



# PowerBook G4

Technology Overview  
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# The PowerBook G4 Family: Thin, Light, and Powerful

Since its auspicious debut, the PowerBook G4 has made waves throughout the industry and set the standard that all other laptop computers aspire to reach. With ongoing enhancements and groundbreaking innovations—like the revolutionary thin and light aluminum enclosure—Apple has kept the PowerBook on the leading edge of performance, design, and ease of use. Today that remarkable evolution continues, as Apple introduces faster processors and hard drives, increased SuperDrive speeds, and enhanced Bluetooth performance. In addition, all of the new PowerBook models come standard with 5400-rpm hard drives, half a gigabyte of memory, and compelling new features such as trackpad scrolling and the Sudden Motion Sensor. With even more power and expanded capabilities, the PowerBook G4 maintains its distinction as one of the most innovative and powerful notebook computers available.

User demands on notebook computers continue to grow with an ever-increasing need for laptops to serve as primary computing systems. Whether it be video files or complex scientific images and calculations, a substantial amount of data must be handled and processed in the office and on the road. The new PowerBook G4 is up to the challenge, enabling everyone from graphic designers and video editors to research scientists and engineers to manipulate, transfer, store, and protect their valuable data with even more speed and ease. Built for mobility while packing considerable power, the PowerBook G4 family provides the best of all worlds and is the perfect choice for anyone who requires a full-featured, completely portable, high-performance notebook.



# 12-inch PowerBook G4



## Ultracompact, Ultradésirable

With the most advanced feature set of any ultracompact notebook, the 12-inch PowerBook G4 is an amazingly small yet full-featured laptop. Now with a faster 1.5GHz G4 processor, a larger and faster 80GB 5400-rpm hard drive,<sup>1</sup> twice the RAM with 512MB standard, a faster 8x SuperDrive,<sup>2</sup> and support for Bluetooth 2.0 + EDR (Enhanced Data Rate), the 12-inch PowerBook G4 is the ultimate travel companion.

With its new performance and technology enhancements, the 12-inch PowerBook G4 is even more capable of getting the job done, and ready for the most grueling tasks. In tests using Halo, the new PowerBook outperformed the 12-inch Dell Inspiron 700m by 73 percent at 1024 by 768 pixels and millions of colors. Its full range of I/O ports includes tremendous video output versatility, with the ability to connect to everything from Apple flat-panel displays to digital projectors to monitors and televisions.<sup>3</sup>

The 12-inch PowerBook is also an amazingly small and convenient DVD-burning studio. Now supporting an even wider range of formats, its slot-loading SuperDrive<sup>2</sup> lets you create and burn custom CDs and professional-looking DVDs at a faster 8x speed using the new iLife '05, which includes the latest versions of iTunes, iPhoto, iMovie, iDVD, and GarageBand. This PowerBook also features a brilliant 12.1-inch (diagonal) display. And with built-in 54-Mbps AirPort Extreme,<sup>4</sup> Ethernet, modem, and the new Bluetooth 2.0 + EDR specification, it allows you to quickly and easily communicate whenever and however you need to, wired or wirelessly.

At lower prices than before, the new 12-inch PowerBook gives users a lot more for less. On top of its improved performance, it provides features like trackpad scrolling, which facilitates navigation up and down or left and right in large documents, web pages, and graphics; and the Sudden Motion Sensor, which helps to minimize the risk of data loss should your PowerBook slip or be dropped. Remarkably compact and incredibly powerful, the notebook weighs a mere 4.6 pounds,<sup>5</sup> requires a minimal amount of desktop space, and is easily tucked away in a briefcase or backpack. And with up to 5 hours of battery life, time is always on your side.<sup>6</sup>

Whether you're a mobile professional leading the jet-set life or a busy student running around campus, the 12-inch PowerBook is the perfect travel companion.

# 15-inch PowerBook G4



## The Ideal Balance of Power and Portability

For the discerning user who places a premium on portability and performance, the 15-inch PowerBook G4 is the ideal computer. Built for power, speed, and mobility, this PowerBook is one of the thinnest and lightest 15-inch notebooks on the market. Inside its sleek aluminum enclosure is more than enough horsepower to get the job done, whether you're editing video, creating presentations, or crunching spreadsheets. You can choose a 1.5GHz or 1.67GHz PowerPC G4 processor, supercharged by an ATI Mobility Radeon 9700 graphics processor with either 64MB or 128MB of memory. The brand-new, faster 8x SuperDrive lets you burn professional DVDs with ease,<sup>2</sup> and with an 80GB 5400-rpm hard drive standard in every configuration,<sup>1</sup> you can store and retrieve data more quickly. All configurations of the new 15-inch PowerBook come equipped with a single 512MB SO-DIMM, leaving a memory slot open for future memory upgrades.

Every 15-inch PowerBook is equipped to connect to a wireless network right out of the box. All configurations feature a built-in AirPort Extreme Card, so you can connect to an 802.11g wireless network at speeds up to 54 megabits per second (Mbps).<sup>4</sup> Integrated 3-Mbps Bluetooth 2.0 + EDR technology extends your wireless capabilities with cable-free connections to existing Bluetooth 1.0 and upcoming 2.0 compatible products, with less drain on your battery. The wired world is also easily accommodated by a suite of high-speed digital connections including Gigabit Ethernet, FireWire 800, USB 2.0, and DVI. The optional graphics configuration with 128MB of memory comes with dual-link DVI functionality, giving you the ability to present your work on a 30-inch Apple Cinema HD Display.

All 15-inch PowerBook G4 models come standard with the revolutionary illuminated keyboard—now 10 times brighter than before. Other new features include trackpad scrolling, which lets you quickly pan through an active window, and the Sudden Motion Sensor, which reduces the chance of hard drive damage and loss of data in the event that the PowerBook slips or is dropped.

With power and capabilities now extended even further, the 15-inch PowerBook gives you the freedom to get your work done anytime, anywhere.

# 17-inch PowerBook G4



## The Ultimate Portable Desktop

With one of the largest displays ever to grace a portable computer, the 17-inch PowerBook G4 is a feat of engineering. No other notebook feels as spacious and as portable at the same time. Built to be a true desktop replacement, this PowerBook features amazing performance—with a faster processor, a high-speed 100GB 5400-rpm hard drive,<sup>1</sup> high-performance graphics, and a faster-burning 8x SuperDrive. For even the most demanding professionals, the 17-inch PowerBook G4 is ready for anything and everything.

The 17-inch (diagonal) megawide display simply must be seen to be believed. With its 1440-by-900-pixel resolution, it provides a viewing area equal to that of a 19-inch CRT monitor. That's plenty of room for the toolbars, palettes, and timelines that are so common in today's professional applications, such as Adobe Photoshop and Final Cut Pro. You might think that a notebook computer with a 17-inch widescreen display must be big and bulky, but thanks to its stunning aluminum case, the PowerBook is just 1 inch thin and weighs only 6.9 pounds.<sup>5</sup> Another innovative design feature of the 17-inch PowerBook is the brighter-than-ever illuminated keyboard, which is ideal when you are working in a low-light environment like an airplane cabin or a studio.

The performance architecture of the 17-inch PowerBook delivers exceptional speed, featuring a 1.67GHz PowerPC G4, an ATI Mobility Radeon 9700 graphics processor with 128MB of dedicated DDR SDRAM, dual-link DVI functionality, and up to 2GB of DDR memory. Built-in AirPort Extreme and Bluetooth 2.0 + EDR technology deliver the most advanced wireless communications available today,<sup>4</sup> while Gigabit Ethernet, FireWire 800, USB 2.0, and DVI ensure that you can connect to the most advanced peripherals and networks available. The built-in SuperDrive, with a new burning speed of 8x, is invaluable for exchanging huge files on DVD. The new 17-inch PowerBook also includes built-in optical digital audio input and output, which musicians, audio-philes, and others who require pristine audio will welcome.

Featuring incredible power, expanded capabilities, and native support for the 30-inch Apple Cinema HD Display, the groundbreaking 17-inch PowerBook G4 is the ultimate choice for creative and scientific professionals who need the best performance, the most advanced features across the board, and an extra-large workspace for video editing, audio creation, graphic design, or complex calculations in the office or on the go.

# Power and Performance

The PowerBook G4 is a full-featured notebook computer equipped with the power and performance required by creative professionals, scientists, and businesspeople. It enables a fast and efficient digital workflow for importing, editing, and rendering data; previewing the results; and outputting to various formats. Whether your workflow involves print, web, video, audio, imaging, or other media, the PowerBook G4 has the high-speed processing, enhanced graphics performance, versatile network connectivity, and easy expandability to help you work faster and more efficiently.

