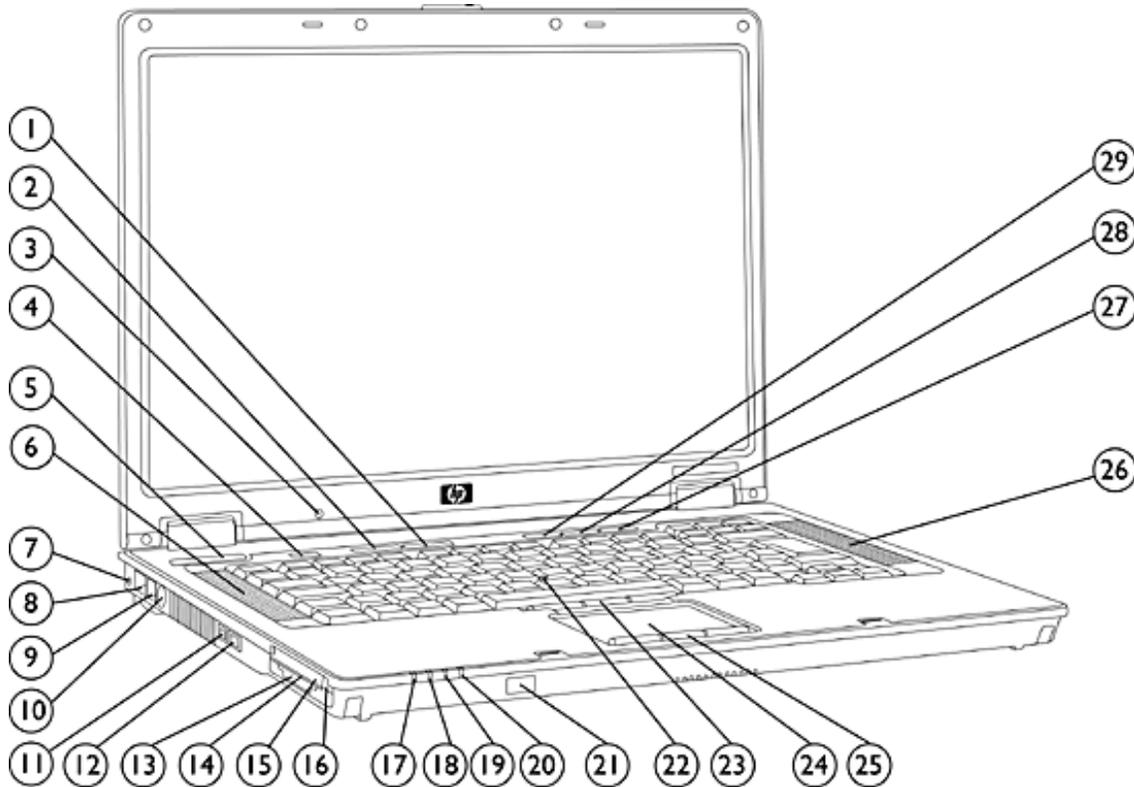
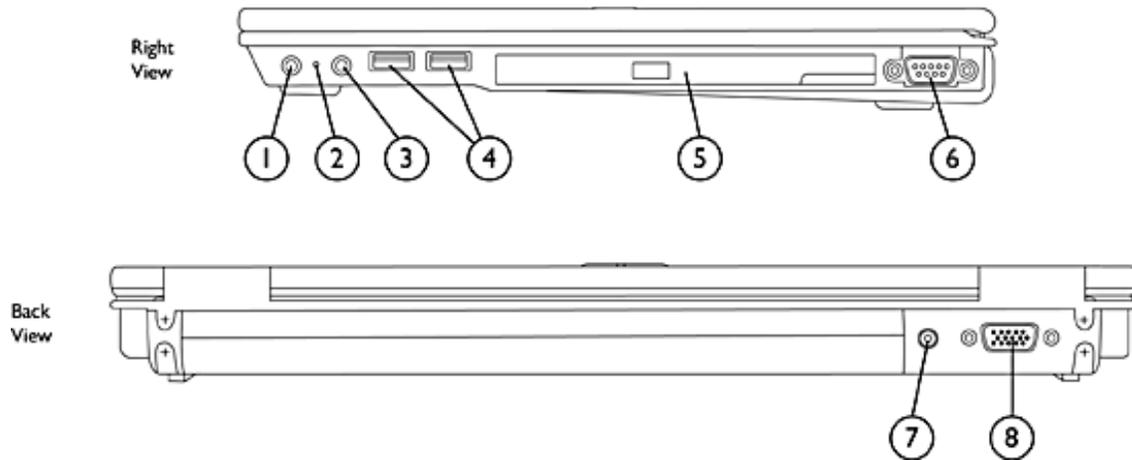


