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	195,371,568	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

80-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	80 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

60-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	60 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	117,231,408	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

40-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	40 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	78,165,360	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

Removable Storage Drives – Fixed Bay

CD-ROM Drive	Access Times	Random	<110 ms CD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW	
	Supported Media (write)	None	
	Max Media Capacity (read)	700 MB	
	Transport	Tray Loading	

DVD-ROM Drive	Access Times	Random	<116 ms CD
			<125 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X-DVD	10,800 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	None	
	Max Media Capacity (read)	4.7 GB	
	Transport	Tray Loading	

Technical Specifications

DVD/CD-RW Combo Drive	Access Times	Random	<110 ms CD
			<130 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		24X CD-RW	3,600 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	CD-R, CD-RW	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	700 MB	
	Transport	Tray loading	

LightScribe DVD+/-RW Drive with Double Layer	Access Times	Random	<175 ms CD
			<230 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		10X CD-RW	1,500 KB/s
		8X DVD+R	10,800 KB/s
		4X DVD+RW	5,400 KB/s
		8X DVD-R	10,800 KB/s
		4X DVD-RW	5,400 KB/s
		2.4X DVD+R(9)	2,700 KB/s
	Transfer Mode	Multiword DMA Mode 2	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, LightScribe	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	

Technical Specifications

DVD+/-RW SuperMulti Drive with Double Layer	Access Times	Random	<175 ms CD
			<230 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		10X CD-RW	1,500 KB/s
		8X DVD+R	10,800 KB/s
		4X DVD+RW	5,400 KB/s
		8X DVD-R	10,800 KB/s
		4X DVD-RW	5,400 KB/s
		2.4X DVD+R(9)	2,700 KB/s
		5X DVD-RAM	6,750 KB/s
	Transfer Mode	Multiword DMA Mode	
	Interface	EIDE	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	

HP Biometric Fingerprint Sensor	Mobile Voltage Operation	3.0V–3.6V Single Supply
	Operating Temperature	32° – 158°F (0° – 70°C)
	Current Consumption @ 3.3V	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	High-Rate Image Capture	Up to 240 image frames /sec
	ESD Resistance	IEC 61000-4-2 Level 4 (±15KV)
	Detection Matrix	192 x 16 Pixels 9.7mm x 0.81mm 500 ppi High-Resolution Images

Audio

Technical Specifications

Hardware	Implementation	ADI1981HD High Definition CODEC
	Volume Controls	Up, down, and mute buttons
	Full Duplex	Yes
	Sound Blaster Pro compatible	Yes
	Microphone Jack	Stereo or mono
	Headphone/Line Out Jack	Stereo

Audio Output Quality	Frequency Response	20 Hz – 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	8 kHZ – 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit

Internal Speakers	Power Rating	2 Watts
	Impedance	4 Ohms

Communications

Integrated Broadcom NetLink Gigabit Ethernet PCI Controller (BCM5788M)	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 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	Power Management	ACPI compliant -- multiple power modes Situation-sensitive features reduce power consumption NIC Battery Saving Mode (enabled by default)
	Performance Features	TCP/IP/UDP Checksum Offload (configurable)
	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 Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite
	Interface	32-bit PCI, 33-MHz
	NIC Device Driver Name	Broadcom NetLink Gigabit Ethernet

QuickSpecs

Technical Specifications

	Drivers Available	Microsoft Windows XP Microsoft Windows 2000

V.92 56K Data/Fax Modem	Form Factor	MDC 1.5 Daughtercard
	Power Management Support	APM Revision 1.2, ACPI
	Approvals/ Certifications	UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries
	Data Mode Capabilities	V.92 data
		V.8bis
		V.80
		V44, V.42bis, MNP5 (Compression)
		V.42 (LAPM, MNP2-4) (Error Correction)
		Optional symbol rates: 2800, 3429 Asymmetric Symbol rates
		Synchronous primary channel data signaling rates: 3600, 31200 Automatic rate re-negotiation V.34 V.32bis V.32 V.23 V.22bis V.22 V.21 Bell 212A Bell 103J
	Fax Mode Capabilities	TIA/EIA-578-B (Class 1) T.30, T.4 (Group 3) V.17 V.29 V.27ter V.21 Channel 2
	Command Set	V.250 (Partial) TIA-602 Identification: +GMI, +GMM, +GMR Port control: +IPR, +ICF, +IFC, +ILRR Modulation: +MS, +MR, +MA Error control: +ES, +ER, +EB, +ESR, +ETBM Data compression: +DS, +DR V.251