## PowerPC G4 Processor

Apple provides powerful computing performance with the PowerPC G4 processor with Velocity Engine, which is a specialized vector processing unit that uses SIMD (single instruction, multiple data) technology to accelerate data processing. Software programs that use vector processing typically transform large sets of data as they edit an image or render a video effect. For example, when a filter is used to apply a motion blur to an image, each pixel of the image must be changed according to the same set of instructions. This is a highly repetitive processing task, which the Velocity Engine accelerates by modifying the image in large, 128-bit sections. Since the Velocity Engine is a separate processing unit, it can work on one processor-intensive task while the other functional units in the processor are crunching other data.

### **Adobe Photoshop performance results**

To demonstrate the superior performance of the PowerBook G4 architecture, Apple conducted tests using Adobe Photoshop CS (8.0), the most popular application among creative professionals. Photoshop is an effective cross-platform measure of system performance because it has been optimized for both Mac and Windows platforms. Apple ran the Adobe Photoshop tests using a 300MB Photoshop file and a suite of 45 commonly used Photoshop actions, including file saving, image adjustments, mode changes, and filters. We measured the time to execute each filter or function and compared the performance of all actions using an indexed score.

The 15-inch and 17-inch PowerBook models were compared to the 2.1GHz Pentium M–based Dell Inspiron 9200, one of the fastest Pentium M–based PC notebooks on the market. The 1.67GHz 15-inch and 17-inch PowerBook systems were up to 14 percent faster, while the 1.5GHz 15-inch PowerBook was 3 percent faster. The 1.5GHz 12-inch PowerBook was tested against a comparable 12-inch Dell Inspiron 700m notebook with a 1.6GHz Pentium M processor. In this case, the 12-inch PowerBook was 11 percent faster.



## DDR Memory

All PowerBook G4 models now come standard with 512MB of Double Data Rate (DDR) memory. The 12-inch PowerBook G4 accommodates up to 1.25GB of DDR memory, while the 15- and 17-inch models accommodate up to 2GB, providing considerable performance improvements to many system processes. In fact, by transferring data on both the rising and falling edge of each system clock cycle, the PowerBook is able to accelerate calls to memory and achieve data rates almost twice those of regular SDRAM.



## Brilliant Display

The widescreen displays of the 15-inch and 17-inch PowerBook G4 give you a panoramic, portfolio-like working environment that is perfect for the tools, palettes, and timelines that creative professionals require to design layouts and edit video, as well as the visualization tools and productivity applications that researchers use. The crisp, clear XGA display in the ultracompact 12-inch PowerBook G4 provides tremendous detail and high saturation for rich, vivid colors. Regardless of the model you choose, the PowerBook display is perfect for viewing everything from spreadsheets to digital media projects to games.

## Powerful Graphics

### **NVIDIA GeForce FX Go5200 (12-inch PowerBook)**

Featured in the 12-inch PowerBook, the NVIDIA GeForce FX Go5200 graphics processor comes with 64MB of dedicated DDR memory. It incorporates advanced features such as hardware transform and lighting as well as the Lightspeed Memory Architecture II. This architecture improves memory bandwidth to ensure fluid frame rates for the latest 2D and 3D games and professional applications. The GeForce FX Go5200 delivers blazing performance and includes AGP 4X support as well as MPEG-2 hardware for flawless DVD playback. Not only do games flow more smoothly, but with the full advantage of Quartz Extreme window resizing, images on a flat-panel display redraw and relocate quite seamlessly.

### **ATI Mobility Radeon 9700 (15- and 17-inch PowerBook)**

The ATI Mobility Radeon 9700 graphics processor, with 64MB of DDR memory standard on the 15-inch and 128MB standard on the 17-inch PowerBook, dramatically enhances all aspects of the visual experience, whether you are viewing high-quality video or complex 3D applications. This advanced graphics processor features a number of cutting-edge technologies, including programmable pixel and vertex shading for lighting, enabling cinematic quality on the screen. To boost graphics performance even more, the 17-inch PowerBook comes standard with dual-link DVI functionality, enabling support of the 30-inch Apple Cinema HD Display. This is especially significant for design professionals who need incredible detail at very high resolutions in graphics applications such as Alias Maya. The 1.67GHz 15-inch PowerBook can also be configured with 128MB of graphics memory and dual-link DVI when ordered through the Apple Store online.

### **Mac OS X graphics: Quartz Extreme and OpenGL**

Not only do these graphics processors make graphics look better and run more smoothly, they boost overall system performance. That's because they work directly with Quartz Extreme, the windowing technology in Mac OS X.

Quartz Extreme offloads graphics-specific tasks from the central processing unit (CPU) to the graphics processing unit (GPU). This approach makes onscreen images faster and more responsive, providing fluid, full-frame-rate graphics even in highly composited scenes such as translucent 3D objects over full-motion DVD video. It also frees the CPU to complete other tasks more quickly. Mac OS X is the only operating system with a composited windowing system, seamlessly blending 2D, 3D, and video content for vastly improved graphics performance.

Quartz Extreme leverages the powerful OpenGL-based 3D graphics engine in Mac OS X. The industry's most widely used and supported 3D graphics technology, OpenGL features high-performance visualization capabilities that make it ideal for graphic design applications, special effects, 3D modeling, and gaming. Mac OS X boosts the performance of OpenGL to a new level, making Mac the ultimate personal computer platform for 3D graphics.

### **Dual-link DVI**

With dual-link DVI functionality in the 17-inch PowerBook (optional in the 1.67GHz 15-inch model), the bandwidth of the video signal from the notebook to an external display is effectively doubled, providing an increase in speed and signal quality. This increased transmission power, along with 128MB of graphics memory, allows you to connect higher-resolution displays such as the 30-inch Apple Cinema HD Display (with 2560-by-1600-pixel resolution) directly to the standard DVI port of the PowerBook.

## 5400-rpm Hard Drives

Professionals need to create and manipulate data files that grow ever larger in size. Wherever they happen to be working, professionals need to access files on their hard drive quickly as well as have plenty of room to store them. The PowerBook G4 family now offers even faster data retrieval by boosting hard drive speed to 5400 rpm across the entire line. To meet users' storage demands, an 80GB drive is now available with the 12-inch model and comes standard with all 15-inch models; for buyers of the 17-inch PowerBook, a 100GB drive comes standard.<sup>1</sup> The 12-inch and 15-inch models can be configured with 100GB hard drives through the Apple Store online.

## SuperDrive

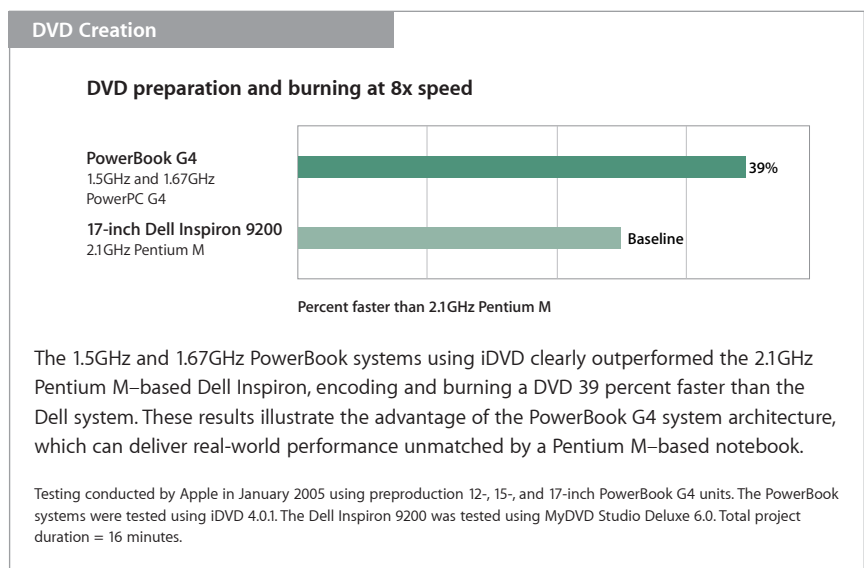
The PowerBook G4 now offers faster DVD-burning capability through the built-in slot-loading 8x SuperDrive (DVD±RW/CD-RW), and also supports the burning of DVD-RW, DVD+R, and DVD+RW media formats in addition to the DVD-R format.<sup>2</sup> With the included iLife '05 software (iTunes, iPhoto, iMovie HD, iDVD, and GarageBand), the PowerBook becomes a stylish portable CD and DVD recording studio.

