AirPort Express

Technology Overview
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Introduction

In 1999, Apple led the way in wireless networking with the introduction of the first AirPort Base Station, creating an environment where users could access the Internet without a wired connection. This breakthrough was followed by another major innovation in 2003: the AirPort Extreme Base Station. Using the 802.11g wireless standard, AirPort Extreme increased the connection speed from 11 megabits per second (Mbps) to up to 54 Mbps and paved the way for future advances in the AirPort line.

Today, millions of AirPort products are providing affordable, easy-to-use wireless networking in homes, businesses, and campuses around the world. The flexibility of a wireless network makes it ideal for almost any situation, from campuswide deployments in education and business to unwiring a home for a family to enjoy. Until now, there have been individual devices that explore the possibilities of wireless networking, such as playing music over a stereo, sharing a USB printer, and extending an existing network via bridging, but none have combined many features into one unit. Now Apple introduces AirPort Express with AirTunes, the first device to combine a shared wireless Internet connection, music streaming, USB printing, and wireless bridging capabilities into a single, mobile unit.

AirPort Express with AirTunes is an extension of the already very successful AirPort line. Designed for use at home and on the go, AirPort Express is an excellent way to unwire your life; it's the perfect addition to an existing AirPort Extreme network. Using AirPort Express, you can access the Internet,[1] play music in iTunes over your stereo or powered speakers,[2] share a printer,[3] and take wireless access with you wherever you want to go. If you already have an AirPort Extreme wireless network set up in your home, you can add one or more AirPort Express Base Stations to extend your existing network, or put one by your stereo so you can take advantage of the AirTunes music feature. AirPort Express works for up to 10 users at a time, and its portable design makes it easy to slip into a laptop bag, a backpack, or even your pocket. Wherever you go, you can have a wireless network up and running in just minutes.

With iTunes now available for both Mac and Windows PCs, it only makes sense that AirPort Express works seamlessly on both platforms. You can use AirPort Express to play music, surf the web, or print wirelessly from a Mac or a Windows PC. And AirPort Express uses the same 802.11g wireless standard that is at the core of AirPort Extreme, so it is fully compatible and works at the same blazing-fast data rate of up to 54 Mbps.[4]

With wireless networks prevalent everywhere from college campuses and business complexes to hotels and cafés, now is the perfect time to discover wireless networking in your home and to enjoy the benefits of streaming music, wireless Internet, printer sharing, and so much more.

AirPort Express with AirTunes

AirPort Express is the first all-in-one mobile base station that lets you enjoy your iTunes music library in almost any room in your house, share a single existing broadband Internet connection, share a USB printer, extend the range of your network, and create an instant network on the go—wirelessly. Unmatched in its ease of use, AirPort Express delivers data rates up to 54 Mbps, fits in the palm of your hand, and goes with you everywhere. Designed for both Mac and Windows PCs, AirPort Express is the ideal wireless networking, music playing, and printer sharing solution.

Driving the Wi-Fi Revolution

In 1999, Apple sparked the wireless revolution with the introduction of AirPort, the first affordable and easy-to-use solution for accessing the Internet without cables. In 2003, AirPort Extreme took your unwired connection to the next level by harnessing the superfast IEEE 802.11g wireless standard for data rates nearly five times those of the 802.11b standard, and it added Windows compatibility to its list of key features.[4] With AirPort Express, Apple continues to advance the wireless landscape, delivering wireless networking, audio, printing, and bridging capabilities in a single, affordable, portable unit.

Mac and PC in Perfect Harmony

Welcome, Windows users. Designed to support both Mac and Windows PCs, AirPort Express is an excellent introduction to the wireless world, Apple style. Setting up your base station is easy. Using the AirPort Express Assistant, you can create a wireless network where both Mac and Windows PCs can surf the Internet, share a printer, and play music on a stereo or set of powered speakers in perfect harmony.

First Mobile Base Station

AirPort Express is made for life on the go. It's an all-in-one base station with a single-piece design, with no separate power supply or power cord required, making it easy and convenient to take with you. It's also incredibly small and lightweight. At just 6.7 ounces (189 grams), it slips weightlessly into your laptop case, carry-on bag, backpack, purse, and even your pocket, so you can take it with you wherever you go. Because it's based on the Apple standard design, it is compatible with any AC plug from Apple's World Travel Adapter Kit, making it a truly global device.

In addition to its small and lightweight design, AirPort Express allows you to create up to five different configurations, called profiles, for moving from location to location. You can create multiple profiles—one for home, one work profile, and one hotel profile—and choose between them when you're on the go. When you get home, you can simply reselect the home profile and be up and running in seconds.

Full-Featured Base Station

AirPort Express redefines how to think of wireless access by combining many different features into one portable unit. It is the most full-featured mobile base station available. Here are the key features of AirPort Express that set it apart:

Connectivity. With AirPort Express, you can create a wireless network for up to 10 users in minutes—in the living room, the kitchen, or even the backyard.[1]
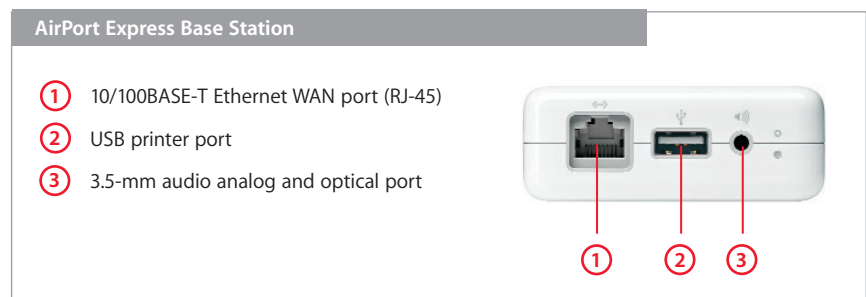
Playing music. Using the new AirTunes feature of AirPort Express, you can play music in iTunes through your stereo or a set of powered speakers.[2]

Extending your network. With AirPort Express, you can extend the range of an existing AirPort Extreme or AirPort Express network, using a feature called bridging, to make it reach into a room where it couldn't be accessed before or to fill gaps in an existing network.[5] Bridging is available as long as the base station is in range of the main or relay base station on the existing network.

Printing. AirPort Express comes with a USB port, so you can connect and share a USB printer over the wireless network.[3]

Portability. AirPort Express is so small and light that you can take it with you anywhere to create a wireless network in a hotel room, in the living room, or at a friend's house. It stores up to five profiles, and you can switch between them when you change locations—there's no need to set up a new profile every time you return to a previous location.

Ease of use. AirPort Express features the superb ease of use that made the original AirPort system so popular. AirPort Express Assistant makes it easy to configure the AirPort Express Base Station and set up your computer to access it. In most cases, you'll have your wireless network up and running in a matter of minutes. The AirPort Admin Utility software for Windows lets you set up the base station from a Windows 2000– or Windows XP–based computer.

AirPort Express Base Station

1. 10/100BASE-T Ethernet WAN port (RJ-45)
2. USB printer port
3. 3.5-mm audio analog and optical port

AirTunes: iTunes Unplugged

AirTunes is a breakthrough technology that redefines the way you listen to your music at home. It gives you the freedom to play your iTunes music through your stereo or powered speakers in virtually any room of your house—wirelessly.[2] It lets you enjoy the tremendous flexibility of iTunes without being bound to your Mac or PC, opening up a whole new world of musical enjoyment.

Once upon a time, you had all of your music on CDs and you could play them individually through your stereo. Then, as the digital revolution took over, you imported the music into your computer and played it through the computer or downloaded your collection to an iPod. Now things have come full circle. You'd like to enjoy your extensive digital music collection, all arranged into playlists in iTunes, on your home stereo in the living room, not just in the den where your computer sits. Enter AirPort Express with AirTunes.

AirPort Express works with iTunes to make listening to your iTunes music library through your home stereo or powered speakers not only a possibility, but a cinch. Whether your stereo or powered speakers are located in your living room, bedroom, or basement, just plug the stereo or speakers into the audio port on the base station using an audio cable (included in the AirPort Express Stereo Connection Kit, sold separately), and iTunes automatically detects the connection. When you open iTunes on your AirPort-enabled Mac or Wi-Fi–enabled PC, you'll see a pop-up menu at the bottom right of the iTunes window showing your remote speakers. Select it, click Play, and your stereo becomes the world's greatest digital jukebox.

Apple: The Leader in Digital Music

Beginning with the original Macintosh—the first personal computer to include built-in audio—Apple has helped to define the way music is written, recorded, and enjoyed today. The runaway success of iPod, Apple's portable digital music player, and iTunes, the best digital jukebox and companion software to iPod, has put Apple at center stage in the digital music revolution. Apple's leadership was solidified with the launch of the iTunes Music Store, the first place to offer easy, immediate, and legal access to the music people want—with hundreds of thousands of songs, albums, and audiobooks to choose from.[6] The store allows music fans to buy, listen to, and keep every song they purchase, and listen from their Mac or PC, iPod, or burned CD playing on a stereo or in the car.