Overview



- | | |
|------------------------------------|--|
| 1. Presentation Mode Button | 16. PC Card Eject Button |
| 2. Wireless On/Off Button with LED | 17. Wireless On/Off LED |
| 3. Ambient Light Sensor | 18. Power/Standby LED |
| 4. HP Info Center Button | 19. Battery Charging LED |
| 5. Power Button with LED | 20. Hard Drive Activity LED |
| 6. Left Speaker | 21. Fast Infrared Port |
| 7. Kensington Lock Slot | 22. Pointstick (nc8230 only) |
| 8. RJ-45 Port (NIC) | 23. Pointstick Buttons (nc8230 only) |
| 9. RJ-11 Port (Modem) | 24. Touchpad with scroll zone |
| 10. S-Video TV Out | 25. Touchpad Buttons (three on nc8230) |
| 11. IEEE 1394 Port | 26. Right Speaker |
| 12. USB 2.0 Port | 27. Volume Up Button |
| 13. Integrated Secure Digital Slot | 28. Volume Down Button |
| 14. Integrated Smart Card Reader | 29. Volume Mute Button with LED |
| 15. PC Card Slot | |

Overview



- | | |
|--------------------|--|
| 1. Headphone Jack | 5. MultiBay II Drive Bay with Easy Release |
| 2. Microphone | 6. Serial Port (nc8230 only) |
| 3. Microphone Jack | 7. Power Connector |
| 4. 2 USB 2.0 Ports | 8. VGA/External Monitor Port |

At A Glance

- Genuine Windows XP Professional, Genuine Windows XP Home Edition (select countries only), or FreeDOS
- Certified for Novell Linux Desktop 9
- Sleek industrial design weighing 5.8 lb/2.6 kg and 1.1-inch/28 mm thin (at front)
- Intel® Pentium® M processors 730 to 780*
- Mobile Intel 915PM Express Chipset
- ATI MOBILITY RADEON X600 graphics controller with 64 MB or 128 MB of discrete video memory
- Optional integrated 802.11 a/b/g or 802.11 b/g wireless LAN module
- Support for optional Intel Centrino™ mobile technology
- Optional integrated Bluetooth®
- 256-MB DDR2 SDRAM, upgradeable to 2048-MB maximum
- Up to 80-GB 5400 rpm, user-removable hard drive
- 15.4-inch wide screen display
- IEEE 1394 Port
- Integrated Secure Digital (SD) slot
- Security features include integrated Smart Card Reader and optional Trusted Platform Module (TPM) Embedded Security Chip
- NetXtreme Gigabit PCI Express Ethernet Controller
- Dual pointing devices on nc8230
- Support for ultra-slim MultiBay II devices
- Protected by a three-year standard parts and labor warranty - certain restrictions and exclusions apply.

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

Overview

What's Special

- Increased viewing area with 15.4-inch wide display
- Latest PCI Express technology and DDR2 400-MHz & 533-MHz memory support
- Enhanced security features:
 - HP ProtectTools
 - Integrated Smart Card Reader
 - Optional Embedded Security features
- Ease of use features:
 - Ambient light sensor
 - HP Fast Charge Technology
 - HP Wireless Assistant
 - HP power down NIC technology
 - HP MultiBay II Easy Release
 - Up to 4.5 hours of battery life with standard 8-cell high capacity Lithium-Ion battery
 - HP Mobile Print Driver for on-the-go printing
- Integrated reliability features:
 - HP Mobile Data Protection System
 - HP Panel Protection System
 - Scratch-resistant keyboard deck using In-mold Lamination
 - Magnesium-alloy display enclosure
 - HP spill-resistant keyboard with Mylar film
- Support for new HP docking solutions and HP Travel Battery

Standard Features

Processors

Intel Pentium M processor 780* (2.26-GHz, 533-MHz FSB, 2-MB L2 cache)
Intel Pentium M processor 770* (2.13-GHz, 533-MHz FSB, 2-MB L2 cache)
Intel Pentium M processor 760* (2.00-GHz, 533-MHz FSB, 2-MB L2 cache)
Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache)
Intel Pentium M processor 740* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache)
Intel Pentium M processor 730* (1.60-GHz, 533-MHz FSB, 2-MB L2 cache)

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

NOTE: Intel Pentium M processors support enhanced Intel SpeedStep™ technology. Processor speed denotes maximum performance mode; processors will run at approximately 800 MHz in battery optimization mode.

Operating System

Preinstalled

Genuine Windows XP Professional SP2
Genuine Windows XP Home Edition SP2
FreeDOS

Supported

Genuine Microsoft Windows 2000 (drivers downloadable from <http://www.hp.com>)

Certified

Novell Linux Desktop 9

Windows Vista Capable

Not all Windows Vista features are available for use on all Windows Vista Capable PCs. All Windows Vista Capable PCs will run the core experiences of Windows Vista, such as innovations in organizing and finding information, security, and reliability. Some features available in premium editions of Windows Vista -- like the new Windows Aero™ user interface -- require advanced or additional hardware. Check <http://www.windowsvista.com/getready> for details.