The new 8x SuperDrive is ideal for archiving and transferring large image files on CDs and DVDs. CDs can hold up to 650MB of data, while DVDs can store as much as 4.7GB. With the increasing size of data files, this level of speed and capacity makes even the largest backup jobs quick and efficient. You can easily back up an entire digital photo collection or a thousand MP3 files—and keep them safe for years.

The CD-burning Combo drive (DVD-ROM/CD-RW) is ideal for creating data and music CDs. The Combo drive and SuperDrive also read CD-ROMs and play DVD movies—perfect for staying entertained on the next long plane flight.

### DVD creation performance results

The performance leadership of the PowerBook line is particularly noticeable when burning video DVDs. Apple compared the DVD creation time of the PowerBook G4 using its included iDVD application against the 2.1GHz Pentium M–based Dell Inspiron 9200 using MyDVD Studio Deluxe. The DVD creation test consisted of encoding a 16-minute clip of DV content into MPEG-2 and then burning it to DVD. DV is the format used by standard digital video cameras, and MPEG-2 is the format used for high-quality television display by consumer DVD players.



### Exposé

Exposé gives you instant access to any open windows with a single keystroke. Display all windows as thumbnails (F9), view windows of the current application (F10), or hide all windows to quickly view your desktop (F11). If you have many applications and windows open, Exposé allows you to instantly turn chaos into order.

## Trackpad Scrolling

When you're browsing web pages or working in large documents, images, or spreadsheets, you have to constantly move around within the window. The new trackpad scrolling capability on PowerBook systems makes navigation and scrolling in a window significantly faster, easier, and more convenient. Your PowerBook ships with this ease-of-use feature activated by default. By simply dragging two fingers anywhere across the trackpad, you can quickly pan up, down, or across your active window. You can customize the settings of this feature or, if you prefer, turn it off completely, through System Preferences.

# Comprehensive Connectivity

## Rendezvous

Apple's revolutionary Rendezvous technology allows computers and other smart devices to create an "ad hoc" network instantly by finding and connecting to one another automatically. Each device broadcasts which services (such as file sharing or printing) it's offering for the use of others, and discovers the services being provided by the other devices.

For example, two business executives in a hotel meeting room can establish a network to exchange files using the AirPort Extreme networking cards built into their PowerBook systems. When the computer is turned on and connected to a wired network, it automatically discovers and lists available Rendezvous-enabled printers.

Rendezvous is built into Mac OS X v10.3 and works with today's most popular connection technologies, including Ethernet, AirPort, and AirPort Extreme. It uses the standard IP networking protocol. Epson, HP, and Lexmark are integrating Rendezvous into printers, and other manufacturers of peripherals and consumer electronics are expected to release Rendezvous-enabled devices.

Today's mobile professionals need a notebook with the connections and capabilities that give them the flexibility to work uninterrupted in a variety of environments, including offices, homes, client sites, and hotels. Many professionals require a variety of video output options as they may find themselves needing to deliver a presentation or extend their work space through a TV, CRT, flat panel, or projector; PowerBook support of DVI, VGA, ADC, composite, and S-video affords them this flexibility. In addition, comprehensive networking technologies are built into every PowerBook G4 system, so no matter how you need to connect—by accessing a wireless network on the fly or by plugging into a wired network via Ethernet—the PowerBook has you covered.

For easy access, all the ports on the PowerBook G4 are placed along the sides in a logical progression from front to back. The headphone and audio line-in ports are located toward the front so you can easily reach the devices that connect to them. Ports for an external monitor, the power cord, and the modem connection—cables that are usually routed behind the system—are located toward the rear. On the 15-inch and 17-inch PowerBook, there's even a USB 2.0 port on each side of the case, allowing you to connect your USB mouse or other device wherever you prefer.

## FireWire

FireWire 400 (IEEE 1394a, also known as Sony i.LINK) supports data transfer rates of up to 400 Mbps. FireWire 800 (IEEE 1394b) increases the rate to 800 Mbps.<sup>7</sup> Anyone involved in video editing, broadcast streaming, or other applications that demand high-speed connections to input, output, and storage devices will want to take advantage of the phenomenal benefits offered by the PowerBook G4 and its FireWire technology.

All three PowerBook models feature one 6-pin FireWire 400 port; in addition, the 15-inch and 17-inch models are equipped with a 9-pin FireWire 800 port. The FireWire 800 port also supports FireWire 400 devices using a 9-pin-to-6-pin cable (sold separately). Up to 63 FireWire devices can be daisy-chained together from one FireWire port. These powered ports enable connections to bus-powered devices such as FireWire hard drives and Apple's iPod and iPod mini digital music players, which can run directly from the computer's power without the need for an external power adapter.

More details on FireWire are available on the web at [www.apple.com/firewire](http://www.apple.com/firewire).

## USB

All PowerBook G4 notebooks feature the latest USB technology, 480-Mbps USB 2.0, with two ports that support up to 127 devices at the same time. You can use the ports to connect a variety of USB-based printers, scanners, keyboards, mice, storage devices, and digital still cameras to the computer with plug-and-play convenience. Designers can connect devices such as a graphics tablet or Zip drive, and musicians and composers can attach the latest audio line-in devices for consumer or professional use. USB devices can be hot-plugged into the system at any time, and USB 2.0 is compatible with USB 1.1, so you can continue to use your older USB peripherals without any cable adapters.

Details on USB are available on the web at [www.apple.com/usb](http://www.apple.com/usb).

## PC Card/CardBus Slot (15- and 17-inch PowerBook)

The PC Card/CardBus slot in the 15-inch and 17-inch PowerBook models is ideal for connecting devices such as a miniature hard drive or CompactFlash memory cards through a PC Card adapter. This slot is compatible with PC Card Type I and Type II formats as well as with the 32-bit CardBus format. Special PC Card adapters let you connect SCSI and PCI peripherals to the PowerBook. Several PC Card SCSI adapters are available from Apple Authorized Resellers—an ideal solution for video and music industry professionals who have invested in PCI-based technologies.

## Video Output

No matter which external display you may have, the PowerBook G4 can get you connected, thanks to its comprehensive video support.

- **DVI.** This port provides the highest image quality for video output. With a pure digital connection all the way from the graphics processor to a DVI-equipped display or projector, it eliminates the degradation inherent in converting a digital signal to analog. (A mini-DVI to DVI adapter comes with the 12-inch PowerBook.) Hot-plug capability allows the PowerBook G4 to recognize and begin displaying content on an external monitor as soon as it is connected to the DVI port.

Now standard in the 17-inch PowerBook and optional in the 1.67GHz 15-inch model, 128MB of graphics memory with dual-link DVI functionality enables your PowerBook to support a 30-inch Apple Cinema HD Display for the ultimate viewing experience.

- **ADC.** With the addition of the Apple DVI to ADC Adapter (sold separately), you can connect to Apple flat-panel displays that have an ADC connector.
- **VGA.** You can connect analog monitors and projectors or analog-based flat panels using the included DVI to VGA adapter or mini-DVI to VGA adapter. Hot-plugging is also supported with VGA devices.
- **S-video.** Using the S-video port on the 15-inch or 17-inch PowerBook (the 12-inch model requires an Apple Mini-DVI to Video Adapter, sold separately), you can connect to many standard televisions, VCRs, or projectors. This gives teachers and students the ability to present their reports, projects, and even websites to an entire class on a television screen. At home, you can attach the system to a TV to watch DVD movies on a larger screen.
- **Composite video.** With the included adapter, you can connect to devices that take composite video input. A TV can be instantly detected while the PowerBook is running; simply press the Command key along with the Brightness Up (F2) function key, and the system sends the video to the external monitor. (The 12-inch model requires an Apple Mini-DVI to Video Adapter, sold separately.)

### External display modes

When an external display is in use, the PowerBook G4 supports three display modes: dual display, video mirroring, and lid-closed operation. Any of these modes can be used with any of the video output options. You can toggle between dual display and video mirroring simply by pressing the F7 function key. Alternatively, in Mac OS X, the two modes can be selected through the Displays pane in System Preferences.

- **Dual display mode.** Many PowerBook G4 users spend a significant amount of time in front of their displays using applications with floating palettes, long timelines, and multiple viewing windows. To minimize the time spent organizing layers of windows, many professional users attach a second display to their PowerBook, which allows them to spread out their work.
- **Video mirroring mode.** For presenters, video mirroring allows whatever is on the PowerBook screen to appear on an external display, television, or projector. Creative professionals, business users, and educators can face their audience and control what's on the screen while the audience views the same image on a larger display. Hardware-based mirroring allows video content such as QuickTime movies to be displayed on an external monitor with performance equal to that of the built-in display.
- **Lid-closed operation.** Creative professionals can also opt to run the PowerBook with its full video memory applied to an external display. To activate this feature, put the PowerBook to sleep by closing the lid, and wake it through an external keyboard such as the Apple Wireless Keyboard. All of the video memory will then be dedicated to the larger external display. The lid-closed function is ideal for users who want to achieve high performance on a high-quality external display.