AirPort Express with AirTunes continues the evolution of digital music, setting Apple apart yet again. With the ability to play your entire iTunes library over your stereo or set of powered speakers, AirPort Express is the ideal addition to your life. Whether you use a Mac or Windows PC, Apple's suite of music software and hardware lets you enjoy your entire music library, at home or on the go.

AirPort Express in Depth

AirPort Express is ideal for your home and for traveling. It allows you to play music wirelessly through your stereo or powered speakers, unwire a single broadband Internet connection for up to 10 users, share a USB printer, and extend the range of an existing AirPort Extreme or AirPort Express network through bridging.

High-Speed Connectivity

AirPort Express uses the 802.11g wireless standard. So AirPort Extreme–enabled Macintosh computers or Windows PCs with Wi-Fi Certified 802.11g cards on an AirPort Express wireless network can transfer data at up to 54 Mbps[4]—nearly five times the data rate of 802.11b. Because 802.11g also supports the 802.11b specification, 802.11b users can use AirPort Express seamlessly, side by side with other Wi-Fi–enabled computers.

What can you do with 54 Mbps of bandwidth from a base station? Here are some of the possibilities:

Listen to music. Using the AirTunes feature of AirPort Express, you can play music in iTunes on a Mac or PC through your stereo or powered speakers.[2] iTunes automatically detects an AirPort Express Base Station within range and lets you play music through the connected stereo or speakers.

Share a printer. AirPort Express comes with a USB port, so you can connect a USB printer and share it over your wireless network.[3]

Watch video on the Internet. You can use your high-speed connection to view videos and movie trailers or listen to Internet radio. Because of the high bandwidth, multiple users can enjoy movies or music at the same time, without slowing down the connection speed.

High-speed file sharing. Need to get a file from one computer to another at home or while you're in a meeting? File transfers are fast—without the hassle of finding and hooking up to an Ethernet connection.

All the ways to connect
The AirPort Express Base Station has a full range of connectivity options: a 10/100BASE-T Ethernet port for wide area network (WAN) connections, an audio port for connecting to a stereo, and a USB port for connecting to a USB printer.[7]

Ethernet. The WAN port connects to a DSL or cable modem or local Ethernet cable to provide high-speed Internet access to the users on your wireless network. When the base station is being used to bridge your network, you can use the Ethernet port as a local area network (LAN) port as well.

Audio. The audio port enables you to connect AirPort Express to your home stereo or powered speakers so you can play your music in iTunes over your wireless network.[2] It supports both analog stereo and optical digital audio.

USB. The USB port connects to your USB printer so you can share the printer across your network.[3]

On the Go with AirPort Express

The AirPort Express Base Station is designed to be extremely small, light, and easy to take with you, which makes it perfect for traveling long or short distances, such as on a business trip or from the living room to the kitchen.

Single-piece design
The AirPort Express Base Station has everything built in, including the power supply.[7] This makes traveling even easier because there is only one small unit to remember, with no additional parts or power cords that are critical to successful operation.

Maximum portability
AirPort Express weighs just 6.7 ounces (189 grams) and measures 3.7 by 2.95 by 1.12 inches (94.0 by 75.0 by 28.5 mm). It fits in the palm of your hand; slips easily in your laptop bag, backpack, or pocket; and tucks away behind your stereo when you're using it to stream music. It is also compatible with Apple's World Travel Adapter Kit, which includes a set of six AC plugs with prongs that fit different electrical outlets around the world. The AC plugs fit outlets in North America, Japan, China, the United Kingdom, Continental Europe, Korea, Australia, and Hong Kong.

Profiles

AirPort Express can store up to five base station configurations, known as profiles. A profile contains base station settings for a particular location, such as the iTunes remote speaker name and password, and network configuration information, such as the network name and password. Profiles are useful if you move your AirPort Express Base Station from one location to another.

For example, you might have one profile for using your base station at home, where you stream music to your home stereo and connect to the Internet using PPPoE. You might have another profile for using AirPort Express in a hotel where you connect to the Internet using DHCP. You'll use AirPort Admin Utility to create, edit, rename, and delete profiles.

With a separate profile for each location, moving the base station is as simple as plugging it in and choosing the location from the menu.
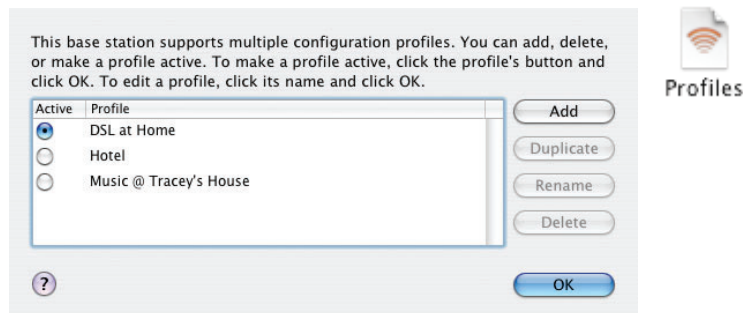
Playing Music

AirPort Express has a breakthrough feature called AirTunes for playing music over a wireless network.[2] Continuing the evolution of digital music, AirTunes lets you play any music you want from your iTunes library through your stereo or powered speakers, including audiobooks and streaming radio stations, using all the features of iTunes.

How does AirPort Express play music?

iTunes automatically detects whether there is an AirPort Express Base Station with AirTunes on the wireless network and lets you select it to play your music. When you click Play in iTunes, AirTunes encodes and encrypts the music using the Apple Lossless Encoder, which ensures that the music is CD quality before it is sent over the wireless network. AirPort Express receives the music, decrypts and decodes it, and fills its buffer with music. The buffer will help ensure that you won't have unwanted skipping, delays, or artifacts during playback. Once the buffer is filled, AirPort Express sends the music through the audio port to the stereo.

The music keeps playing continuously until you click Pause or Stop in iTunes. Just as you aren't able to hear music if you unplug the speakers on your stereo, if you unplug the audio cable from AirPort Express, the music continues playing in iTunes but you can't hear it. When you plug the audio cable back in, the music plays from where it currently is in the song—it doesn't pick up from where you left off when you unplugged it. If you switch the connection from your stereo to a set of powered speakers while you're playing music, iTunes pauses the music until the new connection has been established, and then it continues where it left off. When you are finished using AirPort Express to play music, the buffer is emptied; no music is stored inside.

You can set the volume in iTunes for each profile you set up in AirPort Express. So if you want the music to play at a particular volume in the kitchen, but you want it to play louder in the den, you can set the volume wherever you want and iTunes will remember the setting.

You can protect AirTunes with a password so that only you can access the stereo or speakers that the base station is connected to. This prevents children from playing music on their parents' stereo, or someone in the office from blasting music over the speakers closest to your desk.

iTunes considers AirPort Express to be a set of speakers attached to your computer, so you don't have to use one of your authorizations for music that you have purchased and downloaded from the iTunes Music Store. It plays just as it would if you were listening to it right on your computer.

Four ways to play
The AirPort Express Base Station with AirTunes can be set up in four different ways so you can take advantage of its music streaming capabilities and more.

A client on your network
If you already have a wireless network, you can use an AirPort Express Base Station as a client that wirelessly streams music to your stereo. AirPort Express works as a client on any Wi-Fi Certified 802.11g network. You simply connect the base station to your stereo using an audio cable, and a pop-up menu with a speaker icon appears at the bottom of the iTunes window. When you click the menu, iTunes knows to stream your music over the wireless network to the connected AirPort Express Base Station, which then plays it through your stereo or powered speakers. In this case, your Internet connection is provided by the main base station, not the AirPort Express Base Station functioning as a client on your existing network.

A music-only base station
If you have a DSL connection plugged directly into your computer, but you'd like to play music from iTunes over your stereo, you can use AirPort Express with AirTunes to play your music wirelessly without changing your DSL connection. Simply connect the AirPort Express Base Station to your stereo with an audio cable and plug the base station into a power source. Your computer automatically detects the base station, and iTunes gives you the option to play your music through your stereo.

An Internet and music base station
You can also set up your AirPort Express Base Station as a wireless network and streaming music station. Plug the Ethernet cable from your broadband connection into the base station, connect the audio cable to your stereo or powered speakers, and then plug the base station into a power source. With the cables and power connected, you can access the Internet and stream music over your stereo simultaneously.

