

Carlisle Systems FAQ (Frequently Asked Questions)

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- Is there a wireless router or AP that can keep users isolated from each other?

▪ **What's the difference between Short and Long Preamble?**

The preamble is part of the IEEE 802.11b physical layer specification, and specifically, part of the Physical Layer Convergence Protocol (PLCP). All 802.11b devices **must support the long preamble format**, but may optionally support the short preamble.

If your device supports the short preamble and you are having trouble getting it to communicate with other 802.11b devices, make sure that it is set to use the **long** preamble.

A good, but technical, explanation of this can be found in [this article](#).

▪ **Can two Access Points communicate with each other?**

Maybe. Older Access Points only had one mode and could communicate only with wireless clients. However, newer Access Points sometimes include "**bridging**" modes, which can be used for Access Point to Access Point communication. See [this part of our Wireless Need-To-Know](#) for more info.

▪ **Does 'enhanced' 802.11b really run at 22Mbps?**

Nope. Our [First Rule of Wireless Networking](#) holds for these latest wireless networking products too. Our testing has shown that you **can** get a speed boost to about 6.5 - 7Mbps (vs. a typical 4Mbps normal 802.11b best-case speed). But you get the boost only under strong-signal conditions, and your speed will degrade **more** than it does with normal 802.11b as your signal level decreases.

For more info, see [our review](#) of D-Link's DWL-900AP+ enhanced Access Point.

▪ **Can most USB Wireless Client Adapters be used with Apple computers out of the box?**

No. Most of the available wireless adapters work with Windows-based machines only. **Asante** used to position themselves as one of the few providers of Mac-friendly networking hardware, but most of their recent adapters lack MacOS drivers.

Reader Jörg Albert reports that Belkin's [F5D6050 802.11b USB adapter](#) has [MAC OS 9.x & 10 drivers](#) available for download.

Proxim looks like they still have some products from their absorption of **Farallon** that have MacOS drivers, including their [PN474 802.11b USB adapter](#). It's [priced](#) higher than other 802.11b USB adapters, but that's unfortunately the price you pay for being a MacOS user in a Windows-based world.

▪ **Can I swap the radio card in my wireless router?**

If your wireless router is a "wireless ready" model that allows you to insert an 802.11b PC card radio, in most cases you'll be limited to whichever card the manufacturer recommends. This is because the radio card's driver software is part of the router's firmware, and different cards require different drivers.

Most of the "wireless-ready" products use 802.11b cards, and it will be interesting to see if router firmware upgrades will be available to allow the use of 802.11a/b or a/b/g dual-band cards.

▪ **What are the performance tradeoffs between integrated PCI cards, USB adapters, and PC card/adaptor combinations?**

See [this part](#) of our Wireless NTK.

▪ **Are there any 802.11b PCMCIA cards that can accept an external antenna?**

Not many manufacturers provide this feature, mainly because it complicates their certification process. But there are a few products to be found:

- The [ORiNOCO Gold card](#) sports a proprietary miniature connector in addition to its built-in stripline antenna
- Zoom's [ZoomAir Model 4103](#) is a little easier to deal with, given its robust RP-SMA connector.

▪ **Are there any multiport wireless routers that have both WAN dialup support and removable antenna(s)?**

[D-Link's DI-713P](#) supports dialup for either primary WAN or secondary backup and has RP-SMA antenna connectors. **NOTE** that the connectors are removable only in the newer version of the product in the flat, stackable enclosure.

The [Nexland Wavebase](#), uses an ORiNOCO Gold card plugged into a slot in back. The card supports attachment of one antenna via a custom "Lucent" connector. Supports dialup for either primary WAN or secondary backup.

[Thnx to Eric from TZO for this info!]

▪ **What is SSID Broadcast?**

This is a function performed by an Access Point that transmits its name so that wireless stations searching for a network connection can 'discover' it. It's what allows your wireless adapter's client manager program or Windows XP's built-in wireless software to give you a list of the in-range Access Points.

The ability to disable SSID broadcast essentially makes your Access Point invisible **unless** a wireless client already knows the SSID, or is using tools that monitor or 'sniff' traffic from an AP's associated clients. See [this FAQ](#) for more info.

▪ **What is antenna diversity?**

Antenna diversity is a function included in most wireless LAN equipment that has two antennas.

In simple terms, diversity monitors the signal from each antenna and automatically switches to the one with the better signal. The user usually has no control over this function.

There are also other forms of diversity, which are described [here](#).