### Audio

Delivering enhanced audio performance with powerful stereo speakers, the PowerBook G4 gives more dimension to games, music, and movies. The integrated microphone (located under the left speaker grille of the 15-inch and 17-inch PowerBook and in the upper left corner of the 12-inch PowerBook, above the keyboard) lets you take advantage of speech recognition in Mac OS X or use increasingly popular Internet telephone applications without any additional wires or hardware. A standard minijack provides 16-bit audio input, so you can plug in a powered microphone for making voice annotations, recording movie and presentation voiceovers, or using Internet telephone applications. And with 16-bit audio output at your command, you can plug in headphones and listen to music using iTunes, watch a DVD movie, play the latest games, or compose a new song in GarageBand in complete privacy.

The new 17-inch PowerBook also includes built-in optical digital audio input and output for connecting to devices such as decks, receivers, digital instruments, and 5.1 surround sound systems. Because optical digital audio transmits data as impulses of light rather than electrical signals, it enables true noise-free, pristine sound—eliminating troublesome ground loops and ensuring higher audio and signal quality.

## Modem

Whether you're in a hotel room, at home, or on campus, you can use the built-in modem in the PowerBook G4 to access your office network, dial an Internet service provider, or send and receive faxes. The 56K modem with V.92 support allows you to use a single line for both voice and data.<sup>8</sup> If a voice call comes in while you're online and your ISP supports the V.92 protocol, you'll be able to hold the Internet connection for a set period of time while you speak on the phone.

## Ethernet

Both the 15- and 17-inch PowerBook G4 models feature Gigabit (10/100/1000BASE-T) Ethernet; the 12-inch PowerBook features 10/100BASE-T Ethernet. All PowerBook models automatically switch to the speed of the connected Ethernet network. Just plug your computer into an Ethernet network, DSL modem, or cable modem, and you can transfer files in a flash or browse the Internet immediately.

Speaking of easy Internet connections, Mac OS X automatically finds the best way to connect to the network wherever you take your computer. You don't have to continually set and reset complex network options every time you move to a new location. A feature called "multihoming" in Mac OS X enables the PowerBook to determine the best connection type based on your location, so each network interface needs to be configured only once.

### **Integrated high-speed I/O**

Ethernet and FireWire are implemented in the most efficient manner in the PowerBook systems; they're both connected directly to the system controller. In a Windows-based notebook, these features often reside on the PCI bus, causing additional data congestion for the PCI bus and I/O controller. The dedicated connection in the PowerBook guarantees low latency, resulting in optimal Ethernet and FireWire performance.

# Mobility in Mind

From its brilliant display and smooth aluminum surface to its built-in advanced wireless networking technologies, the PowerBook G4 is ready to work wherever you go. Its new Sudden Motion Sensor helps minimize the risk of data loss in case of a fall; its even brighter illuminated keyboard lets you work in dimly lit environments; and its 3-Mbps Bluetooth 2.0 + EDR technology allows you to take full advantage of wireless peripherals. An ideal combination of form and function, the PowerBook gives you more features and performance than ever, while maintaining the thin, lightweight design you expect from a PowerBook. Made from state-of-the-art materials, built to last, and easy to carry, the PowerBook G4 is an elegant system that you can take with you anywhere.

## Thin, Light Aluminum Case

From the company that sets the standard for computer innovation, the PowerBook G4 is revolutionary in its design and construction. Every tiny detail has been designed for ultimate usability and performance, and the remarkable aluminum alloy enclosure is no exception.

When designing the PowerBook enclosure, it was essential to select a material that would provide optimal weight, strength, and durability. Aluminum is approximately one-third the weight of steel, but it possesses a superior strength-to-weight ratio. These unique properties, combined with its durability, make aluminum the material of choice for performance motorcycle and bicycle frames, aircraft parts, and most car engines.

To create the enclosure, the aluminum alloy is cold-rolled and work-hardened for added strength. After final forming, it undergoes a special anodizing process to further harden and protect the surface against stains, scratches, and discoloration. The result is an enclosure that is lightweight, durable, and modern.

Further enhancing its durability, the PowerBook G4 features a lightweight internal frame for superior stiffness and shock resistance. The hard drive is rubber-mounted to the frame, providing additional protection for this valuable component.



### Instant On

To wake a Windows-based PC from sleep usually takes several seconds. By contrast, the Instant On feature enables a PowerBook to wake from sleep in less than a second, so it is ready to work when you are.

## Illuminated Keyboard (15- and 17-inch PowerBook)

People use notebook computers everywhere these days, often in low-light situations where it is difficult to see the keyboard. To compensate for these environments, Apple introduced a backlit keyboard in the 15-inch and 17-inch PowerBook models in 2003. Unlike other keyboard lighting solutions, which shine a light down onto the keys (so light ends up on the user's hands), the illuminated keyboard on the PowerBook receives lighting from the bottom. With the new 15-inch and 17-inch PowerBook models, Apple has improved on this capability, boosting the keyboard brightness 10 times that of the previous generation, for even better visibility. The illuminated keyboard has proved to be such a popular feature that it's now standard in all configurations of the 15-inch PowerBook in addition to the 17-inch model.

You can activate and adjust the illumination yourself or let the computer control it with the embedded ambient light sensor.

## Ambient Light Sensor (15- and 17-inch PowerBook)

Continuing the tradition of unique features that make Apple products easy to use and optimized for mobility, PowerBook G4 configurations with an illuminated keyboard include built-in ambient light sensors. A feature not found in any other notebook computer, these sensors monitor ambient light levels and adjust the brightness of the screen backlight and keyboard illumination.

When light levels drop, the computer lowers the brightness of the display and the illuminated keyboard comes on, so you can see the keys clearly and continue to work. Conversely, when light levels increase, the PowerBook increases the display brightness and turns off the keyboard backlight.

## AirPort Extreme

Wireless networking is exploding in popularity. In 1999, Apple led the wireless revolution with the affordable, easy-to-use AirPort wireless networking technology. Around home, on campus, or in an office building, AirPort lets you access the network resources you need without cables.

AirPort Extreme wireless technology is built into every model of the PowerBook line, giving you instant access to wireless networks and the freedom to connect wherever you are. Based on the IEEE 802.11g standard, AirPort Extreme supports data rates of up to 54 Mbps.<sup>4</sup> That means you can exchange data on an 802.11g network almost five times as fast as on an 802.11b network. AirPort Extreme is also compatible with Windows PCs and with the millions of Wi-Fi Certified 802.11b devices in use around the world. So even if your environment includes Windows PCs, you'll be able to access your company's wireless network, check email at your favorite coffee house, and do research around your school campus.

Beyond providing wireless Internet access, Apple's AirPort Extreme Base Station—for use with AirPort Extreme and 802.11b and 802.11g devices—is loaded with advanced features, like wireless sharing of a USB printer,<sup>9</sup> wireless bridging of AirPort Extreme or AirPort Express Base Stations, and other options to increase the range of your network. It supports up to 50 simultaneous users—Mac and PC—all sharing a single Internet connection.

Apple's AirPort Express Base Station allows up to 10 Mac and Windows users to wirelessly share an Internet connection, stream their iTunes music library to a stereo or set of powered speakers, wirelessly print to a USB printer, or extend the wireless range of an existing AirPort Extreme Base Station.<sup>10</sup>

## Bluetooth 2.0 + EDR

The PowerBook G4 features integrated Bluetooth 2.0 with Enhanced Data Rate (EDR). This means you can connect wirelessly with Bluetooth-enabled devices such as PDAs, mobile phones, wireless headsets, HCRP-supported printers, and other Bluetooth-equipped computers—all without requiring a direct line of sight between devices and with a bandwidth of up to 3 Mbps. Because Bluetooth was designed to connect to multiple devices simultaneously, you can, for example, connect to the Apple Wireless Keyboard and the Apple Wireless Mouse at the same time. Every PowerBook G4 comes ready to connect wirelessly to Bluetooth-enabled peripheral devices within a radius of 30 feet.