Chipset

Mobile Intel 915PM Express Chipset

Graphics

ATI MOBILITY RADEON X600 graphics controller with 64 MB or 128 MB of discrete video memory

Standard Features

Display	Internal	15.4-inch TFT WXGA (1280 x 800 resolution and 16 M colors) 15.4-inch TFT WSXGA+ wide-viewing angle (1680 x 1050 resolution and 16 M colors) 15.4-inch TFT WUXGA wide-viewing angle (1920 x 1200 resolution and 16 M colors) Ambient light sensor
	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 DVI port in optional HP Docking Station (sold separately) supports resolutions up to 1600 x 1200 at both full and reduced blanking, and 1920 x 1200 at reduced blanking NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Memory	Standard	256-MB, 512-MB, or 1024-MB 400-MHz or 533-MHz DDR2 SDRAM; two SODIMM slots
	Maximum	Upgradeable to 2048-MB maximum (1024-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.

Communications	NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC*) with HP power down NIC technology 56K 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/sec. 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.
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Standard Features

Wireless Devices

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

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
Broadcom 802.11b/g WLAN	Integrated support for 802.11 b and g Up to 54-mbps data rate
Broadcom 802.11a/b/g WLAN	Integrated support for 802.11 a, b and g Up to 54-mbps data rate
Intel PRO/Wireless 2200BG 802.11 b/g WLAN	Intel Centrino mobile technology Integrated support for 802.11 b and g Up to 54-mbps data rate
Intel PRO/Wireless 2915ABG 802.11 a/b/g WLAN	Intel Centrino mobile technology Integrated support for 802.11 a, b and g Up to 54-mbps data rate
Integrated Bluetooth	Bluetooth Specification v1.2 compliant Works with a wide range of Bluetooth devices

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

nc8230: Dual Pointing devices – Touchpad with scroll zone and Pointstick
Both devices have three soft-touch buttons.

Expansion Card Slots

One Type I/II PC Card slot	Supports 32-bit CardBus and 16-bit PC Cards
One Integrated Smart Card Reader	Compatible with ISO 7816 compliant Smart Cards PC/SC interface support

Standard Features

Media Slots	One integrated Secure Digital slot	Supports SD (Secure Digital) and MultiMedia Card media
Storage	Hard Drives	40-, 60-, 80-GB 5400 rpm SMART 60-GB 7200 rpm SMART
	Optical Drives	MultiBay II (9.5-mm) DVD-ROM MultiBay II Drive DVD/CD-RW Combo MultiBay II Drive DVD+/-RW MultiBay II Drive
	Second Hard Drive	MultiBay II (9.5-mm) 80-GB 5400 rpm MultiBay II Hard Drive
Interfaces	PC Card Slot	One – Type I/II
	Smart Card Reader	One
	External Monitor	One – VGA
	External Microphone	One
	Headphone/Line out	One
	Power Connector	One
	RJ-11 (Modem)	One
	RJ-45 (NIC)	One
	Ambient Light Sensor	One
	Fast Infrared Port	One (4-Mb/s support) IrDA 4-MB compliant; IR performance will vary depending on performance of IR peripherals and application used.
	Serial Port	One (nc8230 only)
	IEEE 1394 Port (4-pin)	One
	S-Video TV Out	One (Support for NTSC/PAL)
	USB 2.0	Three
	Docking Connector	One
	Travel Battery Connector	One
	LED Status Indicators	Eleven
Audio	ADI AC '97 CODEC Integrated 16-bit Sound Blaster Pro compatible audio Integrated stereo speakers External volume up, volume down, and mute buttons Stereo headphone/line out Stereo microphone in	

Standard Features

Software	Preloaded Software for Microsoft Windows XP	Adobe Acrobat Reader HP Local Recovery provided by Altiris* HP One-Touch Button Software HP Mobile Print Driver Synaptics Touchpad Driver HP Help and Support HP ProtectTools Security Manager: BIOS Configuration for HP ProtectTools Credential Manager for HP ProtectTools HP Wireless Assistant Sonic RecordNow! (for optional DVD+/-RW and DVD/CDRW drives)* Symantec Norton Antivirus with complimentary 60-day live update Intervideo WinDVD - DVD Player (for optional DVD+/-RW, DVD/CDRW and DVD drives)*
	Software on CD	Intervideo WinDVD Creator – DVD Authoring (for optional DVD+/-RW drives)
	Additional software available from the Web	HP Client Manager Software HP ProtectTools Security Manager: Embedded Security for HP ProtectTools Smart Card Security for HP ProtectTools

* Software is loaded on the hard drive and must be installed by running the Software Setup utility

System Recovery for Microsoft Windows XP systems only	Each unit is shipped with a recovery kit containing Operating System Recovery and Driver/Application Recovery discs. These discs allow users to either recover or repair the notebook operating system and select drivers without losing personal data. The Operating System disc also provides the option of reinstalling the operating system software provided with the notebook.
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Client Management Software	HP Client Manager Software (CMS) provides asset tracking, alerting, diagnostics, and SoftPaq distribution for HP business desktops, notebooks, and workstations. HP CMS is the foundation for HP Client Management Solutions. For more information and to download HP Client Manager Software, please refer to the HP website at http://www.hp.com/go/easydeploy .
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SMBIOS Version 2.3.4	System Management BIOS, previously known as DMI BIOS, is used to store system management information.
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HP Local Recovery Provided by Altiris	Provides data and system file protection for HP business PCs to enable fast recovery of information that is accidentally deleted or if the system becomes corrupted. Designed for disconnected or seldom-connected users, Local Recovery protects your HP computer's data and system state by taking scheduled snapshots, which are then stored in a protected area on the local hard disk. System backup and disaster recovery is now simple and fast for all users, regardless of connectivity. For more information and to download, please refer to the HP website at http://www.hp.com/go/easydeploy .
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Standard Features