▪ **Why do most wireless routers have two antennas while most wireless access points only have one?**

No, this isn't some plot to get higher sales for wireless routers at the expense of Access Points. The number of antennas is purely a design choice by the product's manufacturer.

▪ **What is WDS?**

WDS stands for Wireless Distribution System. It is a special Access Point mode that enables single-radio APs to be wirelessly connected vs. relying on connection to an Ethernet network. WDS encompasses both **wireless bridging** in which WDS APs communicate only with each other and don't allow wireless clients or Stations to access them, and **wireless repeating** in which APs communicate with each other **and** with wireless Stations.

The downside of the repeating mode is that wireless throughput is cut **in half** for each AP that data flows through before hitting the wired network.

These [Proxim](#) and [Intersil](#) application notes (PDF) will give you further details on WDS.

▪ **Are there any commercial implementations of 802.11e?**

The purpose of 802.11e is to add Quality of Service (QoS) features to the 802.11 standards. QoS is intended to make the arrival of data packets more controllable and is said to be essential for applications such as streaming video, music, and telephony that need good real-time data performance.

In 2001, it looked like there was some progress in this standard, most notably via a company named **Sharewave** (later purchased by Cirrus Logic) that developed a protocol dubbed **Whitecap**. Cirrus claimed that the Whitecap2 version of the spec both incorporated 802.11e WLAN functionality, and that Whitecap2's QoS enhancements were added into the 802.11e draft specification!

A few products were sold based on the earlier Whitecap1 protocol version, most notably Panasonic's KX-HGW200 router and KX-HGC200 PC card and NETGEAR's WA301 11Mbps Multimedia Wireless PCI Adapter and WE102 11Mbps Multimedia Wireless to Ethernet Bridge. All have been discontinued, and as far as we know, Whitecap2 products never appeared.

▪ **Can all 802.11b products perform Ad Hoc networking?**

Yes. Ad Hoc mode, in which 802.11b clients communicate directly with each other instead of through an Access Point, is available on all 802.11b **client** products.

▪ **Are there wireless routers that support dialup WAN connection?**

Routers that support dialup connections are getting tougher to find and wireless versions even tougher.

Use the [Router Product Guide](#) and do a search with "WAN Dialup/ISDN capability" selected. You can always use a non-wireless router with dialup WAN capability with an Access Point to add wireless capability.

▪ **I want to set up an 802.11a-only WLAN, but should I buy 11a-only products?**

Dual-band products are probably a better choice. 11a-only products are quite scarce, pretty pricey if you find them, and probably use the obsoleted first-gen Atheros 11a AP chipset, which you **don't** want because of its inferior performance. We also recommend not buying 11a-only client cards for the same reason.

NETGEAR's WAB102 Dual-Band (a/b) access point is a decent Atheros 2nd generation 11a-based choice. 11a/b/g routers as of June/July 2003 so far all use Atheros 2nd gen 11a radios, but you need to be careful going forward since Intersil, Broadcom, and TI all have a/b/g chipsets, which will probably be appearing soon in dual-band products. We can't speak for the 11a performance of those chipsets, since we haven't tested them.

▪ **I want to set up a wireless network in my neighborhood. Can you tell me what to buy & how to do it?**

There are a number of websites that can help your quest to become a Wireless ISP (WISP).

For commercial, i.e. pricey, solutions, try [WiPOP.com](#). It's mainly a marketing-oriented companion site to WISP equipment provider [YDI.com](#), but it has useful info and pre-packaged solutions if you're in a hurry and have plenty of money to spend.

If you're looking for a lower-budget solution, you should check out the various "Community Wireless" sites.

[NYCwireless](#) has one of the better organized sites and includes a "[Getting Started with Free Wireless Networks](#)" article. [NewburyOpen.net](#) also has a [detailed spec](#) for their community wireless setup in Boston that's worth checking out. Also, check the links in the [Community Wireless](#) and [Long-Range LANs/WIPOPs](#) sections of our [Links&Tools](#).

▪ **What does the Basic Rate setting in an access point or wireless router do and how does it differ from the Transmit Rate setting?**

The Basic Rate set is the rates that all clients that want to associate with a given access point must support. For 802.11b WLANs, these will be 1, 2, 5.5 and 11Mbps. This information is transmitted by an access point as **mandatory rates** in the Supported Rates element of various management frames.