Wireless bridging and music
Wireless bridging, also referred to as a Wireless Distribution System, lets you extend your network to parts of your home that your existing network is unable to reach.[5] Using AirPort Express, you can stream music at the same time you extend your network. Just set up your AirPort Express Base Station where you want to extend your network, within range of the primary base station, and connect it to your stereo or speakers. Then you can play music wirelessly over the newly bridged network, and access the Internet wirelessly anywhere within 150 feet of the satellite AirPort Express Base Station.

AirPort Express and iTunes
AirPort Express and iTunes work together seamlessly, whether you're using a Mac or a Windows PC, so you don't have to set anything up—AirPort Express and iTunes do it all for you. For example, when you connect AirPort Express, iTunes automatically detects the base station and gives you the option to play your music using AirTunes.

Stereo or speakers
With AirPort Express connected to your stereo or set of powered speakers, a pop-up list with a speaker icon appears at the bottom of the iTunes window. Click the pop-up list to tell iTunes to play your music to the base station and through the stereo or speakers that are connected to it. AirTunes takes a few seconds to connect to the remote speakers before the music plays. AirPort Express buffers the music to help prevent skipping, delays, or artifacts created by temporary interference, such as someone walking through the room using a 2.4GHz wireless phone.

Playing to different rooms
You can play music through your stereo from one computer at a time. If a second computer tries to stream to AirPort Express while another computer is connected, iTunes displays a Busy indicator, telling you that the connection is in use. You can try again later or disconnect the first stream so you can play music from the second computer.

If there are multiple AirPort Express Base Stations in your home, you can play music through multiple stereos or sets of speakers. For example, if you're in the kitchen listening to music from the computer in the office, another family member can play music over his or her stereo using the computer in the bedroom. So you can each listen to your own music playing from different computers over different stereos, without disturbing the other person.

Wireless Printing

AirPort Express delivers cost-effective printing for multiple users by making it possible to share a USB printer wirelessly on both Mac and Windows PCs. Just connect a printer to the USB port, and it instantly becomes available to all the users on your network.[3] No more buying extra printers, moving a printer from room to room, emailing files to the one computer that's connected to the printer, or running expensive, unsightly cables.

Flexible Networking

With AirPort Express, it's easy to manage the coverage of your wireless network. You can extend or reduce the range of a single base station or add another base station to your wireless network without cabling.[5]

Using wireless at home
For most homes, one AirPort Express Base Station provides ample wireless coverage because the internal antenna delivers uniform service to a broad area. If you could view the radio waves coming from the base station, you would see that they create an almost perfect sphere reaching about 150 feet from the base station. The internal antenna allows users with AirPort Extreme Cards and other 802.11g cards to achieve data rates of up to 54 Mbps up to 50 feet away from the base station, and data rates of up to 11 Mbps at up to 150 feet from the base station. Users with AirPort Cards and other 802.11b cards can obtain data rates of up to 11 Mbps at up to 150 feet from the base station.[4]

Rendezvous
AirPort wireless networking works with the revolutionary Rendezvous technology introduced in Mac OS X version 10.2. Rendezvous lets you create an instant network of computers and other devices without any configuration. It makes the services and capabilities of each device—such as file sharing and printing—dynamically discoverable by other devices on the network using the standard IP networking protocol.

For example, suppose there's a Rendezvous-enabled printer and a set of powered speakers on your wireless network, and you also have Rendezvous enabled on your PowerBook or iBook computer. As soon as you bring the computer into range of the network, it detects the presence of the printer and the speakers and makes them available. Rendezvous also works over wired IP networks such as Ethernet.
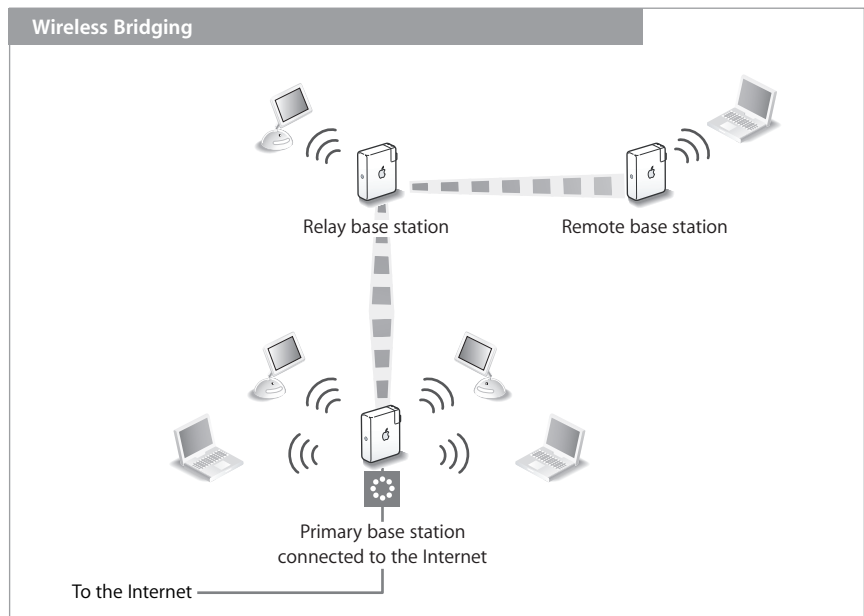
Extending the range of your network

With bridging, you can extend the range of your existing AirPort Extreme or AirPort Express wireless network anywhere you would like it to go: in your home, in the office, or even outside.

Wireless bridging

Wireless bridging, also referred to as a Wireless Distribution System (WDS), is a feature of AirPort Express that allows you to extend AirPort wireless networking to areas that don't have a physical Internet connection.[5] With wireless bridging, one AirPort Express Base Station can connect to another AirPort Express Base Station or an AirPort Extreme Base Station and use its Internet access.

One base station is the "primary" station and is connected to your wired network (WAN or LAN). Additional base stations can be connected wirelessly to the primary base station and use its Internet connection. These other base stations can be either stand-alone "remote" base stations or "relay" stations that themselves have remote base stations. All clients associated with any base station in the WDS network can see all available network services, including Rendezvous-enabled devices.


Wireless Bridging

Relay base station   Remote base station

Primary base station
connected to the Internet

To the Internet

The impact of extending your network

When you set up an additional AirPort Express Base Station as a wireless bridge for your existing AirPort network, you can almost double its range. The advantage of this range increase is obvious: more network coverage without any additional wires. However, bridging your network affects its bandwidth and can reduce your throughput. This makes very little difference for most home networks, where DSL and cable modem connections are most common. Most DSL and cable modems have a connection speed of up to 3 Mbps, which is a tiny fraction of the 54-Mbps speed that AirPort Express is capable of. However, to ensure the highest-quality connection throughout your home, it is recommended that you minimize the number of relay base stations.

Limiting the range

The Transmission Power Control setting in the AirPort Admin Utility software lets you adjust the range of your network by decreasing the amount of power the base station transmits. This feature is ideal for protecting the privacy of your network in a public setting, such as a hotel room. By limiting the range of the network so that only you can use it, you keep other people from seeing the network and piggybacking on your wireless connection.
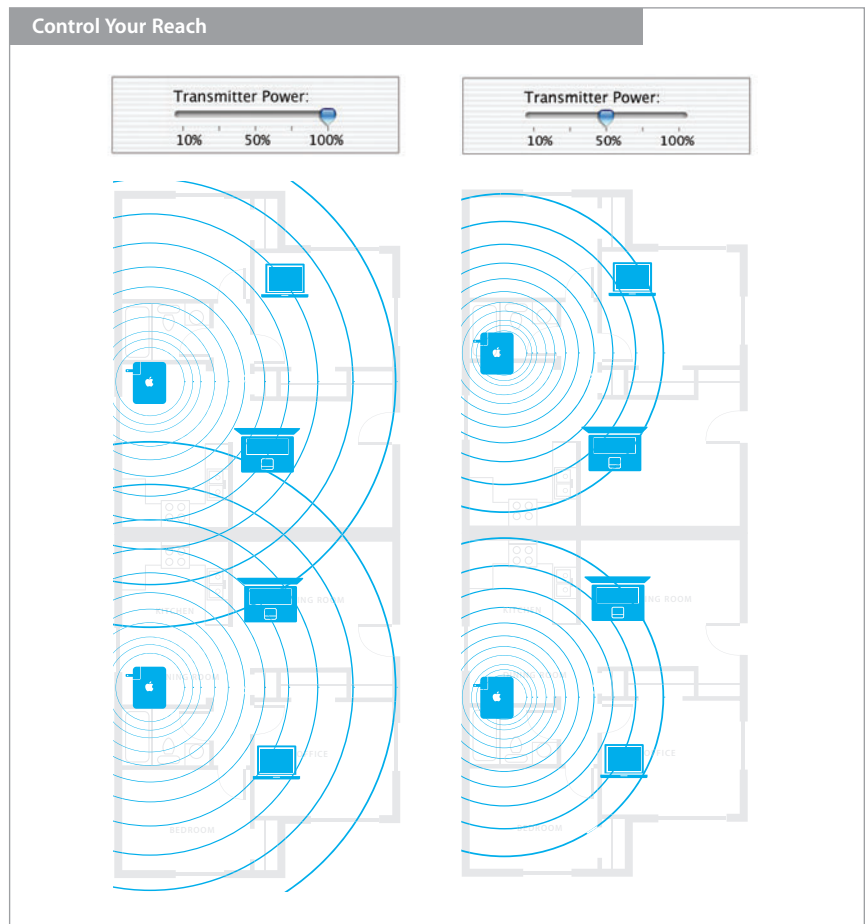

Connection robustness

The AirPort software provides connection robustness features that enhance the ability of wireless clients to maintain a connection in the face of interference. The software offers three connection robustness features: automatic channel selection, interference robustness, and automatic sensing.