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 or planned are:

- Smart Card Security for HP ProtectTools
- BIOS Configuration for HP ProtectTools
- Embedded Security for HP ProtectTools
- Credential Manager for HP ProtectTools

Security

Standard Features

Configuration Control Hardware
Memory Change Alert
Ownership Tag
Setup Password
Power-On Password
Drivelock
Enabled for PC Smart Card options
Kensington Lock Slot

Integrated Smart Card Reader

Compatible with ISO 7816 compliant Smart Cards
PC/SC interface support

Optional Features

TPM Embedded Security Chip

Designed to the Trusted Computing Group (TCG) standard
Microsoft Crypto API and PKCS#11 software interface support
RSA Secured Partner program certification
NOTE: Full functionality of the TPM Embedded Security Chip is available only with Windows XP Professional.

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

Power Supply

External 90-watt 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

Battery

Primary Battery

8-cell high capacity Lithium-Ion (69Wh) – one-year warranty

Optional Travel Battery

8-cell high capacity Lithium-Ion (52Wh)

Standard Features

Battery Life	Primary Battery	Up to 4 hours and 30 minutes
	Primary Battery and optional HP Travel Battery	Up to 8 hours and 30 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
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Power Conservation	Supports enhanced Intel SpeedStep technology with Intel Pentium M processors (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode) ATI PowerPlay technology HP power down NIC technology Hibernation Standby ACPI compliance
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MultiBay II Devices	MultiBay II devices may be swapped with the system powered on (hot) under Microsoft Windows XP Professional, Windows XP Home, or Windows 2000 (except MultiBay II secondary hard drive).
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Docking	HP Docking Station HP Advanced Docking Station 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, DVI, 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
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Service and Support	HP Services includes a 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 (depending on model). 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
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Select Model(s)

Standard Features

nc8230 PR173UA#ABA	Processor	Intel Pentium M processor 760* (2.0-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Genuine Windows XP Professional
	System Memory	1024-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1 and slot 2)
	Hard Drive	60-GB 5400 rpm
	Display	15.4-inch color TFT WSXGA+ with wide-viewing angle and (1680 x 1050) resolution (up to 16.7 M colors internal)
	Graphics	ATI MOBILITY RADEON X600
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO Wireless 2915ABG 802.11 a/b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
	Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter	
Warranty	3/3/0	

nc8230 PZ518UA#ABA	Processor	Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Genuine Windows XP Professional
	System Memory	1024-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1 and slot 2)
	Hard Drive	60-GB 5400 rpm
	Display	15.4-inch color TFT WSXGA+ with wide-viewing angle and (1680 x 1050) resolution (up to 16.7 M colors internal)
	Graphics	ATI MOBILITY RADEON X600
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO Wireless 2200BG 802.11 b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes

Standard Features

Integrated Smart Card Reader	Yes
Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter
Warranty	3/3/0

nc8230
PZ515UA#ABA

Processor	Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache)
Operating System	Genuine Windows XP Professional
System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
Hard Drive	60-GB 5400 rpm
Display	15.4-inch color TFT WSXGA+ with wide-viewing angle and (1680 x 1050) resolution (up to 16.7 M colors internal)
Graphics	ATI MOBILITY RADEON X600
Video Memory	64 MB
Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
Optical Drive	9.5-mm DVD/CD-RW Combo
Communications	56K Fax Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
Integrated Wireless	Intel PRO Wireless 2915ABG 802.11A/b/g WLAN Bluetooth
TPM Embedded Security Chip	Yes
Integrated Smart Card Reader	Yes
Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter
Warranty	3/3/0

Standard Features

nc8230 EK708AW#ABA	Processor	Intel Pentium M processor 760* (2.0-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Genuine Windows XP Professional
	System Memory	512-MB 533-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
	Hard Drive	60-GB 5400 rpm
	Display	15.4-inch color TFT WSXGA+ with wide-viewing angle and (1680 x 1050) resolution (up to 16.7 M colors internal)
	Graphics	ATI MOBILITY RADEON X600
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO Wireless 2200BG 802.11b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes
	Integrated Smart Card Reader	Yes
	Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
	Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter	
Warranty	3/3/0	

nc8230 PV406AW#ABA	Processor	Intel Pentium M processor 750* (1.86-GHz, 533-MHz FSB, 2-MB L2 cache)
	Operating System	Genuine Windows XP Professional
	System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
	Hard Drive	60-GB 5400 rpm
	Display	15.4-inch color TFT WSXGA+ with wide-viewing angle and (1680 x 1050) resolution (up to 16.7 M colors internal)
	Graphics	ATI MOBILITY RADEON X600
	Video Memory	64 MB
	Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
	Optical Drive	9.5-mm DVD/CD-RW Combo
	Communications	56K Fax Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
	Integrated Wireless	Intel PRO Wireless 2200BG 802.11b/g WLAN Bluetooth
	TPM Embedded Security Chip	Yes