Technical Specifications

HP ev2200 1xEV-DO Broadband Wireless Module	Band and Power Class	0 (North American Cellular) – Class III; 1 (North American PCS) – Class II
	Wireless Protocol Standards	CDMA 1x Release 0/A; IS-95A, IS-95B, IS-2000
	Wireless Parametric Standards	Meets or exceeds TIA/EIA IS-98-D
	Interoperability	CDG 22 (TIA/EIA/IS-95-A) CDG 53(TIA/EIA/IS-95-B) C.S0031 (TIA/EIA/IS-2000) CDG 64 (TIA/EIA/IS-2000) C.S0032 (TIA/EIA/IS-866)
	Frequency Band	Dual Band: 800 MHz (Cellular) and 1900 MHz (PCS)
	Data Rates (Packet Mode)	IS-856 rates up to 2.4 Mbps IS-2000 data rates up to 307.2 kbps
	Maximum Output Power	24dBm (+/-1)
	Power Consumption (maximum)	500mA
	Power Consumption, Sleep Mode	1.7mA – 3.5mA
	Power Management	USB selective suspend CDMA slotted mode sleep and dormant modes
	Antenna Type	High efficiency dual band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard
	Weight	0.35 oz (10 g)
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 4.5 mm)
	Voltage, Operating	3.3v +/- 10%
	Temperature, Operating (from TIA/EIA/IS-98-D)	-22° to 140° F (-30° to 60° C) (full RF performance) -22° to 167° F (-30° to 75° C) (reduced RF performance)
	Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
	Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	Configuration Utilities	Verizon Wireless VZAccess Manager
	LED Activity	LED Off – Radio Off; Solid LED On – Radio On
Broadcom 4311BG 802.11b/g WiFi Adapter	Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

Technical Specifications

Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	
Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP- MSCHAPv2, LEAP, EAP-FAST, EAP-SIM. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).	
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.	
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power (for CKK)[2]	17.5 dBm	
Output Power (for OFDM; power varies by data rate)[2]	15 dBm	
Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode[3]: 390 mW (nominal) Sleep mode: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[4]	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm	
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Range	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	PCI-Express MiniCard	
Weight	0.026 lb (12 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	32° to 176° F (0° to 80° 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)

Technical Specifications

	Configuration Utility[5]	Choice of Configuration Utility:

- Microsoft Windows XP Wireless Network Connection Manager
- Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)

	LED Activity	LED Off – Radio OFF; Solid LED On – 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.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK 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. WLAN may also be compatible with certain third-party software supplicants.

Broadcom 4311AG 802.11a/b/g WiFi Adapter	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CKK)[2]	17.5 dBm
	Output Power (for OFDM; power varies by data rate)[2]	15 dBm
	Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode[3]: 390 mW (nominal) Sleep mode: 20 mW (max)
	Power Management	ACPI compliant power management 802.11 compliant power saving mode
	Receiver Sensitivity[4]	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm

Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Range	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	PCI-Express MiniCard	
Weight	0.026 lb (12 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	32° to 176° F (0° to 80° 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)
Configuration Utility[5]	Choice of Configuration Utility:	

- Microsoft Windows XP Wireless Network Connection Manager
- Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)

LED Activity	LED Off – Radio OFF; Solid LED On – 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.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK 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. WLAN may also be compatible with certain third-party software supplicants.

Intel PRO/Wireless 3945ABG 802.11a/b/g Network Connection	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM

Technical Specifications

Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM.
	Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CKK)[2]	15 dBm
Output Power (for OFDM; power varies by data rate)[2]	15 dBm
Power Consumption	Transmit: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode[3]: 150 mW (nominal) Sleep mode: 30 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure

Range	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment

Form Factor	PCI-Express MiniCard	
Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	32° to 176° F (0° to 80° 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)

	Configuration Utility[5]	Choice of Configuration Utility:

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet (required for Cisco Compatible Extensions support)

LED Activity — LED Off – Radio OFF; Solid LED On – 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.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK 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. WLAN may also be compatible with certain third-party software supplicants.

Intel PRO/Wireless 3945BG 802.11b/g Network Connection

Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at www.hp.com/go/notebooks/WLAN)
Frequency Band	2.4 GHz
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CKK)[2]	15 dBm
Output Power (for OFDM; power varies by data rate)[2]	15 dBm
Power Consumption	Transmit: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode[3]: 150 mW (nominal) Sleep mode: 30 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure

Technical Specifications

Range	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	PCI-Express MiniCard	
Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	32° to 176° F (0° to 80° 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)
Configuration Utility[5]	Choice of Configuration Utility:	

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet (required for Cisco Compatible Extensions support)

LED Activity	LED Off – Radio OFF; Solid LED On – 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.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK 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. WLAN may also be compatible with certain third-party software supplicants.