All current-generation 802.11b products support the 1,2,5.5 and 11Mbps basic rate set. However some very old 802.11b clients may only be able to associate with APs advertising a 1, 2Mbps basic rate set. This is why some APs allow you to change this setting. The Transmit Rate setting is used to set the fastest rate that an AP or wireless router will send data. It can be used to force a lower rate in order to trade off speed for more reliable connection in WLANs where many clients are operating at low signal levels. I recommend Matthew Gast's [802.11 Wireless Networks: The Definitive Guide](#) book as a great resource for looking up the definitions of wireless networking terms. Hasn't failed me yet!

▪ **Can I add a wireless LAN card to my Ethernet-connected computer and have it act like an access point for other wireless computers?**

Yes! It won't act exactly like an access point, but will work essentially the same. See this [ProblemSolver](#).

▪ **When connecting a gaming console to the Internet via a wireless connection is an 802.11g adapter better than an 802.11b?**

Most broadband connections run about 1-2Mbps best case, and best case throughput runs between 4 - 6Mbps and 18 - 20Mbps for 802.11b and 11g products respectively. Typical best-case response (ping) times for either standard run below 5ms. So **if you have a strong wireless connection**, either product won't stand in your way of being quick on the trigger in on-line frag-fests. The main argument in favor of 11g would be for longer-range / weaker signal connections. 11b products will drop down to about 1-2Mbps—still fast enough for a broadband connection—but the **response time tends to degrade to the tens of milliseconds**. Even worse, though is that the connection gets very "bursty" as the adapter constantly switches between different transmit rates to try to lower its error rate. Since 11g products also use the 2.4GHz band, their signals will degrade at about the same rate as 11b products'. But since 11g throughput starts out higher, **with well-designed products**, you should see higher throughput at equivalent range. The more important factor, however, is response time, which from our experience **tends to stay down below 5ms** even under weaker signal conditions. So bottom line: Strong signal—shouldn't matter; Weak signal—11g has the edge.

▪ **Will wireless keyboards interfere with my wireless network?**

Generally no. Wireless keyboards and mice using infra-red technology certainly won't, and most others use frequencies in the 900MHz range. The possible exception are Bluetooth keyboards and mice, which might interfere, but probably to an extent that you wouldn't notice.

▪ **Should I buy 802.11a - only products?**

In general, no. Most 802.11a products you'll find are based on first-generation chipsets from Atheros. These products had range problems that gave 802.11a "poor range" reputation that persists even today.

We recommend purchasing only **dual-band** products if you want to use 802.11a. These products are generally based on current-generation Atheros chipsets which have essentially the same or better range than competing 802.11b or 11g products.

▪ **What is the maximum number of wireless clients that can be networked using Ad Hoc mode, i.e. w/o access point?**

The theoretical limit, which is the same as in Ethernet, is determined by the 48 bit MAC address field in each wireless data frame.

The practical limit is determined by constraints that may be built into client drivers. As a rule of thumb, Ad Hoc networks with 16 to 32 stations should be possible.

▪ **Will a wireless LAN card work worldwide?**

As long as it is an 802.11b or 11g card, it should work fine. Using an 802.11a card is a little more difficult, since different frequency bands are supported in different countries.

▪ **Where can I find construction details and test data for wireless LAN products?**

Wireless LAN products sold in the U.S. must be certified by the Federal Communications Commission (FCC). The certification process requires that the manufacturer submit detailed information about a product including external and internal construction detail photos and test reports.

The [FCC website](#) has search tools that can find a product by its FCC ID (usually found on the serial number label of the product) and also find manufacturers' three-character 'Grantee Code' that is helpful for general product searches.

▪ **Is there a tool that will give you a better indication of wireless signal strength than the meter built into WinXP or many wireless clients?**

If you're running a Windows machine, then Marius Milner's [NetStumbler](#) is probably your best bet. The latest version runs on only WinXP and 2000 but supports many more wireless cards than before. There's also a "ministumbler" version for PocketPC. It's free, but you'll probably find it so useful that you should consider making a [donation](#) to support Marius' work. Also check [this page of our Links & Tools section](#) for other options.

▪ **Can I connect wireless LAN adapters running in Ad Hoc mode to a wired LAN?**

Generally no. WLAN clients running in Ad Hoc mode communicate with each other and not with Access Points or wireless routers.

However, there is a trick you can use if one of your LAN's computers is running WinXP or other operating system that allows bridging network adapters. See [this How To](#) for more info.