Standard Features

Integrated Smart Card Reader	Yes
Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter
Warranty	3/3/0

nc8230
PR174UA#ABA

Processor	Intel Pentium M processor 740* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache)
Operating System	Genuine Windows XP Professional
System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
Hard Drive	40-GB 5400 rpm
Display	15.4-inch color TFT WSXGA+ with wide-viewing angle and (1680 x 1050) resolution (up to 16.7 M colors internal)
Graphics	ATI MOBILITY RADEON X600
Video Memory	64 MB
Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
Optical Drive	9.5-mm DVD/CD-RW Combo
Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
Integrated Wireless	No
TPM Embedded Security Chip	No
Integrated Smart Card Reader	Yes
Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter
Warranty	3/3/0

Standard Features

nc8230
PZ094UA#ABA

Processor	Intel Pentium M processor 740* (1.73-GHz, 533-MHz FSB, 2-MB L2 cache)
Operating System	Genuine Windows XP Professional
System Memory	512-MB 400-MHz DDR2 SDRAM (512-MB SODIMM in slot 1)
Hard Drive	40-GB 5400 rpm
Display	15.4-inch color TFT WXGA with wide-viewing angle and (1280 x 800) resolution (up to 16.7 M colors internal)
Graphics	ATI MOBILITY RADEON X600
Video Memory	64 MB
Audio	ADI AC '97 CODEC, Line out/headphone and microphone jacks
Optical Drive	9.5-mm DVD/CD-RW Combo
Communications	56K Fax/Modem, Integrated NetXtreme Gigabit PCI Express Ethernet Controller (10/100/1000 NIC)
Integrated Wireless	Intel PRO Wireless 2200BG 802.11b/g WLAN
TPM Embedded Security Chip	No
Integrated Smart Card Reader	Yes
Pointing Device	Dual pointing devices (both Pointstick and Touchpad)
Battery	8-cell high capacity Lithium-Ion (69Wh)
Power	External 90W adapter
Warranty	3/3/0

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

Options

Memory	256MB 400MHz/533MHz DDR2 SDRAM	PE830A
	512MB 400MHz/533MHz DDR2 SDRAM	PE831A
	1024MB 400MHz/533MHz DDR2 SDRAM	PE832A
MultiBay II Storage (9.5-mm)	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
	80GB 5400 rpm MultiBay II Hard Drive	PH357A
Other Storage	60GB 5400rpm Primary Hard Drive	PA852A
	40GB Mobile USB Hard Drive	DQ549A
	USB Digital Drive + 256MB Secure Digital Card	DL702C
	USB Diskette Drive	DC361B
Communications	Intel PRO/Wireless 2200BG 802.11 b/g WLAN option kit	PF952AA#ABA
Expansion Solutions	HP Docking Station	PA286A#ABA
	HP Advanced Docking Station	PA287A#ABA
	HP 3-in-1 NAS Docking Station	EM537AA#ABA
	HP Monitor Stand	PA507A
	HP Adjustable Notebook Stand	PA508A
	HP External MultiBay II (9.5-mm)	PA509A#ABA
	HP 4-port USB 2.0 Hub	DG954A
Power	HP 2-bay Battery Charging Station*	DT533A#ABA
	HP 10-bay Battery Charging Station*	DT534A#ABA
	Battery Adapter kit #1	PK402A
	90W AC Adapter	DC895B#ABA
	90W Auto Adapter	DC303B
	90W Air/Auto/AC Combo Adapter	DV574A#ABA
	90W Aircraft Cables	DC899A
	Primary 8-cell Battery Pack	PB992A
	HP Travel Battery	PB993A

*HP 2-bay & 10-bay battery charging stations require use of battery adapter kit for each battery.

Options

Carrying Cases	HP Entry Value Case	DL617A
	HP Top Load Nylon	DC915A
	HP Executive Leather Case	PA847A
	HP Sport Backpack	DG102A
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Security	PC Card Smart Card Reader	DC350B
	Smart Card Bulk Pack (1-100)	DR032A
	HP/Kensington Cable Lock	PC766A
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Input/Output Devices	USB/PS2 Keyboard	DC852A#ABA
	USB/PS2 Optical Mouse	DC369A
	HP USB Optical Travel Mouse	F2100A
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HP Care Pack Services	9x5 Pick-up and Return - 4 Years	U7868E
	9x5 Pick-up and Return - 5 Years	U7869E
	9x5 Pick-up and Return - 1 Year Post Warranty	U4426PE
	9x5 Next-Business-Day On-Site Coverage - 3 Years	U4414E
	9x5 Next-Business-Day On-Site Coverage - 4 Years	U7860E
	9x5 Next-Business-Day On-Site Coverage - 5 Years	U7861E
	9x5 Next-Business-Day On-Site Coverage - 1 Year Post Warranty	U4416PE
	9x5 Next-Business-Day On-Site Coverage for Notebook with Off-Site Accidental Damage Protection Service - 3 Years	365711-001
	9x5 Next-Business-Day On-Site Coverage for Notebook with Off-Site Accidental Damage Protection Service - 4 Years	365712-001
	9x5 Pick-up and Return Coverage with Off-Site Accidental Damage Protection Service - 3 Years	U4428E
	9x5 Pick-up and Return Coverage with Off-Site Accidental Damage Protection Service - 4 Years	U9586E

Memory

Up to 2048 MB of 400-MHz or 533-MHz DDR2 SDRAM

Two DIMM slots

DIMM sizes supported: 256 MB, 512 MB, or 1024 MB

Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

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)

Optional Memory Upgrades

Support for up to 2048 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.