With the included iSync software, you can easily synchronize information between your PowerBook, mobile phone, and Palm OS-based PDA. You can also have cable-free connections between your PowerBook and your Palm handheld. Use the Bluetooth File Exchange application to transfer files between your PowerBook and another Mac or a Windows computer. Or use a camera phone to send images to your PowerBook, put them in an iCard, and send an instant postcard over the phone's GPRS connection. With the Bluetooth technology in your PowerBook, your Bluetooth-enabled GSM/GPRS mobile phone can even act like a cellular modem in your pocket. When future phones access the Internet at broadband speeds, the 3-Mbps Bluetooth capability in your PowerBook will give you the optimum foundation to take advantage of this greater bandwidth.

## Sudden Motion Sensor

Notebooks are increasingly pervasive in both our professional and personal lives. More and more, people expect their notebooks to go where they do. The information stored on notebook hard drives can range from business-critical information to priceless family photos—making protection of data on the hard drive a must-have feature. The Sudden Motion Sensor, standard across the new PowerBook line, helps to detect an accidental drop or fall by sensing the change in axis position of the PowerBook as well as the accelerated movement. In the event of a drop or fall, the Sudden Motion Sensor instantly parks the hard drive heads so they won't scratch the disks on impact. This lessens the risk of damage to the drive and helps increase the chance that you will be able to retrieve your valuable data. When the Sudden Motion Sensor detects that the PowerBook position is once again level, it unlocks the hard drive heads, and normal operation can resume.

### Battery life performance results

#### 17-inch PowerBook G4 (1.67GHz)

Maximum	Up to 4 hours, 30 minutes
Wireless productivity	Up to 3 hours, 45 minutes
DVD playback	Up to 2 hours, 30 minutes

#### 15-inch PowerBook G4 (1.5GHz)

Maximum	Up to 4 hours, 30 minutes
Wireless productivity	Up to 3 hours, 15 minutes
DVD playback	Up to 2 hours, 15 minutes

#### 12-inch PowerBook G4 (1.5GHz)

Maximum	Up to 5 hours
Wireless productivity	Up to 3 hours, 45 minutes
DVD playback	Up to 2 hours, 45 minutes

Testing conducted by Apple in January 2005 using preproduction PowerBook G4 units. Battery life depends on configuration and use.

## Long Battery Life

One of the most important features needed to ensure portability in a notebook computer is long battery life. The PowerBook G4 is designed to provide outstanding battery life at a variety of performance levels and in varied work environments.<sup>6</sup>

One measure of battery performance is the system's maximum battery life, where the workload is modest but the demand for long productivity times is high. For today's busy professionals, however, working on the go is no longer a luxury—it's a necessity. With the growing prevalence of Wi-Fi networks at work, in cafés, in airports, and at home, battery life in wireless environments is increasingly important to notebook users. Another key area is battery life while playing a DVD movie, something many mobile users enjoy during a plane flight or long car trip. Apple tested the battery life provided by the PowerBook family when running for the longest time possible, working in a wireless environment, or running a DVD movie. Results are shown at left.

### Sleep swapping

If you need to work with multiple batteries while traveling, the sleep-swapping feature of the 15-inch and 17-inch PowerBook allows you to quickly change batteries without shutting down the system. Simply put the system to sleep by closing the lid and then remove the battery; the PowerBook can maintain the contents of RAM using its backup battery for up to three minutes. After inserting a new battery, open the lid to wake the system from sleep and resume work.

- **Maximum battery life test.** All PowerBook systems are capable of incredible battery life. Apple tested the PowerBook G4 in several usage scenarios, using energy-saving features built into Mac OS X, to gauge what users can expect in terms of maximum battery life.
- **Wireless productivity test.** All new PowerBook G4 computers have built-in AirPort Extreme wireless networking to make staying connected as easy as possible.<sup>4</sup> Apple tested wireless battery life by alternately loading web pages over an AirPort network and editing a text document, never letting the system go to sleep during the test. This is a typical scenario of computer use on the go, resulting in a battery performance number that is very relevant to mobile users.
- **DVD playback performance test.** Every PowerBook comes standard with a DVD player for DVD movie playback. Viewing a DVD movie usually takes 2 hours and is an experience that shouldn't be interrupted by the need to recharge or swap the battery. PowerBook battery life for this system-intensive activity was tested by playing a complete DVD movie in full-screen mode at full screen brightness.

### Power management features

With Mac OS X, you can adjust processor performance to further increase battery efficiency. Through the Energy Saver system preference, you can set the computer's performance to the Automatic setting, which dynamically adjusts the processor frequency based on the demands of the user and various applications. To ensure maximum battery life, the processor can be set to operate at the Reduced setting, which forces it to operate at a lower frequency. If constant operation at the highest level of performance is required (as it is for data-intensive applications like creative audio software), you may want to set the processor at the Highest setting to keep the processor running at its highest frequency at all times.

It's easy to monitor the amount of battery charge—simply look at the battery status icon in the menu bar or at the five LEDs on the bottom of the battery. Pressing the button next to the LEDs gives an indication of the amount of charge left in the battery. The LEDs work even when the battery is out of the computer. They also illuminate when the system is plugged into AC power to indicate that the battery is charging, and turn off when the battery becomes fully charged.

# Designed for You

Every PowerBook G4—from the ultracompact 12-inch to the powerful 15-inch to the impressive 17-inch model—is a full-featured notebook loaded with the advanced capabilities and power required by creative professionals, scientists, students, and mobile professionals alike. So no matter what you do, there's a PowerBook G4 that's perfect for you.

## Compatible applications

More than 12,000 applications have been developed for Mac OS X. Many of these same applications, such as Microsoft Office and Adobe Photoshop, are available for Windows and are compatible between the Mac and Windows platforms. Sharing files and formats between the Mac and PC worlds has never been easier.

## Creative Professionals

### Professional video

The portability and power of the PowerBook G4 combined with Final Cut Pro HD (sold separately) make it possible to edit video whether you're on location or at your own studio. Take advantage of the widescreen display of the 17-inch or 15-inch PowerBook for viewing video and graphics, or use the dual display capability of any of the three models to attach an Apple flat-panel display and spread out your video assets, timelines, and work windows.<sup>3</sup> Enjoy the ultimate viewing experience and attach a 30-inch Apple Cinema HD Display, adding over 4 million pixels to your desktop (15-inch and 17-inch models with 128MB of graphics memory and dual-link DVI functionality). Use the FireWire 800 or FireWire 400 ports to access high-performance external storage devices, camcorders, and media servers. Exchange email and send data at high speed with Gigabit Ethernet (featured in the 15- and 17-inch PowerBook) and AirPort Extreme wireless networking.<sup>4</sup> Retrieve and save huge files faster than ever with the 5400-rpm hard drive. And burn your own DVDs and CDs even when you're on the go, with the even faster 8x SuperDrive.<sup>2</sup>

### Design and publishing

The PowerBook G4 has the connections and high-level performance to deliver results fast and reliably. Whether you're developing website content, presenting ideas at a client site, or producing precise magazine layouts, it's easy to see why the PowerBook is the ideal mobile design center. With ColorSync for precise color, the Quartz engine for superior graphics, and integrated PDF support, Mac OS X works seamlessly with the G4 processor and the crisp, bright PowerBook display to give you consistent, high-quality color images from capture through output. Native support for the 30-inch Apple Cinema HD Display in the 17-inch model (optional in the 15-inch model) allows you to showcase your work with maximum impact. Gigabit Ethernet, featured in the 15- and 17-inch PowerBook, enhances workflow by speeding file transfers at every step. And AppleScript lets you automate routine tasks, from reformatting large groups of images to building an entire online catalog using content on servers across the globe.

### FileVault

Because you may want to take your PowerBook wherever you go, you'll need to keep your confidential documents from getting into the wrong hands. FileVault lets you secure your home directory by encrypting its entire contents using the Advanced Encryption Standard (AES) with 128-bit keys. This high-performance algorithm automatically encrypts and decrypts on the fly, so you don't even know it's happening. To comprehend the level of security that AES provides, consider this comparison to the less secure Digital Encryption Standard (DES): If a machine could be built to recover a 56-bit DES key in one second, it would take that machine approximately 149 trillion years to crack a 128-bit AES key. For these reasons, 128-bit AES encryption has been adopted by the U.S. government as a standard for securing electronic transmissions.

### Secure keychain

To make it easy to manage the daunting number of passwords and permissions associated with network computing and a secure environment, Mac OS X includes Keychain Access. This feature consolidates your passwords in one secure location, then allows you to access them via a master password. You can unlock your keychain so that applications or network connections can read them when accessing secure sites, or you can lock it so that you are prompted for your master password each time an application attempts to retrieve a password from the keychain. With Keychain Access, managing your passwords has never been easier or more secure.