▪ **How can I prevent a wireless lap from losing connection when moving between multiple Access Points?**

The concept of "roaming", i.e. moving among access points, was not high on the priority list for the framers of the 802.11 series of specifications. As a result, roaming performance varies widely from product to product and for SOHO-grade equipment tends toward the terrible.

Roaming logic is built into wireless client software (and sometimes firmware) and tends to be set so that clients hang on to the signal they have until the AP signal pretty much completely disappears. We've occasionally seen a wireless client that has allows a selection of optimizing for range or speed, but the control is usually buried deep in the network properties.

"Enterprise" grade products, especially entire WLAN management / security systems tend to have faster roaming switchover times, but much higher prices.

▪ **Can I connect multiple signal boosters (like Hawking's HSB1) and a high-gain antenna together to get an even stronger signal?**

It all depends on how strong a signal your current equipment has. To stay within FCC requirements, signal boosters limit their output power to 30dBm or 1W (or in the HSB1's case, 20dBm or 0.5W). If one booster amplifies your signal up to its limit, adding another won't help and could hurt by distorting the signal and raising the error rate. Depending on the signal booster design, you could also damage the second booster by overloading its input. Adding a higher-gain antenna, on the other hand, **will** increase gain, no matter what the power level, since its gain doesn't use active (powered) amplification and doesn't have power output limiting.

▪ **Can wireless products sold in the United States be used in other countries?**

In general, these products will work as long as you can supply the proper AC power requirements, as long as you have a "matched set" of components, i.e. AP or wireless router and client adapters. Intermixing U.S. and locally-sourced products, can be a little trickier, however.

802.11b and 11g products, which operate in the 2.4GHz frequency band can be used without technical or legal problems. However, channel selection limitations must be observed.

The situation is more complicated for 802.11a products, which operate in three 5GHz frequency bands. The issue, again, is mixing U.S. and locally-sourced products, which might not interoperate due to channel selection limitations.

[This article](#) provides some good insight into the issues.

- **How are 'gaming' wireless bridges different from non-gaming products?**

Some "gaming" wireless bridges have auto-setup features that allow them to connect to **unsecured** WLANs without having to run a computer-based setup utility. But if you are running a WEP or WPA-secured wireless LAN (as you should be), you'll need to fire up either a utility or log into a web-based admin server in the device to properly set it up. As long as your gaming device has an Ethernet port, you should be able to use any wireless bridge product with it.

- **My WLAN has multiple access points. Is there a way I can get my wireless notebook to automatically connect to the AP with the strongest signal?**

Multiple AP WLANs usually assign the same SSID to all APs, so if you're using WinXP's built-in wireless utility, you will see only one "network".

The client utilities that come with wireless adapters might allow you to see multiple APs with the same SSID, but since you select a network by SSID and not MAC address of the AP, you won't be able to select a specific AP. The only reliable way to allow selection of specific APs is to assign each one a unique SSID. Note that this might force you to have to manually re-connect when you move out of an AP's range.

- **Will 802.11b/g products purchased in one country work in another?**

Maybe. Since most manufacturers don't like making country-specific products, the chipsets used in these products are capable of operating in all **14 channels**. However, operating systems and drivers localized for specific countries may lock operation to only the frequencies allowed in that country.

Some products handle this issue by asking the user to specify the country of operation upon first use. In other cases, the user can go into the Advanced properties settings and set the channels used.

See [this Wikipedia article](#) for a list of the allowed 802.11b/g channels in major countries / world regions.

- **What will affect a wireless network signal around an average home?**

WLAN interferers can be grouped into four categories: things with high water content, metal, RF (radio frequency) generators and dense materials. The first group includes fish tanks, water heaters, hot tubs and such.

Metal-related problems can come from obvious things such as filing cabinets, foil-backed insulation, and metal bookcases. But they can also include not-so-obvious things such as tinted windows that use metal-based films and aluminum window screens.

Things that can generate RF strong enough to overpower your wireless LAN include microwave ovens, 2.4 and 5GHz cordless phones (but not DECT or 900MHz models), baby monitors and lots more.

Finally, dense building materials like filled cinder block, brick, rock fireplace walls, adobe or stucco construction will significantly knock your wireless signal strength down.

- **Is there a wireless router or AP that can keep users isolated from each other?**

Yes. Most of Linksys' wireless routers, most notably the venerable **WRT54G**, have an "**AP isolation**" feature that keeps wireless users from communicating with each other.

Buffalo Technology's wireless routers, such as the **WZR-RS-G54** have a similar feature, called "Privacy Separator".