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

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

1024-MB 533-MHz DDR2 SDRAM

PE832A

512-MB 533-MHz DDR2 SDRAM

PE831A

256-MB 533-MHz DDR2 SDRAM

PE830A

Storage

Removable Media Drive Support

	Quantity Supported	Drive Bay
DVD+/-RW MultiBay II Drive*	One	MultiBay II
DVD/CD-RW Combo MultiBay II Drive*	One	MultiBay II
DVD-ROM MultiBay II Drive*	One	MultiBay II

Hard Drive Support

	Quantity Supported	Drive Bay
Primary Hard Drives		
60-GB 7200 rpm SMART Hard Drive	One	Dedicated hard drive bay
80-GB 5400 rpm SMART Hard Drive*	Up to two	Dedicated hard drive bay and/or MultiBay II
60-GB 5400 rpm SMART Hard Drive	One	Dedicated hard drive bay
40-GB 5400 rpm SMART Hard Drive	One	Dedicated hard drive bay

* MultiBay II drives supported in the internal MultiBay II are also supported in the optional HP External MultiBay II and the HP Advanced Docking Station.

Technical Specifications

System Unit	Dimensions (HxWxD)	1.1 (at front) x 14.0 x 10.2 in (28 (at front) x 355 x 259 mm)
	Weight	nc8230 with MultiBay II weight saver 5.8 lb (2.63 kg) nc8230 with MultiBay II DVD optical drive 6.1 lb (2.77 kg)
NOTE: Height varies depending upon where on the notebook the measurement is made. Weight includes 8-cell battery, 60-GB hard drive, 512-MB memory, 15.4-inch WUXGA display, 802.11 wireless communications module, and TPM Embedded Security Chip. Weight varies by configuration and components.		
Stand-Alone Power Requirements	Nominal Operating Voltage	19 V
	Average Operating Power	25 W
	Max Operating Power	< 90 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	Blue Angel	No
	UL	Yes
	Energy Star Compliant	Yes
	ICES	Yes
	TUV GS	Yes
	Australia / NZ Compliance	Yes
	CCC	Yes
	Japan Compliance	Yes
	MIC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	KONCAR	Yes
	GOST	Yes
	SASO	Yes
	SABS	Yes
UKRSERTCOMPUTER	Yes	

Technical Specifications

90W External AC Adapter	Weight	0.82 lb (0.37 kg) (adapter) 0.29 lb (0.13 kg) (power cord)
	Dimensions	5.00 x 1.97 x 1.1 in (12.7 x 5.0 x 2.9 cm)
	Input	Operating Input Voltage 100 to 240 VAC Operating Input Current PFC Version: 1.5 A at 90 VAC 0.75 A at 180 VAC Non-PFC Version: 2.4 A at 90 VAC 1.2 A at 180 VAC
	Output	Operating Frequency Range 47 to 63 Hz AC Efficiency 83% minimum at 115 VAC Output Power 90 W DC Output Voltage 18.5 V
	Environmental	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, Class2, SELV Agency approvals: C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE, S-Mark, Australian Electric Permit, PSB, eK, BSMI, <i>BNCI, KONCAR, GS, GOST, SASO, SABS, UKRSERTCOMPUTER</i> *NOTE: Approvals in italics apply to PFC version only.
	MTBF	Over 200,000 hours at 25°C ambient condition

Technical Specifications

69Wh Primary 8-Cell Battery	Dimensions (H x W x L)	0.8 x 1.9 x 10.6 in (2.0 x 4.8 x 27.0 cm)	
	Weight	0.980 lb (0.445 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Voltage	14.4V
		Watt-hour Capacity	69Wh
		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 90 minutes when system is OFF

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	

Technical Specifications

15.4-inch Color TFT WUXGA Wide Viewing Angle Display	Dimensions (W x H)	13.0 x 8.1 in (33.1 x 20.7 cm)	
	Diagonal Size	15.4 in (39.1 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	0.173 mm
		Format	1920 x 1200
		Configuration	RGB stripe
		Backlight	CCFL
	PPI	147	
	Viewing Angle	±65° Horizontal, ± 50° Vertical (typical)	

15.4-inch Color TFT WSXGA+ Wide Viewing Angle Display	Active Area (W x H)	13.0 x 8.1 in (33.1 x 20.7 cm)	
	Diagonal Size	15.4 in (39.1 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	0.197 mm
		Format	1680 x 1050
		Configuration	RGB stripe
		Backlight	CCFL
	PPI	129	
	Viewing Angle	±65° Horizontal, ± 50° Vertical (typical)	