### Music and audio

As an audio professional, you'll find the PowerBook G4 ideal for composing and arranging music, wherever you are. GarageBand, part of iLife and included with every PowerBook, turns your computer into a complete recording studio packed with hundreds of digital instruments and a built-in "recording engineer" to perfect your compositions. Seasoned professionals can add Apple's Logic Pro 7 software, which expands on one of the industry-leading systems for integrated composition, notation, and audio production, and features nearly inexhaustible possibilities for native sound generation and processing.

Musicians in particular will appreciate the portability and stability of the PowerBook, using it with confidence for recording or as a host for DSP and virtual instruments. The 17-inch PowerBook now includes built-in optical digital audio input and output, providing the higher audio and signal quality musicians need. And in the dimly lit conditions of a studio or stage, musicians can take advantage of the illuminated keyboard included with the 15-inch and 17-inch models. Mac OS X Core Audio provides high-definition, 24-bit digital audio with scalable resolutions exceeding 192kHz, while fast processing supports multiple simultaneous channels and plug-ins, all with extremely low latency. And you get seamless, plug-and-play connectivity of multichannel audio and MIDI devices over USB 2.0 or FireWire 800 and 400.

### Business

As a mobile professional, you require a portable computer that is compact and lightweight enough to take anywhere, yet powerful enough to get the job done. With the thinnest, lightest designs in the industry—including the road warrior's perfect companion, the ultracompact 12-inch PowerBook—these notebooks provide portability and power. With performance enhancements throughout the architecture and the Sudden Motion Sensor to help protect against data loss, the new PowerBook systems are designed to boost your work output and ease concerns about losing your critical data. The PowerBook G4 also gives you the freedom to present at virtually any customer site. Using its DVI, ADC, VGA, composite, and S-video connections, you can attach the PowerBook to just about any display, monitor, TV, or projector.<sup>3</sup> AirPort Extreme provides fast 54-Mbps wireless networking,<sup>4</sup> while Bluetooth 2.0 + EDR technology allows up to 3-Mbps cable-free connections to your PDA and mobile phone and to future Bluetooth 2.0 devices, making life on the road even easier now and into the future.

### Higher Education

As a university administrator or faculty member, you require a computer that allows you to create and deliver presentations, design lesson plans, perform research, and access the Internet. With the PowerBook G4, you can perform these tasks with ease anywhere on campus.

College campuses are increasingly embracing the wireless world. That's great news for PowerBook owners, who can send and receive data at up to 54 Mbps with AirPort Extreme on an 802.11g network, as well as connect easily to 802.11b Wi-Fi networks.<sup>4</sup>

College students are looking for a powerful, all-in-one computer that can go anywhere. The durable PowerBook G4 is designed to provide the power, memory, and features necessary to last through your college years. You'll love its captivating aluminum design, its DVD-playing ability, and the advanced gaming made possible by the powerful ATI or NVIDIA graphics processor. For extra peace of mind, the Sudden Motion Sensor helps protect your data. Choose a PowerBook equipped with the SuperDrive

and you'll be able to copy your data onto DVDs, which provide up to 4.7GB of storage—you'll have the room to back up your ever-growing volume of research papers, MP3s, video clips, and photos. And with software like iLife '05 (including iTunes, iPhoto, iMovie HD, iDVD, and GarageBand), Safari, Mail, and iChat AV, the PowerBook is a complete package and significant value for those on a college budget.

## Science and Technology

The typical researcher's desktop often has two or more computers: a UNIX workstation for computational and open source applications, and a PC or Mac for mainstream productivity applications such as graphics, email, word processing, and presentations. Thanks to Mac OS X, the PowerBook G4 lets you run UNIX, vector processing, and productivity applications all on a single system—at your desk and on the road. And you'll be running all those programs on the now more powerful G4 processor with its Velocity Engine vector processing unit for fast computation, analysis, and display of scientific data.

# Product Configurations and Options

## Standard Configurations

The following standard PowerBook G4 configurations are available through the Apple Store and Apple Authorized Resellers.

### 12-inch PowerBook G4

Order number	M9690LL/A	M9691LL/A
Processor	1.5GHz PowerPC G4	1.5GHz PowerPC G4
Memory	512MB of PC2700 (333MHz) DDR SDRAM	512MB of PC2700 (333MHz) DDR SDRAM
Hard drive	60GB 5400-rpm Ultra ATA/100 <sup>1</sup>	80GB 5400-rpm Ultra ATA/100 <sup>1</sup>
Optical drive	Slot-loading Combo (DVD-ROM/CD-RW)	Slot-loading 8x SuperDrive (DVD±RW/CD-RW)
Display	12.1-inch (diagonal) TFT XGA; 1024-by-768 resolution	12.1-inch (diagonal) TFT XGA; 1024-by-768 resolution
Graphics support	NVIDIA GeForce FX Go5200 with 64MB of DDR SDRAM	NVIDIA GeForce FX Go5200 with 64MB of DDR SDRAM
Wireless support	Built-in 54-Mbps AirPort Extreme <sup>4</sup> Built-in 3-Mbps Bluetooth 2.0 + EDR	Built-in 54-Mbps AirPort Extreme <sup>4</sup> Built-in 3-Mbps Bluetooth 2.0 + EDR
Ethernet	10/100BASE-T	10/100BASE-T
Modem	56K V.92 <sup>8</sup>	56K V.92 <sup>8</sup>
Also included	Mini-DVI to DVI adapter, mini-DVI to VGA adapter, modem cable, power adapter, AC wall plug, power cord	

**15-inch PowerBook G4**

Order number	M9676LL/A	M9677LL/A
Processor	1.5GHz PowerPC G4	1.67GHz PowerPC G4
Memory	512MB of PC2700 (333MHz) DDR SDRAM (single SO-DIMM)	512MB of PC2700 (333MHz) DDR SDRAM (single SO-DIMM)
Hard drive	80GB 5400-rpm Ultra ATA/100 <sup>1</sup>	80GB 5400-rpm Ultra ATA/100 <sup>1</sup>
Optical drive	Slot-loading Combo (DVD-ROM/CD-RW)	Slot-loading 8x SuperDrive (DVD±RW/CD-RW)
Display	15.2-inch (diagonal) TFT widescreen; 1280-by-854 resolution	15.2-inch (diagonal) TFT widescreen; 1280-by-854 resolution
Graphics support	ATI Mobility Radeon 9700 with 64MB of DDR SDRAM	ATI Mobility Radeon 9700 with 64MB of DDR SDRAM
Wireless support	Built-in 54-Mbps AirPort Extreme <sup>4</sup> Built-in 3-Mbps Bluetooth 2.0 + EDR	Built-in 54-Mbps AirPort Extreme <sup>4</sup> Built-in 3-Mbps Bluetooth 2.0 + EDR
Ethernet	10/100/1000BASE-T (Gigabit)	10/100/1000BASE-T (Gigabit)
Modem	56K V.92 <sup>8</sup>	56K V.92 <sup>8</sup>
Keyboard	Full size; backlit with ambient light sensor	Full size; backlit with ambient light sensor
Also included	S-video to composite adapter, DVI to VGA adapter, modem cable, power adapter, AC wall plug, power cord	

**17-inch PowerBook G4**

Order number	M9689LL/A
Processor	1.67GHz PowerPC G4
Memory	512MB of PC2700 (333MHz) DDR SDRAM (single SO-DIMM)
Hard drive	100GB 5400-rpm Ultra ATA/100 <sup>1</sup>
Optical drive	Slot-loading 8x SuperDrive (DVD±RW/CD-RW)
Display	17-inch (diagonal) TFT widescreen; 1440-by-900 resolution
Graphics support	ATI Mobility Radeon 9700 with 128MB of DDR SDRAM and dual-link DVI functionality
Wireless support	Built-in 54-Mbps AirPort Extreme <sup>4</sup> Built-in 3-Mbps Bluetooth 2.0 + EDR
Ethernet	10/100/1000BASE-T (Gigabit)
Modem	56K V.92 <sup>8</sup>
Keyboard	Full size; backlit with ambient light sensor
Also included	S-video to composite adapter, DVI to VGA adapter, modem cable, power adapter, AC wall plug, power cord

**Included Software**

PowerBook G4 computers come with the following software: Mac OS X, Mail, iChat AV, Safari, Sherlock, Address Book, QuickTime, iLife (includes iTunes, iPhoto, iMovie HD, iDVD, and GarageBand), iSync, iCal, DVD Player, Classic environment, Art Directors Toolkit, EarthLink TotalAccess (includes 30 days of free dial-up Internet service on EarthLink activation), FileMaker Pro Trial, GraphicConverter, Microsoft Office 2004 for Mac Test Drive, OmniGraffle, OmniOutliner, QuickBooks for Mac New User Edition, Zinio Reader, Xcode Developer Tools, and Apple Hardware Test.