HP Integrated Module with Bluetooth Wireless Technology	Bluetooth Specification	2.0 Compliant
	Dimensions	1.02 x 0.55 x 0.22 in (26 x 14 x 5.7 mm)
	Frequency Band	2402 to 2480 MHz
	Number of Available Channels	79 (1 MHz) available channels
	Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps
		Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
		Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
	Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)
	Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate
	Power Consumption	Peak (Tx) 264 mW
		Peak (Rx) 231 mW
		Sleep <1 mW
	Antenna	Internally integrated within module
	Range	Up 33 ft (10 m)
	Electrical Interface	USB 2.0 compliant
		Microsoft Windows Plug and Play compliant
	OS Support	Microsoft Windows XP Professional and Home

Technical Specifications

		Microsoft Windows 2000
Bluetooth Software Supported		Broadcom Bluetooth for Windows
		Microsoft Windows XP Bluetooth Software
Link Topology		Point to Point, Multipoint Pico Nets up to 7 slaves
Security		Full support of Bluetooth Security Provisions
Power Management		Microsoft Windows ACPI, and USB Bus Support
		Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications		All necessary regulatory approvals for supported countries, including:
		FCC (47 CFR) Part 15C, Section 15.247 & 15.249
		ETS 300 328, ETS 300 826
		Low Voltage Directive IEC950
		UL, CSA, and CE Mark
Temperature	Operating	-4° to 158° F (-20° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90%
	Non-operating	5% to 95%
Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
Bluetooth Profiles Supported		(with Bluetooth for Windows 4.0 software)
		Serial Port Profile (SPP)*
		Dial-Up Networking (DUN)*
		Generic Object Exchange Profile (GOEP)
		Object Push Profile (OPP)*
		File Transfer Profile (FTP)
		Synchronization Profile (SYNC)
		Hard Copy Cable Replacement (HCRP)*
		Personal Area Networking Profile (PAN)*
		Human Interface Device Profile (HID)*
		FAX Profile (FAX)
		Basic Imaging Profile (BIP)
		Headset Profile (HSP)
		Hands Free Profile (HFP)
		Advanced Audio Distribution Profile (A2DP)

* indicates the profile is also supported by Microsoft Windows XP SP2

Technical Specifications

Environmental Data	Eco-Label Certifications	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
- US Federal Energy Management Program (FEMP)
- Taiwan Green Mark
- China Energy Conservation Program
- IT ECO declaration

System Configuration — The configuration used for the Energy Consumption and Declared Noise Emissions data is based on a "Typically Configured Notebook."

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	23.0 W	23.5 W	23.0 W
Sleep (Energy Star low power mode)	1.72 W	1.88 W	1.73 W
Off	1.90 W	1.90 W	1.98 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	78 BTU/hr	80 BTU/hr	78 BTU/hr
Sleep	5.9 BTU/hr	6.4 BTU/hr	5.9 BTU/hr
Off	6.5 BTU/hr	6.8 BTU/hr	6.5 BTU/hr

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

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.2	23
Fixed Disk (random writes)	3.8	24

Batteries — This product complies with ISO standards:

EU Directive 91/ 157/ EEC
EU Directive 93/ 86/ EEC
EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

Mercury greater than 5ppm by weight
Cadmium greater than 10ppm by weight
Lead greater than 4000 ppm by weight.

Battery type and chemistry used in the product:

Primary battery
6-cell high capacity Lithium-Ion battery pack

Real Time Clock battery
CR2032 (coin cell), Lithium

Technical Specifications

Additional Information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

Keyboard complies with ISO standard: ISO 9995, EN 29241-4, and ISO/IEC 15412

Input devices of this product comply with ISO 9241, part 9.

Plastics parts weighing over 0.055 pounds (25 grams) used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% recycled materials (by wt.)

This product is greater than 85% recycle-able when properly disposed of at end of life.

Packaging

Packaging Materials

- External:
    - Corrugated Paper – 2.03 lb (920 g)
- Internal:
    - Corrugated Paper – 1.84 lb (835 g)
    - EPE Foam – 0.12 lb (55 g)
    - LDPE Bag – 0.01 lb (5 g)
- The corrugated paper packaging materials contains at least 80% recycled content.

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.

Material Usage	This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment (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)

End-of-life Management and Recycling	HP offers our customers several other options for handling their aging computers while also minimizing the impact on the environment-including product trade-in and leasing services-in addition to recycling services. Please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
Hewlett-Packard 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
Environment website
http://www.hp.com/environment
Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Technical Specifications