Automatic channel selection

When the base station is turned on and automatic channel selection is checked (this is on by default), AirPort Express checks the wireless spectrum and locates a suitably "quiet" channel on which to operate.
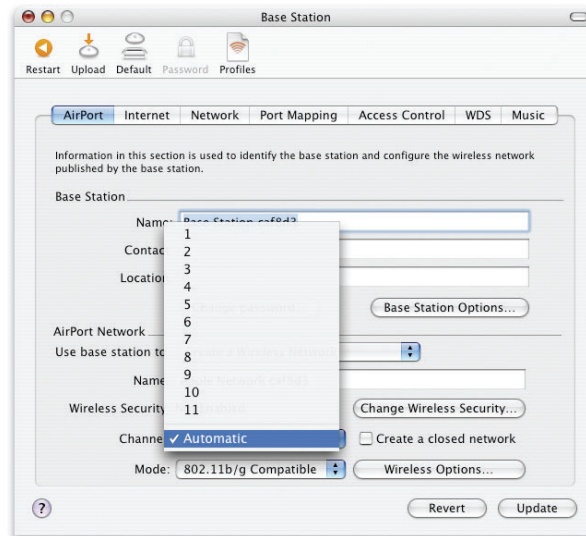
Interference robustness

Wireless interference can come from a variety of sources, including other wireless networks, cordless phones, baby monitors, and wireless video distribution systems. When there is interference, some data packets may not reach their destination. These "lost" packets are automatically retransmitted, so no data is actually lost. Unless the need for resends is great enough to noticeably slow down data transfer, users are often unaware that there has been a problem. However, sometimes interference can be so severe that wireless clients actually lose their connection.

A feature called interference robustness is designed to maintain a wireless connection between an AirPort Express Base Station and an AirPort Extreme client or Wi-Fi–enabled Windows client in the face of severe wireless interference. This feature must be enabled on both the base station and the client computer.

Note that interference robustness provides a stronger connection between the client and base station, but may reduce the overall range of the wireless network.

Automatic sensing

Interference that is not severe enough to jeopardize connectivity may still cause enough packet resends to reduce the data throughput speed. Because interference is often temporary, AirPort Express includes an interference-sensing feature that automatically returns the system to its maximum speed when the interference subsides.

Security

Apple has designed AirPort Express to provide multiple levels of security, so users can enjoy peace of mind when they access an Internet site, manage online financial transactions, or send and receive email. The security of the base station can help prevent unauthorized users from gaining access to the wireless network. Network attacks can occur through wireless as well as wired networks. That's why Apple gives you ways to protect your entire AirPort network and the data that travels over it. Whether you're using AirPort at home, at work, or on the road, the following features will help keep confidential data in and unauthorized users out.

Firewall. You can separate your wireless network from the outside world with firewall protection. The AirPort Express Base Station has a built-in firewall that creates a barrier between your network and the Internet, protecting data from web-based IP attacks. The firewall is automatically enabled when you configure the base station to share a single Internet connection. For computers with a cable or DSL modem, AirPort can actually be safer than a wired connection.

Hidden network. Hiding your wireless network keeps the network name—and thus the very existence of the network—private. The network does not show up on a scan of available networks; prospective users must know the network name and, if it is encrypted, also the password to access it.

Password protection and encryption. AirPort incorporates password protection and encryption capabilities that deliver a level of security comparable to that offered by traditional wired networks. Users can be required to enter a password to log in to the network. When transmitting data and passwords, the base station uses either Wi-Fi Protected Access or up to 128-bit WEP encryption to scramble data and help keep it safe.

AirPort Express also has password protection for the audio port. This prevents children from accessing their parents' stereo, and it prevents someone in your office from playing music on a set of speakers located close to your desk without your permission.

Wi-Fi Protected Access (WPA). This capability greatly enhances over-the-air data protection and access control for your wireless network. WPA includes a strong encryption algorithm (TKIP), the ability to check the integrity of the data being sent over the air, and 802.1X user authentication. See the sidebar at left for more information.

In a home environment, WPA runs in Personal mode, which does not require a RADIUS server for user authentication.[8] Instead, the person setting up the home AirPort network defines a network password that must subsequently be entered by all users who want to get on the network. In addition to logging the user in to the network, the password starts the TKIP encryption process. Other than setting the network password, no administration is required to make WPA work in the home.

AOL parental controls. If you're using AirPort in conjunction with an America Online account, you can enable AOL parental controls on the AirPort Express Base Station. The settings you configure are enforced for all clients connected to the base station.[9]

MAC filtering. Support for MAC (Media Access Control) filtering allows you to set up a list of MAC addresses (or AirPort ID numbers) that are allowed to connect to your wireless network.

Compatibility

AirPort Express adapts to your needs through support for multiple wireless networks, operating systems, and Internet service providers.

Wireless network compatibility

Both 802.11b and 802.11g users can enjoy the benefits of wireless networking with AirPort Express.[4] By default, the base station runs in 802.11b/g compatibility mode to support 802.11b and 802.11g connections simultaneously. That includes connections from AirPort Extreme Cards, AirPort Cards, and other Wi-Fi Certified 802.11b and 802.11g products.

When only 802.11g users are connected, the base station can run up to the full data rate of 54 Mbps. If you always want to maximize the benefits of 802.11g technology, you can use AirPort Admin Utility to permit only 802.11g connections.

The base station senses when only AirPort Express and AirPort Extreme users are connected and increases the throughput of the network to its maximum rate. When one or more 802.11b users connect, the wireless network begins to decrease its maximum data rate to accommodate them. When many 802.11b users are active on the wireless network, the overall network data rate begins to approximate 802.11b rates. However, all 802.11g users will always experience faster data rates than 802.11b users. With performance enhancements in the AirPort software, AirPort Express and AirPort Extreme users experience even better performance on an AirPort Express network with both 802.11b and 802.11g users.

Computer compatibility

Because the 802.11g technology is compatible with 802.11b, users of AirPort-enabled Macintosh computers and Wi-Fi Certified 802.11b Windows-based computers can access AirPort networks.

Users of AirPort Extreme–ready Macintosh systems can enjoy the high-speed capabilities of the AirPort Express Base Station simply by adding an AirPort Extreme Card to their systems. (All new PowerBook G4 configurations come with an AirPort Extreme Card already installed.) Of course, AirPort Express is fully compatible with the 802.11b AirPort Cards in AirPort-enabled Macintosh systems.[4]

The base station is also designed to work with other 802.11b and 802.11g devices certified by the Wi-Fi Alliance. That means users of Windows-based desktop and portable computers with 802.11b or 802.11g cards can access AirPort Express networks.

ISP compatibility

AirPort Express works with most Internet service providers over a DSL or cable modem connection. As of version 5.0 of the AOL software, America Online has been compatible with AirPort wireless networking.[9] With AirPort and the iChat software in Mac OS X v10.2 and later, you can chat with AOL Instant Messenger (AIM) users from anywhere in your home or office. AirPort Express can even enforce AOL parental controls for users on your wireless network.

Connection sharing with NAT and DHCP

AirPort Express provides secure, efficient sharing of a single Internet connection through two technologies: Network Address Translation (NAT) and the Dynamic Host Configuration Protocol (DHCP).

When the computers on your network are set for DHCP networking, they obtain IP addresses from a DHCP server. As its name implies, it assigns IP numbers dynamically. A DHCP server can change a computer's address assignment as frequently or infrequently as the network administrator deems necessary.

Normally, the DHCP server is located at your ISP. However, AirPort Express can also act as a DHCP server, handing out IP addresses to all your connected computers. Because Apple has designed it to permit the sharing of a single Internet address in a home, small office, or other site with only one Internet connection, the base station has to find a way to assign a working IP address to each computer even though only one such address has been provided by your ISP.