## Build-to-Order Options

You can order a custom-configured PowerBook G4 from the Apple Store or an Apple Authorized Reseller. Options may include additional RAM, a larger hard disk drive, additional graphics memory, type of optical drive, additional batteries and power adapters, AirPort Extreme or AirPort Express Base Stations, Apple flat-panel displays, external keyboards and mice, and third-party peripherals.

## Apple Displays and Adapters

To enhance your PowerBook G4 system, choose from Apple's family of all-digital, flat-panel displays:

- Apple Cinema Display (20-inch), order number M9177LL/A
- Apple Cinema HD Display (23-inch), order number M9178LL/A
- Apple Cinema HD Display (30-inch), order number M9179LL/A

In addition, the following display adapters are available:

- Apple DVI to ADC Adapter, order number M8661LL/B (required to connect Apple flat-panel displays that have an ADC connector)
- Apple Mini-DVI to Video Adapter, order number M9319G/A (12-inch PowerBook)

## Other Products

These products are also available for your PowerBook G4 system:

- Apple Portable Power Adapter, order number M8943LL/A
- 12-inch PowerBook G4 Rechargeable Battery, order number M9572G/A
- 15-inch PowerBook G4 Rechargeable Battery, order number M9325G/A
- 17-inch PowerBook G4 Rechargeable Battery, order number M9326G/A
- AirPort Express Base Station, order number M9470LL/A
- AirPort Extreme Base Station with modem and antenna port, order number M8799LL/A
- AirPort Extreme Base Station with Power over Ethernet support and UL 2043 conformance, order number M9397LL/A
- iSight, order number M8817LL/B
- .Mac, order number M9495Z/A
- Apple Wireless Keyboard, order number M9270LL/A
- Apple Wireless Mouse, order number M9269Z/A
- AppleCare Protection Plan, order number M8853LL/A

## Extended Service and Support

Every PowerBook G4 comes with 90 days of toll-free telephone support and a one-year limited warranty. You can purchase the AppleCare Protection Plan to extend your service and support to up to three full years. The plan provides support for your Mac, the Mac OS, and many Apple consumer applications, so just one phone call can help resolve most issues. You can also enroll one Apple display for coverage, provided that the PowerBook G4 and display are purchased together. For more information, visit [www.apple.com/support/products](http://www.apple.com/support/products) or call 800-823-2775.

# Technical Specifications

## 12-inch PowerBook G4

### Processor and memory

- 1.5GHz PowerPC G4 processor with Velocity Engine
- 512K SRAM on-chip L2 cache
- 167MHz system bus
- 512MB of PC2700 (333MHz) DDR SDRAM (256MB built in, 256MB in single SO-DIMM slot; one open slot remains); support for up to 1.25GB

### Storage

- 60GB or 80GB 5400-rpm Ultra ATA/100 hard drive; optional 100GB 5400-rpm drive<sup>1</sup>
- One of the following optical drives:
  - Slot-loading Combo drive (DVD-ROM/CD-RW): reads DVDs at up to 8x speed, writes CD-R discs at up to 24x speed, writes CD-RW discs at up to 16x speed, reads CDs at up to 24x speed
  - Slot-loading SuperDrive (DVD±RW/CD-RW): writes DVD-R and DVD+R discs at up to 8x speed Zoned Constant Linear Velocity (ZCLV), writes DVD-RW and DVD+RW discs at up to 4x speed ZCLV, reads DVD-ROMs at up to 8x speed, reads DVD-R and DVD+R discs at up to 6x speed, reads DVD-RW and DVD+RW discs at up to 6x speed, writes CD-R discs at up to 24x speed, writes CD-RW discs at up to 10x speed, reads CDs at up to 24x speed (depending on quality of media)

### Communications

- Built-in 54-Mbps AirPort Extreme wireless networking<sup>4</sup> (based on 802.11g standard; Wi-Fi Certified for 802.11g and 802.11b interoperability)
- Built-in 3-Mbps Bluetooth 2.0 + Enhanced Data Rate (EDR)
- Built-in 10/100BASE-T Ethernet (RJ-45 connector)
- Built-in 56K V.92 modem<sup>8</sup> (RJ-11 connector)

### Expansion

- One FireWire 400 port at up to 400 Mbps<sup>7</sup>
- Two USB 2.0 ports at up to 480 Mbps

### Display

- 12.1-inch (diagonal) TFT XGA active-matrix display
  - Support for millions of colors at 1024-by-768-pixel resolution
  - Support for resolution scaling to 800-by-600-pixel and 640-by-480-pixel resolution with millions of colors

### **Video and graphics support**

- NVIDIA GeForce FX Go5200 graphics processor with AGP 4X support and 64MB of DDR SDRAM for 2D/3D graphics acceleration
- Dual display and video mirroring: Simultaneously supports up to 1024 by 768 pixels on the built-in display and up to 2048 by 1536 pixels on an external display, both at millions of colors<sup>11</sup>
- DVI output using included mini-DVI to DVI adapter
- VGA output using included mini-DVI to VGA adapter
- S-video and composite video output using mini-DVI to video adapter (sold separately)

### **Audio**

- Audio line in (minijack)
- Headphone out (minijack)
- Built-in stereo speakers with midrange-enhancing third speaker
- Internal omnidirectional microphone

### **Battery and power**

- 50-watt-hour lithium-ion battery with integrated charge indicator LEDs
- Up to 5 hours of battery life<sup>6</sup>
- 45W power adapter with cable management system
- Power adapter port

### **Security**

- Kensington cable lock slot

### **Keyboard and trackpad**

- Built-in full-size keyboard with 78 (U.S.) or 79 (ISO) keys, including 12 function keys, 4 arrow keys (inverted "T" arrangement), and embedded numeric keypad
- Trackpad scrolling for precise cursor control and faster navigation and scrolling; supports tap, double-tap, and drag capabilities

### **Electrical and environmental requirements**

- Meets ENERGY STAR requirements
- Line voltage: 100V to 240V AC
- Frequency: 50Hz to 60Hz
- Operating temperature: 50° to 95° F (10° to 35° C)
- Storage temperature: -13° to 113° F (-25° to 45° C)
- Relative humidity: 0% to 90% noncondensing
- Maximum operating altitude: 10,000 feet
- Maximum storage altitude: 15,000 feet
- Maximum shipping altitude: 35,000 feet

### **Size and weight**

- Height: 1.18 inches (3.0 cm)
- Width: 10.9 inches (27.7 cm)
- Depth: 8.6 inches (21.9 cm)
- Weight: 4.6 pounds (2.13 kg) with battery and optical drive installed<sup>5</sup>

## 15-inch PowerBook G4

### Processor and memory

- 1.5GHz or 1.67GHz PowerPC G4 processor with Velocity Engine
- 512K SRAM on-chip L2 cache
- 167MHz system bus
- 512MB of PC2700 (333MHz) DDR SDRAM (single SO-DIMM); two SO-DIMM slots support up to 2GB

### Storage

- 80GB 5400-rpm Ultra ATA/100 hard drive; optional 100GB 5400-rpm drive<sup>1</sup>
- One of the following optical drives:
  - Slot-loading Combo drive (DVD-ROM/CD-RW): reads DVDs at up to 8x speed, writes CD-R discs at up to 24x speed, writes CD-RW discs at up to 16x speed, reads CDs at up to 24x speed
  - Slot-loading SuperDrive (DVD±RW/CD-RW): writes DVD-R and DVD+R discs at up to 8x speed Zoned Constant Linear Velocity (ZCLV), writes DVD-RW and DVD+RW discs at up to 4x speed ZCLV, reads DVD-ROMs at up to 8x speed, reads DVD-R and DVD+R discs at up to 6x speed, reads DVD-RW and DVD+RW discs at up to 6x speed, writes CD-R discs at up to 24x speed, writes CD-RW discs at up to 10x speed, reads CDs at up to 24x speed (depending on quality of media)

### Communications

- Built-in 54-Mbps AirPort Extreme wireless networking<sup>4</sup> (based on 802.11g standard; Wi-Fi Certified for 802.11g and 802.11b interoperability)
- Built-in 3-Mbps Bluetooth 2.0 + Enhanced Data Rate (EDR)
- Built-in 10/100/1000BASE-T Gigabit Ethernet (RJ-45 connector)
- Built-in 56K V.92 modem<sup>8</sup> (RJ-11 connector)

### Expansion

- One FireWire 800 port at up to 800 Mbps; one FireWire 400 port at up to 400 Mbps<sup>7</sup>
- Two USB 2.0 ports at up to 480 Mbps
- PC Card/CardBus slot for Type I or Type II card