Technical Specifications

15.4-inch Color TFT WXGA Display	Active Area (W x H)	13.0 x 8.1 in (33.1 x 20.7 cm)		
	Diagonal Size	15.4 in (39.1 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	0.259 mm	
		Format	1280 x 800	
		Configuration	RGB stripe	
	Backlight	CCFL		
	PPI	98		
	Viewing Angle	±45° Horizontal, ±25° Vertical (typical)		

Hard Drives

60-GB 7200 rpm	Drive Weight	0.25 lb (113 g)		
	Capacity	60 GB		
	Height	0.37 in (9.5 mm)		
	Width	2.75 in (70 mm)		
	Interface	ATA-7		
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)	
	Seek Time	Single Track	1 ms	
	(typical reads, including settling)	Average	10 ms	
		Maximum	18 ms	
	Rotational Speed	7200 rpm		
	Logical Blocks	117,210,240		
Operating Temperature	41° to 131° F (5° to 55° C)			
Features	ATA Security			

Technical Specifications

80-GB 5400 rpm

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
Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)
Seek Time	Single Track 3 ms
(typical reads, including settling)	Average 13 ms
	Maximum 24 ms
Rotational Speed	5400 rpm
Logical Blocks	156,301,488
Operating Temperature	41° to 131° F (5° to 55° C)
Features	ATA Security

60-GB 5400 rpm

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
Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)
Seek Time	Single Track 3 ms
(typical reads, including settling)	Average 13 ms
	Maximum 24 ms
Rotational Speed	5400 rpm
Logical Blocks	117,210,240
Operating Temperature	41° to 131° F (5° to 55° C)
Features	ATA Security

Technical Specifications

40-GB 5400 rpm	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	
	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	78,140,160	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	

Removable Storage Drives – MultiBay II

DVD-ROM MultiBay II Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	Weight	0.34 lb (155 g)		
	Access Times	Random	<120 ms CD	
			<200 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)	8.5 GB		
Transport	Tray Loading			

Technical Specifications

DVD/CD-RW Combo MultiBay II Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	Weight	0.45 lb (205 g)		
	Access Times	Random	<120 ms CD	<155 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			

DVD+/-RW MultiBay II Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	Weight	0.45 lb (205 g)		
	Access Times	Random	<150 ms CD	<125 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	
		2.4X DVD+R	3,240 KB/s	
		2.4X DVD+RW	3,240 KB/s	
		2X DVD-R	2,700 KB/s	
		2X DVD-RW	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			
Max Media Capacity (read)	4.7 GB			

Technical Specifications

Max Media Capacity (write)	4.7 GB
Transport	Tray Loading

80-GB 5400 rpm MultiBay II Hard Drive	MultiBay II Drive Adapter	Dimensions (H x W x D)	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)
		Weight	0.16 lb (72 g)
	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-6	
	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 131° F (5° to 55° C)		
Features	ATA Security		

Audio

Hardware	Implementation	ADI AC '97 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)	7 kHz - 48 kHz
	AD/DA Resolution	16 bit

Technical Specifications

Internal Speakers	Power Rating	2 Watts
	Impedance	4 Ohms

Communications

Integrated Broadcom NetXtreme Gigabit PCI Express Ethernet Controller (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 802.3z 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 1.1a 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) Microsoft Large Send Offload (configurable) TCP Segmentation Offload CPU Task Offload Adaptive Interrupts
	Manageability	Wake-on-LAN from all Power-Managed States (configurable; Magic Packet and Microsoft Wake-Up Frame) PXE 2.0 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Cable Analyzer
	NIC Device Driver Name	Broadcom NetXtreme Gigabit Ethernet
	Drivers Available	Microsoft Windows XP Microsoft Windows 2000

Technical Specifications

Agere Systems AC'97 Modem	Form Factor	MDC 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	56K modem (a-law, mu-law) V.8bis V.80 V44, V.42bis, MNP5 (Compression) V.42 (LAPM, MNP2-4) (Error Correction) V.34 (file date: 10/96) Optional symbol rates: 2800, 3429 Asymmetric Symbol rates Synchronous primary channel data signaling rates: 3600, 31200 Automatic rate re-negotiation 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
Broadcom 802.11b/g WLAN	Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at http://www.hp.com/go/notebooks/WLAN)

Technical Specifications

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	
Security¹	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. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).	
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 CCK) ²	17.5 dBm +/- 1.5 dB	
Output Power (for OFDM; power varies by data rate) ²	13.5 dBm +/- 1.5 dB	
Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode: 248 mW (nominal) Sleep mode: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 Compliant Power Saving Mode	
Receiver Sensitivity³	54 Mbps: -72 dBm, 1 Mbps: -94 dBm	
Antenna type	High efficiency dual band antenna with polarization 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	MiniPCI Type IIIB	
Weight	0.026 lb (12 g)	
Dimensions	0.20 x 1.75 x 2.34 in (4.9 x 44.6 x 59.8 mm)	
Operating Voltage	3.3v	
Temperature	Operating	32° to 122° F (0° to 50° C)
	Non-operating	-14° to 158° F (-10° to 70° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 15,000 ft (4,572 m)
	Non-operating	0 to 40,000 ft (12,192 m)

Technical Specifications

Configuration Utility⁴

Choice of Configuration Utility:

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

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. 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).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support. WLAN may also be compatible with certain third-party software suppliers.