This is where NAT comes in. NAT software running on the base station translates between your public and private IP addresses for both incoming and outgoing Internet traffic.

Because the only IP address exposed to the outside world is that of your base station, placing your computers behind the base station's firewall protects them from many kinds of hacker attacks that require knowledge of the target computer's IP address. This approach also keeps your networking costs lower because it enables multiple users in your household or office to share a single Internet connection.

Setting Up AirPort Express

AirPort Express is very easy to set up and use. This section describes how to set up an AirPort Express network in your home or small business.

Requirements for Setting Up Your Wireless Network

To set up your AirPort Express wireless network, you need the following:

• An AirPort Card or AirPort Extreme Card installed in your Macintosh, or a Wi-Fi Certified 802.11b or 802.11g card installed in your Windows PC.

• A cable or DSL modem or an Ethernet network.

• An account with an ISP, or Internet access through a network (fees may apply).

• The latest version of the AirPort software installed on your computer. For up-to-date information on AirPort software, check these websites:
  – AirPort: www.apple.com/airportexpress
  – Apple Support: www.apple.com/support

For more information about using AirPort Express with your Internet account, contact your ISP or go to the AppleCare Knowledge Base on the web at kbase.info.apple.com.

You'll also need to choose a suitable location for your AirPort Express Base Station. AirPort Express is designed to fit almost anywhere. Since it plugs directly into a power source, you can plug it into the wall or a power strip and hide it behind your desk or stereo. Place your AirPort Express Base Station in a central location—away from potential sources of interference, such as a microwave oven or large metal appliances. Apple also recommends putting the base station in a location where it is not covered by wires and cables.

Software requirements

Setting up and administering AirPort Express for access to a wireless network for Internet connectivity, sharing a USB printer, and using AirTunes to stream music requires the following software:
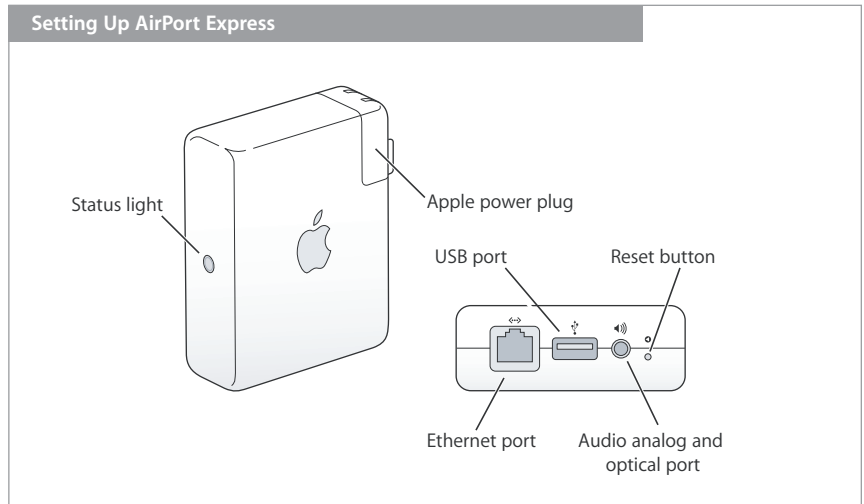
• Mac OS X v10.3 or later, Windows XP, or Windows 2000
• AirPort software 4.0 or later
• iTunes 4.6 or later

Accessing the wireless network for Internet connectivity and USB printer sharing requires the following software:

• Mac OS X v10.2.7 or later, Windows XP, or Windows 2000
• AirPort software

Setting Up AirPort Express

To set up AirPort Express, you first need to connect the cables to the ports you want to use: the Ethernet cable connects to your DSL or cable modem, the audio cable connects to your stereo, and a USB cable connects to your compatible USB printer.[7] Once you have connected all the cables you need, plug the AirPort Express Base Station into a power source. There is no on/off switch.

Setting Up AirPort Express

Status light

Apple power plug

USB port   Reset button

Ethernet port   Audio analog and optical port

When you plug the base station into the power source, the status light flashes amber while it starts up. Once it has detected an IP address, or the base station connects as a client or WDS bridge on your existing network, the status light glows solid green. (In AirPort Admin Utility, you can set the base station so that the green light blinks to indicate network activity.) If the status light is not on, make sure the base station is plugged into a working outlet.

AirPort Express Assistant
To set up and configure AirPort Express with AirTunes, open the AirPort Express Assistant software. On a Mac with Mac OS X v10.3 or later, it is located in the Applications/Utilities folder. On a PC with Windows XP, it is located in the AirPort folder on the hard drive.

AirPort Express Assistant

Introduction

Welcome to the AirPort Express Assistant.

This application helps you set up your AirPort Express to connect to the Internet, play iTunes music through remote speakers using AirTunes, share a printer, and extend the range of your existing AirPort wireless network.

Make sure your AirPort Express is plugged in, in range of this computer, and you have connected the appropriate Ethernet, audio, and USB cables.

When you are ready, click Continue to begin.

Go Back   Continue

AirPort Express Assistant asks if you want to create a new wireless network or connect to an existing one. It then leads you through entering the appropriate settings for the network you are creating, joining, or extending. If you do not have a wireless network, you need to create a new network. If a wireless network is already set up, you can join or extend the network to suit your needs. To join a network, you simply use your AirPort Express Base Station as a client on the network that allows you to play music over your stereo or share a USB printer. If the network does not reach the area you want to use, you can extend the network using your base station.
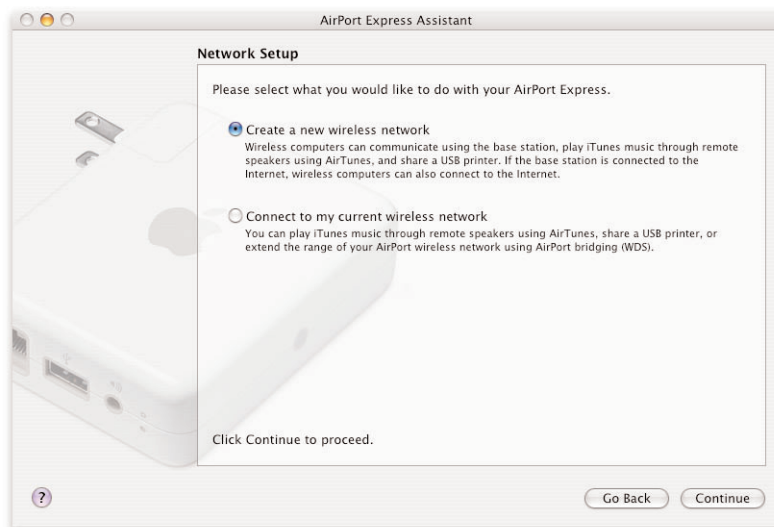
See the following sections for more detailed explanations of each activity.

Smart cable detection
AirPort Express is designed to be extremely easy to use. It detects which cables are plugged into the base station and adjusts accordingly. For example, AirPort Express determines what type of Internet service is connected via Ethernet and asks you the right questions to get your base station up and running. And because there is no on/off switch, the Ethernet, USB, and audio ports are turned on when the base station is plugged in, so you don't have to flip a switch or change a setting if you move the base station to another location. AirPort Express does it all for you.

Creating a new wireless network
AirPort Express Assistant guides you through the steps to create and name your new wireless network, protect it with a password, and set other options. If you plan to play music through your stereo using iTunes and share a USB printer, you'll connect audio cables to the audio port and to your stereo, and connect your printer to the USB port. This way, AirPort Express Assistant leads you through the appropriate steps.

Configuring and sharing Internet access
If you plan to share your Internet connection with computers on your network, you need to set up AirPort Express as an AirPort base station.[1] Once it is set up, computers access the Internet via the wireless network.

Before you use AirPort Express Assistant, make sure that all the cables you need are connected, such as Ethernet, audio, and USB cables. AirPort Express Assistant provides the base station with settings appropriate for your ISP and configures how the base station shares this connection with other computers.

**Connecting to an existing wireless network**
You can use AirPort Express Assistant to join an existing 802.11g wireless network. When you connect your AirPort Express Base Station with AirTunes to your home stereo, computers on your wireless network can stream music to the stereo using iTunes.[2] If you connect a USB printer to the base station, all of the computers on the network can print wirelessly to the printer.[3]

Extending the range of an existing AirPort Express or AirPort Extreme network
You can use AirPort Express Assistant to extend the range of an existing AirPort
wireless network.[5] Wi-Fi–enabled computers can connect to the network and stream
music, share the Internet connection, exchange files, print wirelessly, and play games.
(Note that extending the range of an AirPort Express or AirPort Extreme network may
reduce overall network performance.)