### Display

- 15.2-inch (diagonal) TFT widescreen display
  - Support for millions of colors at 1280-by-854-pixel resolution
  - Supported resolutions: 1280 by 854 (native), 1152 by 768, 896 by 600, 720 by 480, and 640 by 480 pixels at 3:2 aspect ratio; 1024 by 768, 800 by 600, and 640 by 480 pixels at 4:3 aspect ratio

### Video and graphics support

- ATI Mobility Radeon 9700 graphics processor with AGP 4X support and 64MB of DDR SDRAM for 2D/3D graphics acceleration; optional 128MB of DDR SDRAM with dual-link DVI functionality in 1.67GHz configuration
- Dual display and video mirroring: Simultaneously supports up to 1280 by 854 pixels on the built-in display and up to 2048 by 1536 pixels on an external display, both at millions of colors; optional 128MB of DDR SDRAM with dual-link DVI functionality supports up to 2560 by 1600 pixels on an external display, at millions of colors<sup>11</sup>
- DVI output port
- VGA output using included DVI to VGA adapter
- S-video output port
- Composite video output using included S-video to composite adapter

#### **Audio**

- Audio line in (minijack)
- Headphone out (minijack)
- Built-in stereo speakers with midrange-enhancing third speaker
- Internal omnidirectional microphone (located under left speaker grille)

#### **Battery and power**

- 50-watt-hour lithium-ion battery with integrated charge indicator LEDs
- Up to 4.5 hours of battery life<sup>6</sup>
- 65W power adapter with cable management system
- Power adapter port

#### **Security**

- Kensington cable lock slot

#### **Keyboard and trackpad**

- Built-in full-size keyboard with 78 (U.S.) or 79 (ISO) keys, including 12 function keys, 4 arrow keys (inverted "T" arrangement), and embedded numeric keypad; illuminated fiber-optic, backlit keys
- Trackpad scrolling for precise cursor control and faster navigation and scrolling; supports tap, double-tap, and drag capabilities

#### **Ambient light sensor**

- Measures ambient light and works with integrated software to adjust keyboard illumination and screen brightness based on user preferences

#### **Electrical and environmental requirements**

- Meets ENERGY STAR requirements
- Line voltage: 100V to 240V AC
- Frequency: 50Hz to 60Hz
- Operating temperature: 50° to 95° F (10° to 35° C)
- Storage temperature: -13° to 113° F (-25° to 45° C)
- Relative humidity: 0% to 90% noncondensing
- Maximum operating altitude: 10,000 feet
- Maximum storage altitude: 15,000 feet
- Maximum shipping altitude: 35,000 feet

#### **Size and weight**

- Height: 1.1 inches (2.8 cm)
- Width: 13.7 inches (34.8 cm)
- Depth: 9.5 inches (24.3 cm)
- Weight: 5.6 pounds (2.5 kg) with battery and optical drive installed<sup>5</sup>

## 17-inch PowerBook G4

### Processor and memory

- 1.67GHz PowerPC G4 processor with Velocity Engine
- 512K SRAM on-chip L2 cache
- 167MHz system bus
- 512MB of PC2700 (333MHz) DDR SDRAM (single SO-DIMM); two SO-DIMM slots support up to 2GB

### Storage

- 100GB 5400-rpm Ultra ATA/100 hard drive; optional 80GB 5400-rpm drive<sup>1</sup>
- Slot-loading SuperDrive (DVD±RW/CD-RW): writes DVD-R and DVD+R discs at up to 8x speed Zoned Constant Linear Velocity (ZCLV), writes DVD-RW and DVD+RW discs at up to 4x speed ZCLV, reads DVD-ROMs at up to 8x speed, reads DVD-R and DVD+R discs at up to 6x speed, reads DVD-RW and DVD+RW discs at up to 6x speed, writes CD-R discs at up to 24x speed, writes CD-RW discs at up to 10x speed, reads CDs at up to 24x speed (depending on quality of media)

### Communications

- Built-in 54-Mbps AirPort Extreme wireless networking<sup>4</sup> (based on 802.11g standard; Wi-Fi Certified for 802.11g and 802.11b interoperability)
- Built-in 3-Mbps Bluetooth 2.0 + Enhanced Data Rate (EDR)
- Built-in 10/100/1000BASE-T Gigabit Ethernet (RJ-45 connector)
- Built-in 56K V.92 modem<sup>8</sup> (RJ-11 connector)

### Expansion

- One FireWire 800 port at up to 800 Mbps; one FireWire 400 port at up to 400 Mbps<sup>7</sup>
- Two USB 2.0 ports at up to 480 Mbps
- PC Card/CardBus slot for Type I or Type II card

### Display

- 17-inch (diagonal) TFT widescreen display
  - Support for millions of colors at 1440-by-900-pixel resolution
  - Supported resolutions: 1440 by 900 (native), 1152 by 720, 1024 by 640, and 800 by 500 pixels at 16:10 aspect ratio; 1024 by 768, 800 by 600, and 640 by 480 pixels at 4:3 aspect ratio

### Video and graphics support

- ATI Mobility Radeon 9700 graphics processor with AGP 4X support and 128MB of DDR SDRAM for 2D/3D graphics acceleration and dual-link DVI functionality
- Dual display and video mirroring: Simultaneously supports up to 1440 by 900 pixels on the built-in display and up to 2560 by 1600 pixels on an external display, both at millions of colors<sup>11</sup>
- DVI output port
- VGA output using included DVI to VGA adapter
- S-video output port
- Composite video output using included S-video to composite adapter

### Audio

- Combined optical digital input/audio line in (minijack)
- Combined optical digital output/headphone out (minijack)
- Two built-in stereo speakers
- Internal omnidirectional microphone (located under left speaker grille)

### Battery and power

- 58-watt-hour lithium-ion prismatic battery with integrated charge indicator LEDs
- Up to 4.5 hours of battery life<sup>6</sup>
- 65W power adapter with cable management system
- Power adapter port

### Security

- Kensington cable lock slot

### Keyboard and trackpad

- Built-in full-size keyboard with 78 (U.S.) or 79 (ISO) keys, including 12 function keys, 4 arrow keys (inverted "T" arrangement), and embedded numeric keypad; illuminated fiber-optic, backlit keys
- Trackpad scrolling for precise cursor control and faster navigation and scrolling; supports tap, double-tap, and drag capabilities

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- Relative humidity: 0% to 90% noncondensing
- Maximum operating altitude: 10,000 feet
- Maximum storage altitude: 15,000 feet
- Maximum shipping altitude: 35,000 feet

### Size and weight

- Height: 1.0 inch (2.6 cm)
- Width: 15.4 inches (39.2 cm)
- Depth: 10.2 inches (25.9 cm)
- Weight: 6.9 pounds (3.1 kg) with battery and optical drive installed<sup>5</sup>

## For More Information

For more information about the PowerBook G4, visit [www.apple.com/powerbook](http://www.apple.com/powerbook). To find out more about Mac OS X, visit [www.apple.com/macosx](http://www.apple.com/macosx).

Internet access requires a compatible Internet service provider; fees may apply. Product includes electronic documentation. Backup copy of software is included. <sup>1</sup>1GB = 1 billion bytes; actual formatted capacity less. <sup>2</sup>Burning DVDs requires SuperDrive; available in selected configurations. <sup>3</sup>May require adapter (included or sold separately). <sup>4</sup>Wireless Internet access requires wireless access point and Internet access (fees may apply). Achieving data rates of up to 54 Mbps requires that all users have an AirPort Extreme- or Wi-Fi Certified 802.11g-enabled computer and connect to an AirPort Extreme or AirPort Express Base Station or other 802.11g access point. Some ISPs are not currently compatible with AirPort. Actual speeds will vary based on range, connection rate, site conditions, size of network, and other factors. <sup>5</sup>Actual weight varies by configuration and manufacturing process. <sup>6</sup>Battery life depends on configuration and use. <sup>7</sup>Actual rates will vary. <sup>8</sup>Compatible ISP and telephone services required. Your ISP may not support all V.92 features. Modem will function according to V.90 standards if V.92 services are not available. Actual modem speeds lower; speed depends on connection rate and other factors. <sup>9</sup>Wireless printing over USB requires Mac OS X v10.2.7 or later and a compatible printer. <sup>10</sup>AirPort Express requires a Wi-Fi Certified 802.11b- or 802.11g-enabled computer and Mac OS X v10.3, Windows XP, or Windows 2000. Wireless printing requires a compatible printer. Streaming music requires iTunes 4.6 or later. <sup>11</sup>Some third-party DVI displays may not support all resolutions.

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