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

Security¹

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

Ad-hoc (Peer to Peer)

Models

Infrastructure (Access Point Required)

Roaming

IEEE 802.11 compliant roaming between access points

Output Power (for CCK)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: 390 mW (nominal)
Sleep mode: 20 mW (max)

Power Management

ACPI compliant power management
802.11 compliant power saving mode

Receiver Sensitivity³

54 Mbps: -72 dBm, 11 Mbps: -88 dBm, 1 Mbps: -97 dBm



Technical Specifications

Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Range	802.11 a – Typical (@6 Mbps)	1000 feet – Outdoor Open Area 300 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	MiniPCI Type IIIA	
Weight	0.035 lb (16 g)	
Dimensions	0.19 x 2.00 x 2.35 in (4.8 x 50.95 x 59.75 mm)	
Operating Voltage	3.3v	
Temperature	Operating	32° to 122° F (0° to 50° C)
	Non-operating	-14° to 158° F (-10° to 70° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 15,000 ft (4,572 m)
	Non-operating	0 to 40,000 ft (12,192 m)
Configuration Utility⁴	Choice of Configuration Utility: <ul style="list-style-type: none">• Microsoft Windows XP Wireless Network Connection Manager• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support) <ol style="list-style-type: none">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. 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).4. 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
2200BG 802.11b/g WLAN**

Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant (details at http://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

Technical Specifications

Security¹	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.	
	Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).	
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	16 dBm +/- 2 dB	
Output Power (for OFDM; power varies by data rate) ²	15 dBm +2/-5 dB	
Power Consumption	Transmit: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode: 75 mW (nominal) Sleep mode: 60 mW	
Power Management	ACPI compliant power management 802.11 Compliant Power Saving Mode	
Receiver Sensitivity³	54 Mbps: -72 dBm, 11 Mbps: -88 dBm, 1 Mbps: -97 dBm	
Antenna type	High efficiency dual band antenna with polarization 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	MiniPCI Type IIIB	
Weight	0.026 lb (11.75 g) (max)	
Dimensions	0.20 x 1.75 x 2.34 in (4.9 x 44.6 x 59.8 mm)	
Operating Voltage	3.3v	
Temperature	Operating	32° to 158° F (0° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)

Technical Specifications

Configuration Utility⁴

Choice of Configuration Utility:

- Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)
- Microsoft Windows XP Wireless Network Connection Manager

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. 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).
4. 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 2915ABG 802.11a/b/g WLAN

Wireless LAN Standards

IEEE 802.11a
IEEE 802.11b
IEEE 802.11g

Interoperability

Wi-Fi certified
Cisco Compatible Extensions Program compliant
(details at <http://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

Security¹

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.

Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program).

Sub-channels

Multinational support with frequency bands and channels compliant to local regulations.

Media Access Protocol

CSMA/CA (Collision Avoidance) with ACK

Network Architecture

Ad-hoc (Peer to Peer)

Models

Infrastructure (Access Point Required)

Roaming

IEEE 802.11 compliant roaming between access points

Output Power (for CCK)²

16 dBm +/- 2 dB

Output Power (for OFDM; power varies by data rate)²

15 dBm +2/-5 dB

Power Consumption

Transmit: 1.8 Watts (max)
Receive: 1.4 Watts (max)
Idle mode: 100 mW (nominal)
Sleep mode: 60 mW (max)

Power Management

ACPI compliant power management
802.11 Compliant Power Saving Mode

Receiver Sensitivity³

54 Mbps: -72 dBm, 11 Mbps: -89 dBm, 1 Mbps: -97 dBm

Technical Specifications

Antenna type	High efficiency dual band antenna with polarization 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	MiniPCI Type IIIB	
Weight	0.026 lb (11.75 gm) (max)	
Dimensions	0.20 x 1.75 x 2.34 in (4.9 x 44.6 x 59.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
Configuration Utility⁴	Choice of Configuration Utility: <ul style="list-style-type: none">• Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)• Microsoft Windows XP Wireless Network Connection Manager <ol style="list-style-type: none">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. 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).4. WLAN supplier's client utility is required for Cisco Compatible Extensions support. WLAN may also be compatible with certain third-party software supplicants.	

Bluetooth by HP

Name	HP Integrated module with Bluetooth wireless technology
Bluetooth Specification	1.2 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	1 Mbps data rate; throughput up to 720 Kbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 723.2 kbps/57.6 kbps asymmetric or 433.9 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

Technical Specifications

	Peak (Rx) 231 mW
	Sleep <1 mW
Antenna	Internally integrated within module
Range	Up 33 ft (10 m)
Electrical Interface	USB 1.1 compliant
	Microsoft Windows Plug and Play compliant
OS Support	Microsoft Windows XP Professional and Home Microsoft Windows 2000
Bluetooth Software Supported	Widcomm 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)

Technical Specifications

Advanced Audio Distribution Profile (A2DP)

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

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