AirPort Admin Utility
Once AirPort Express is up and running, you may need to adjust certain settings.
Using AirPort Admin Utility, you can configure advanced base station settings such
as additional security options, closed networks, DHCP lease time, access control, WAN
privacy, power controls, remote dial-in or port mapping, and more. If you are using a
PC with Windows 2000, you will also need to use AirPort Admin Utility to configure
your AirPort Express Base Station. AirPort Admin Utility is located in the Applications/
Utilities folder on the Mac and in the AirPort folder on the Windows PC.
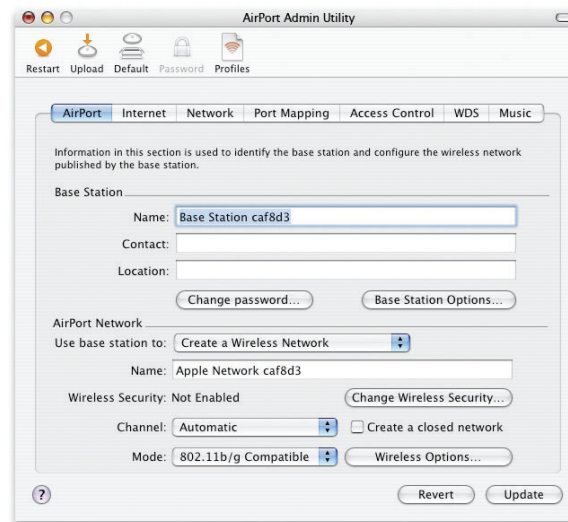
Here are some of the tasks you can do with AirPort Admin Utility.

Internet. You can easily manage your base station's Internet settings. If your ISP
settings change, you can go directly to the setting you need to update in AirPort
Admin Utility. It's that simple.

Name and password. You can name and password-protect both your wireless net-
work and the AirPort Express Base Station. You can also create a secure password for
AirTunes.

Hidden network. Hiding your wireless network keeps the network name—and thus
the very existence of the network—private. The network does not show up on a scan
of available networks; prospective users must know the network name and, if it is
encrypted, also the password to access it.

Port mapping. If you are running a web, AppleShare, or FTP server on your AirPort
network, other computers need to be able to initiate communication with it. Because
the base station only stores port-to-private IP address table entries for outgoing con-
nection requests, it has no way of directing incoming information to the appropriate
computer. To ensure that requests are routed to your server, you need to establish a
permanent IP address for the server and then use AirPort Admin Utility to provide
inbound port mapping information to the base station.

Profiles. AirPort Express can store up to five base station configurations, known as profiles. A profile contains base station settings, such as the iTunes remote speaker name and password, and network configuration information, such as the network name and password. Profiles are useful if you move your base station from one location to another. You use AirPort Admin Utility to create, edit, rename, and delete profiles.

Switching from client mode (STA) to base station mode. If you have an existing network and you have added AirPort Express as a client on that network, you can use AirPort Admin Utility to disassociate from the wireless network and switch it back to base station mode.

The AirPort Extreme Card in Depth

The AirPort Extreme Card fits easily into AirPort Extreme–ready Macintosh computers, allowing you to transfer data nearly five times as fast as with the previous AirPort Card.

An AirPort Extreme Card is built into all new PowerBook G4 computers and can be preinstalled in other Macintosh models at the time of purchase. It's also simple to install an AirPort Extreme Card yourself. Just open your computer, slip the card into the dedicated slot, attach the cable from the antennas already built into the computer, and close everything up.

Now you're ready to start enjoying the benefits of wireless networking—not just at home, but also at school or in the office. In addition, an increasing number of hotels, airports, cafés, libraries, and other businesses and public buildings around the world have implemented 802.11b "hot spots." You can use these wireless Internet access points freely, because the AirPort Extreme Card is compatible with any Wi-Fi Certified 802.11b or 802.11g network.[4] Just take your computer within range of a hot spot and you're ready to start surfing! It's a great way to check your email or view a website when you're on the go.

To get the full speed benefits of your AirPort Extreme Card, you'll want to use it with an AirPort Express or AirPort Extreme Base Station. As 802.11g systems are deployed in place of 802.11b networks, you'll have more and more locations where you can enjoy data rates of up to 54 Mbps.[4] Imagine how convenient that will make web browsing, file sharing, and printing. You can access any AirPort Express, AirPort Extreme, or Wi-Fi Certified 802.11b and 802.11g base stations without hassles; you don't need to change any hardware or software settings. Everything is automatic.

Sharing Files

The AirPort Extreme Card makes it easier than ever to exchange files with colleagues. You can take advantage of Mac OS X file sharing even in areas where no base station has been installed, because AirPort Extreme, AirPort, and other 802.11b- or 802.11g-enabled computers can communicate directly with each other.[4]
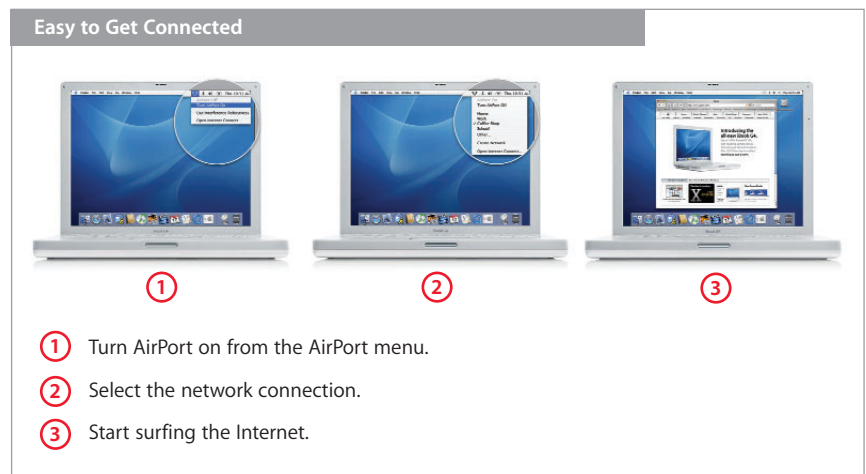
Printing

With an AirPort Extreme Card and Mac OS X v10.2.7 or later, you'll be able to use a USB printer that's connected to your local AirPort Express or AirPort Extreme Base Station.[3] With AirPort Extreme Base Stations, you can also print to any Ethernet printers that are on a wired network linked to the base station. The Rendezvous technology in Mac OS X v10.2 and later will even find available printers and other network services for you and display them in your printer, file server, and other services listings automatically. Just choose one and go. There's no configuration needed.

Using AirPort Networks

You use an AirPort wireless network just as you would a wired network. If your network is connected to the Internet, you can run your usual Internet applications to view websites, download email, and so on. If network services such as file servers or shared printers are available, you can select them just as you would on an Ethernet network.

The AirPort menu gives you important information right from your Mac OS X desktop. This menu (accessible via the AirPort icon in the menu bar) shows you the current signal strength your computer is receiving and lists the available AirPort Express, AirPort Extreme, AirPort, and other Wi-Fi Certified 802.11b or 802.11g networks. It also lets you quickly create a direct computer-to-computer wireless connection when you and another wireless user are out of range of a base station, or when you need a direct connection between two computers.

You can set your system preferences so that your computer automatically rejoins a wireless network after you restart the system or it wakes up from sleep. Go to the AirPort pane in the Network preferences of Mac OS X and choose the option you prefer. For example, you may want to have the computer join the most recently used network that's currently available to it. Mac OS X can even keep track of your network password for automatic login.

Easy to Get Connected

1. Turn AirPort on from the AirPort menu.
2. Select the network connection.
3. Start surfing the Internet.
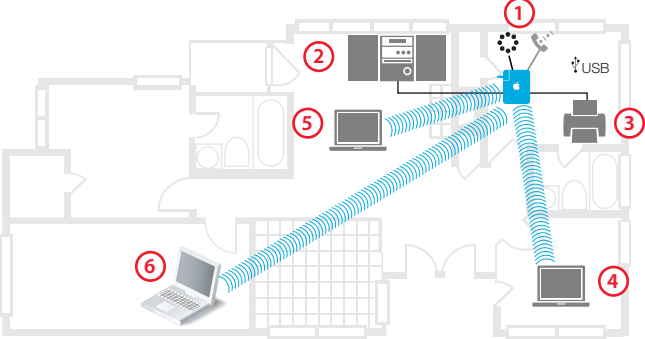
AirPort in the Real World

Today millions of AirPort Extreme and AirPort products are already in use, and AirPort Express is certain to increase that number significantly. This section highlights the benefits of AirPort wireless networking at home and on the road.

AirPort at Home

No matter how well designed your home is, chances are that it doesn't have a phone jack or broadband connection everywhere you'd like to use a computer. Thanks to AirPort, you can solve that problem without running cables all over your house.

One AirPort Express Base Station lets you and your family—up to 10 users—share a single Internet connection to surf the web and access email, share a printer, and enjoy multiplayer games throughout your house.[1] And using the new AirTunes feature of AirPort Express, you can play music in iTunes through your stereo or set of powered speakers. With a transmission range of approximately 150 feet from the base station, AirPort lets you take your notebook or desktop computer where you want, not just where there's a phone jack or network cable. Everyone else in your home who has a Mac or Windows computer with an AirPort or compatible card can also access the Internet through your wireless network.

Using AirPort at Home

A single, very affordable AirPort Express Base Station can provide a multitude of services for members of your household. Here are just a few examples.

1. Internet connection
2. Streaming music
3. Shared access to printer
4. Support for any Apple computer with an AirPort Card
5. Support for any Apple computer with an AirPort Extreme Card
6. Support for Windows PCs with compatible wireless networking cards

AirPort is simple to set up and use. The AirPort Express Base Station has an Ethernet port that you can connect directly to a DSL or cable modem. AirPort Express Assistant walks you through the easy process of configuring the base station.

With AirPort Extreme Cards installed, file transfers will zip by at up to 54 Mbps. Even if some of your family's computers have 802.11b cards, they can communicate up to their maximum speed of 11 Mbps—plenty fast for most home uses. And notebook computers become truly portable in your home, allowing you to surf the Internet, work, and play where it is most comfortable for you.

The AirPort Express Base Station includes a USB printer port, allowing your whole family to share a single printer throughout the house, wirelessly.[3] It's easy, convenient, and cost-effective.

You can also extend the range of your existing AirPort Extreme or AirPort Express network by placing an AirPort Express Base Station in the area you would like the network to reach.[5] It must be in range of the primary base station to maintain a connection to the network.

AirPort on the Road

With an AirPort Extreme–enabled PowerBook G4 or iBook G4, you're ready to start enjoying the benefits of wireless networking not just at home, but around the world. In the United States alone, thousands of cafés, hotels, airports, and other businesses and public buildings have implemented "hot spots": 802.11b wireless access points that let you access the Internet wirelessly. A growing number of airplanes, trains, and even parks are also becoming Wi-Fi Certified hot spots. AirPort Extreme is compatible with any Wi-Fi Certified 802.11b or 802.11g network, so you can take your PowerBook or iBook within range of a hot spot and start surfing! It's a great way to check your email or view a website when you're on the go.

Even when there isn't a wireless network available, you can create one using an AirPort Express Base Station. Just connect the base station to a wired network anywhere you are, and you have a fast and easy wireless connection. The base station is so portable that it fits in your laptop bag, backpack, or any suitcase; you can take it with you anywhere.

AirPort Express can store up to five different profiles to choose between when you're on the go. Each profile is set up and configured for a particular location, making it easy to set up a wireless network almost instantly. For example, you can have one profile set up for home, where you connect to the Internet and play music over your stereo. When you're traveling and you connect your base station in a hotel room, you can select the hotel profile (or create a new one if you've never traveled there before), and the base station immediately switches to the setup for the hotel room. When you return home, select your home profile from the pop-up menu and you're all set.

AirPort software is installed in all PowerBook and iBook systems. Because the computers have antennas already built in and optimally placed, they provide the best possible wireless performance. All current PowerBook computers and some iBook models come with an AirPort Extreme Card preinstalled; on the others, you can quickly add a card yourself.

It's easy to connect your wireless-enabled notebook to a hot spot right from your Mac OS X desktop. Just turn on AirPort from the AirPort menu in the menu bar, select the network connection, log in, connect to the Internet, and start surfing.

The AirPort menu shows you the current signal strength of the active network and lists the available AirPort Express, AirPort Extreme, AirPort, and other Wi-Fi Certified 802.11b and 802.11g networks, in case you want to switch to a different network. It also lets you quickly create a direct computer-to-computer wireless connection when you and another wireless user are out of range of a base station.

For convenience, you can set your system preferences so that your computer automatically rejoins a wireless network after you restart the system or wake it from sleep. Go to the AirPort pane in Network preferences and choose the option you prefer. For example, you may want to have the computer join the most recently used network that's currently available. Mac OS X can even remember your network password for automatic login.

What Is 802.11 Wireless Technology?

What's Wi-Fi?
The term "Wi-Fi" (Wireless Fidelity) refers to certification by the Wi-Fi Alliance, an international nonprofit association of 802.11 product vendors.

Wi-Fi Certification means that an 802.11 product has been tested and found to be interoperable with other certified products. That means you can use your Wi-Fi Certified product with Wi-Fi Certified 802.11 networks, whether they are Mac- or Windows-based networks. Although 802.11 products that don't have Wi-Fi Certification may work fine with certified devices, the Wi-Fi Certified logo is your assurance of interoperability.

In 1990, the Institute of Electrical and Electronics Engineers (IEEE) began developing a way to provide the benefits of Ethernet (802.3) networks without wires. The result was the IEEE 802.11 standard, often called "wireless Ethernet." IEEE 802.11 wireless local area networks (WLANs) use radio frequencies, primarily on the 2.4-gigahertz (GHz) band. Currently, the most popular implementations of this technology are 802.11b and 802.11g, which are in use all over the world.

Since the release of the initial 802.11 standard, various working groups continue to develop enhancements to make it faster, more compatible, and more secure.

In 1999, Apple was the first company to make 802.11b technology available to consumers with its AirPort wireless solution. Apple brought this complicated technology to a consumer product that was affordable, easy to set up, and easy to use—without requiring users to have any special knowledge of wireless networks. Wireless networks based on 802.11b technology soon began to grow in popularity. As a result, today more users than ever before expect Internet access wherever they take their portable computers; more businesses and educational institutions recognize the cost savings of not having to run networking cables through a building; and more families want to share their cable or DSL connection at home. There's an increasing demand for wireless networking technologies that can handle more users at higher speeds.

802.11g

802.11a: Wireless networking for the 5GHz band
The 802.11a standard is a version of 802.11 for the 5GHz radio band. Despite its name, 802.11a was released after 802.11b and offers a significant speed increase. Like 802.11g, it provides data rates of up to 54 Mbps and supports more simultaneous users than 802.11b. However, 802.11a technology has been hampered by its lack of compatibility with existing 802.11b networks and products. Also, because of current regulatory restrictions, it has been certified for use in far fewer countries than 802.11b or 802.11g.

The latest version of 802.11 is the 802.11g standard. 802.11g offers a maximum data rate of 54 Mbps—nearly five times faster than 11-Mbps 802.11b products now in widespread domestic and international use.[4]

Wi-Fi Certified 802.11g devices such as the AirPort Express and AirPort Extreme Base Stations are also compatible with 802.11b; that is, 802.11g access points support Wi-Fi Certified 802.11b devices, such as AirPort. When 802.11b devices use an AirPort Express or AirPort Extreme Base Station, they receive the same bandwidth as they would with an 802.11b access point—a maximum data rate of 11 Mbps. Similarly, the 802.11g AirPort Extreme Card enables users to access both 802.11g and 802.11b networks. If you already have an AirPort Base Station at home and you purchase a new Mac with an AirPort Extreme Card, you can use this Mac to access your existing AirPort network.

Because 802.11g networks operate in the popular 2.4GHz frequency band, they are occasionally subject to interference by devices such as microwave ovens and cordless phones. However, such interference generally only causes a decreased data rate, not a loss of connection or loss of data. That disadvantage is offset in normal use by the more robust signals associated with the 2.4GHz band, which readily pass through solid objects such as walls. Since AirPort Extreme operates in the 2.4GHz frequency band, it is approved for use in the same countries as 802.11b products.

Bluetooth

Bluetooth is an innovative short-range wireless technology standard that lets you connect many peripheral devices to your computer without cables. Using a Bluetooth-enabled mobile phone or handheld computer, you can quickly and easily synchronize your important data. For example, you could use Bluetooth technology in conjunction with Apple's iSync software to synchronize Address Book contacts and iCal calendars between your Mac, your mobile phone, and your handheld computer. With Apple's Bluetooth wireless keyboard and mouse, you can eliminate cable clutter on your desk.

Bluetooth technology complements the capabilities of AirPort. If 802.11 can be thought of as "wireless Ethernet," Bluetooth can be likened to "wireless USB."

	Wired	Wireless
Network	Ethernet	AirPort Express 802.11g
Peripheral	USB FireWire	Bluetooth
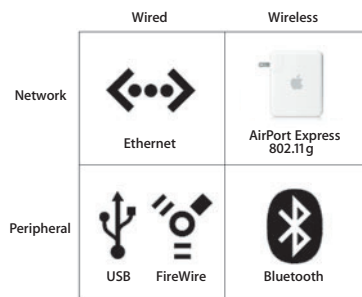
802.11g and streaming music

With the potential for interference on the 2.4GHz band, 802.11b solutions, whose bandwidth is not as large as 802.11g, are particularly susceptible to drop-offs. Thanks to the increased bandwidth of 802.11g, there is enough additional bandwidth to compensate for such interference, which makes 802.11g devices such as AirPort Express particularly well suited for streaming media like music over a wireless connection. Even with multiple users online and heavy wireless traffic, the large pipeline allows for an uninterrupted, high-quality stream of music.

For these reasons, Apple has adopted 802.11g as the foundation of AirPort Express and AirPort Extreme. Other companies have also recognized the benefits offered by 802.11g and are developing products based on it.

802.11b

The best-known 802.11 standard is 802.11b, which has a top data rate of 11 Mbps. 802.11b networks have become prevalent all over the globe and will be a valuable resource for the foreseeable future. Because of the ease of use and affordability of 802.11b networks that Apple pioneered with AirPort, for example, home users have been able to work and play on the Internet without sitting at their desks all the time.[1]

802.11b wireless networks have also engendered the "hot spot" phenomenon. In the United States alone, thousands of hotels, airports, cafés, and other businesses with a large number of mobile computer users have installed 802.11b access points so their customers can use the Internet without having to connect a cable to an Ethernet network. It isn't difficult to envision a day when you can connect to the Internet wherever you happen to be.

As users want to do more and more wirelessly, such as transfer large files and access streaming video, the demand for higher throughput has outgrown what 802.11b can provide. Hence the impetus for developing 802.11g, which is compatible with 802.11b but able to handle increasing bandwidth demands.[4]

Comparison of major 802.11 implementations[10]

	802.11g	802.11b	802.11a
Maximum data rate	54 Mbps	11 Mbps	54 Mbps
Range in which maximum data rate is available	59 feet	150 feet	39 feet
Maximum range (approximate)	240 feet at 6 Mbps	300 feet at 1 Mbps	123 feet at 6 Mbps
Frequency band	2.4GHz	2.4GHz	5GHz
Compatible with wireless hot spots in coffee shops, airports, and other locations	Yes	Yes	No
Available worldwide	Yes	Yes	No
Power requirements (approximate)	1.5W	1W	2W–2.5W

Product Details

Product Availability

The AirPort Express Base Station can be purchased from the Apple Store online
(www.apple.com or 800-MY-APPLE), an Apple Store near you, or an Apple
Authorized Reseller.

AirPort Express Base Station
Order number M9573LL/A

The following products are also available:
- AirPort Extreme Card, order number M8881LL/A
- AirPort Express Stereo Connection Kit with Monster Cables, order number T9573LL/A

Extended Service and Support

Purchase the AppleCare Protection Plan to extend the service and support for your
Mac to up to three full years. The plan also covers an AirPort Card or AirPort Extreme
Card, an AirPort Express Base Station, and Apple RAM when used with a Mac covered
by the AppleCare Protection Plan. For more information, visit www.apple.com/
support/products or call 800-823-2775.

Technical Specifications

Wireless data rates[4]
- Up to 54 Mbps for AirPort Extreme– and other Wi-Fi Certified 802.11g-enabled
  computers (data rate depends on environment)
- Up to 11 Mbps for AirPort- and other Wi-Fi Certified 802.11b-enabled computers
  (data rate depends on environment)

Range[4]
- 50-foot range from the base station in typical use at 54-Mbps data rate
  (range depends on building construction)
- 150-foot range from the base station in typical use at 11-Mbps data rate
  (range depends on building construction)

Frequency band
- 2.4GHz

Channels
- Channels 1–11 approved for use in the United States, Canada, Latin America,
  and Taiwan
- Channels 1–14 approved for use in Japan
- Channels 1–13 approved for use in other countries

Radio output power
• 15 dBm

Compatibility
• Interoperable with Wi-Fi Certified 802.11b and 802.11g computers[4]
• NAT, DHCP, FTP, PPPoE, VPN Passthrough (IPSec, PPTP, and L2TP), QuickTime Streaming, DNS Proxy, SNMP
• America Online[9]
• Cisco LEAP client support to connect to Cisco LEAP access points for Macintosh computers with Mac OS X v10.3 or later

Security
• Wi-Fi Protected Access (WPA)[8]
• Wireless security (WEP) configurable for 40-bit and 128-bit encryption
• MAC address filtering
• NAT firewall
• Support for RADIUS authentication
• 802.1X, PEAP, LEAP, TTLS, TLS

Included software—AirPort Express Base Station
• AirPort Express Assistant to configure the base station
• AirPort Admin Utility for advanced user settings
• iTunes for streaming music

Included software—AirPort Card and AirPort Extreme Card
• Internet Connect to connect to and disconnect from your ISP, monitor connection status, turn AirPort on and off, change networks, and check signal quality
• AirPort menu bar status icon to monitor connection status, check signal quality, change networks, and turn AirPort on and off

Base station interfaces
• 10/100BASE-T Ethernet WAN port (RJ-45 connector) for connecting a DSL or cable modem
• 3.5-mm audio port for analog or optical digital sound[2]
• USB port for connecting a USB printer[3]
• Apple power plug

Electrical and environmental requirements
• Line voltage and frequency: 100–240V AC, 50–60Hz, input current 0.2A
• Operating temperature: 32° to 95° F (0° to 35° C)
• Storage temperature: –13° to 140° F (–25° to 60° C)
• Relative humidity (operating): 20% to 90%, noncondensing
• Maximum operating altitude: 10,000 feet
• Maximum storage altitude: 15,000 feet

Agency approvals and conformance
• FCC Part 15 Class B, Canada RSS-210, EN 300-328, EN 301-489, ARIB STD-T66, RCR STD-T33, AS/NZS 4771:2000, UL 60950, CSA-C22.2 No. 60950

Base station size and weight
• Dimensions: 3.7 by 2.95 by 1.12 inches (94.0 by 75.0 by 28.5 mm)
• Weight: 6.7 ounces (189 grams)[11]

For More Information

For more information about AirPort Express, visit www.apple.com/airportexpress.

[1]Wireless Internet access requires a Wi-Fi–enabled computer, base station or other access point, and Internet access (fees may apply). Some ISPs are not currently compatible with AirPort. [2]Music streaming with AirTunes requires iTunes 4.6 or later and a compatible stereo system or powered speakers. [3]Wireless printing over USB requires Mac OS X v10.2.7 or later and a compatible printer. [4]AirPort Express and AirPort Extreme use the 802.11g wireless standard. Accessing the wireless network requires an AirPort- or AirPort Extreme–enabled computer or a Wi-Fi Certified 802.11b or 802.11g computer. Achieving data rates of 54 Mbps requires that all users have an AirPort Extreme– or Wi-Fi Certified 802.11g–enabled computer and connect to an AirPort Express or AirPort Extreme Base Station. If a user of a Wi-Fi Certified 802.11b product joins the network, that user will get up to 11 Mbps and AirPort Extreme and 802.11g users will get less than 54 Mbps. Actual speed will vary based on range, connection rate, site conditions, size of network, and other factors. [5]AirPort Express and AirPort Extreme can extend the range only of an AirPort Express or AirPort Extreme wireless network and may reduce overall network performance. [6]The iTunes Music Store is available in the United States, United Kingdom, France, Germany, and other select territories and is open only to persons age 13 or older. Requires iTunes 4.6 or later and Internet access; terms apply [7]Cables sold separately. [8]Support for WPA requires a computer with Mac OS X v10.3 or later or a Wi-Fi Certified WPA-enabled computer. Use of WPA reduces the maximum number of network users. When joining an existing wireless network, AirPort Express supports only WPA Personal mode. [9]Compatible with AOL 5.0 or later in the U.S. only. Simultaneous sharing of an AOL connection requires multiple AOL accounts. [10]Comparison based on IEEE 802.11g, 802.11b, and 802.11a specifications, assuming the following conditions: Tx power +15 dBm. Antenna gains 0 dBi on transmit and receive. Diversity 2 level switched (9.8 dB fade margin at 99% coverage). Propagation environment: free space (loss exponent = 2) up to 8.5M; loss exponent = 3.3 above 8.5M intended to represent a semi-open environment (cube farm). Receiver sensitivities: For 1, 2, 5.5, and 11 Mbps measured from AirPort Card specifications; for the OFDM rates at both 5.2GHz and 2.44GHz measured using the sensitivities in the 802.11a standard. [11]Weight varies by configuration and manufacturing process.