Wireless broadband kits

All you need to wirelessly connect your PCs and notebooks to broadband

Two important technologies have reached maturity recently: broadband and wireless networking. Together they make a powerful team, and prices have fallen enough for anyone with more than one system to consider combining them. This month, we round up all the kit you need to attach multiple notebooks or desktop PCs to your cable or ADSL broadband connection.

Although you can use Internet Connection Sharing and a collection of wireless client adaptors to spread Internet access around your office or house, many more features are available if you opt for a wireless broadband router as the hub of your network.

For a start, your broadband is always available without the need to turn on a host PC to get Internet access up and running. Then there are the added security benefits available over peer-to-peer connection. For example, MAC address control allows you to limit the users of your wireless network (and broadband) to those whom you know and trust, using the unique hexadecimal serial number found on all networking devices.

Another useful feature found on some access points is built-in printer sharing, which makes it easy to give all your network users access to a common printer, again without turning on a host PC. We've got 13 access points and routers on test, from the tiny Sony VAIO PCWA-A220 to more industrial models.
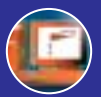
We've also rounded up a selection of adaptors for notebooks and desktops. Unless you're lucky enough to have 802.11 networking built in or have recently bought a Centrino notebook (*see p102*), a PC Card adaptor will be the first choice for adding Wireless LAN capability to your portable. For desktops, there's a range of options from PCI adaptors to USB dongles. We've got a selection in all categories, so read on for everything you need to make fast Internet available to everyone in your office or home without the need for wires.

CONTRIBUTOR
James Morris

THE LABS
Wireless broadband kits

How we test

As with all Labs evaluations, *PC Pro*'s philosophy for testing wireless kits starts with the question of how people use their WLANs in the real world. Apart from assessing general installation ease and range of features, we put each access point (AP) through its paces for performance in realistic situations. Also, in the realisation that you may want to jump on the Centrino bandwagon sooner or later, we test each AP for compatibility with a Rock Pegasus CT Centrino notebook running Windows XP.
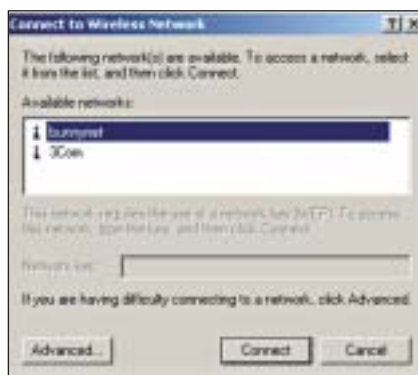
PERFORMANCE TESTS

To test maximum throughput, we use a 100MB collection of files and copy them from a desktop PC connected to the access point via wired Ethernet. To give each manufacturer the best-case scenario, we use the company's own PC Card adaptors installed in the same Rock notebook but with its Centrino wireless disabled. In the few cases where the manufacturer's own adaptors aren't available, we use the Centrino wireless supplied in the Rock for the entire suite of tests.
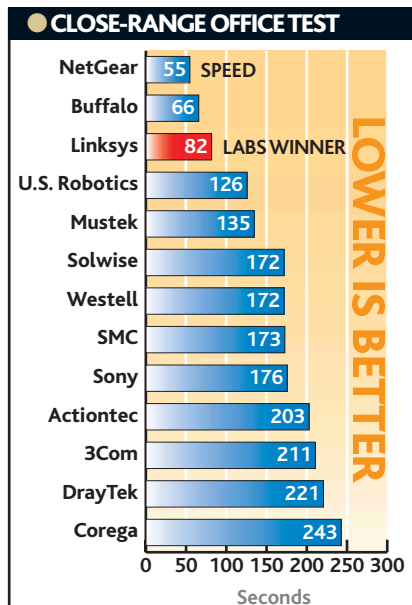
The strength of a wireless connection can drop off markedly with distance and because of obstacles like walls, so we test bandwidth in three locations. The first, simulating a small office environment, places the test notebook on a desk a short distance away from the AP. The second location, simulating domestic use or a more widely spaced office, is a room one floor above and across from the AP. Our final test is a more gruelling version of the latter, using a basement room below the AP with a greater density of blocking obstacles.
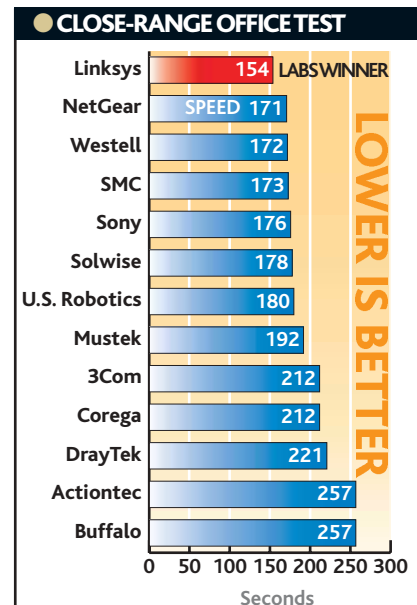
COMPATIBILITY TESTS

The advertising campaign for Centrino has given the brand extremely high visibility recently, and our reviews this month (*see p102*) show there's a lot more to it than just marketing hype. With so much to offer, Centrino is sure to be on the shortlist of anyone looking to buy a notebook this year, so we test each of the APs with Centrino, using the short-distance office test.
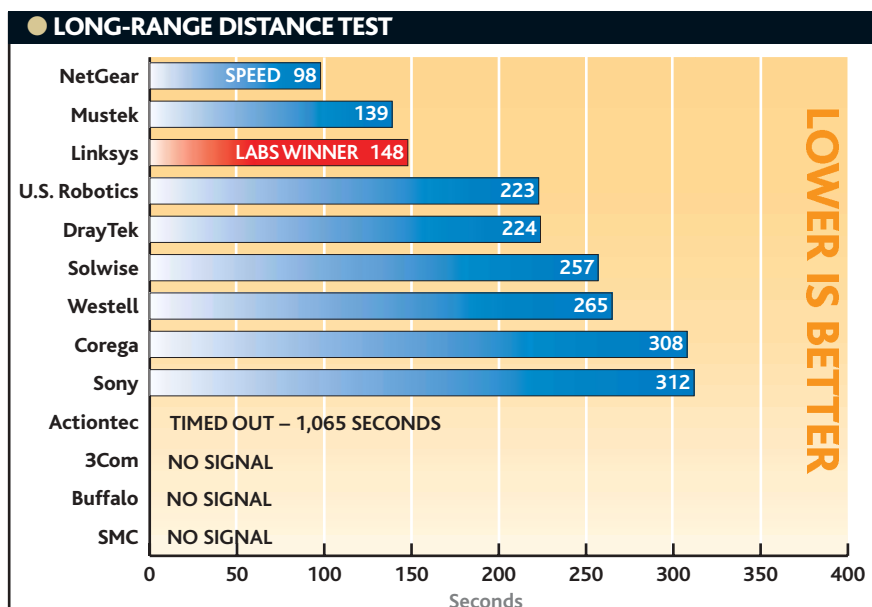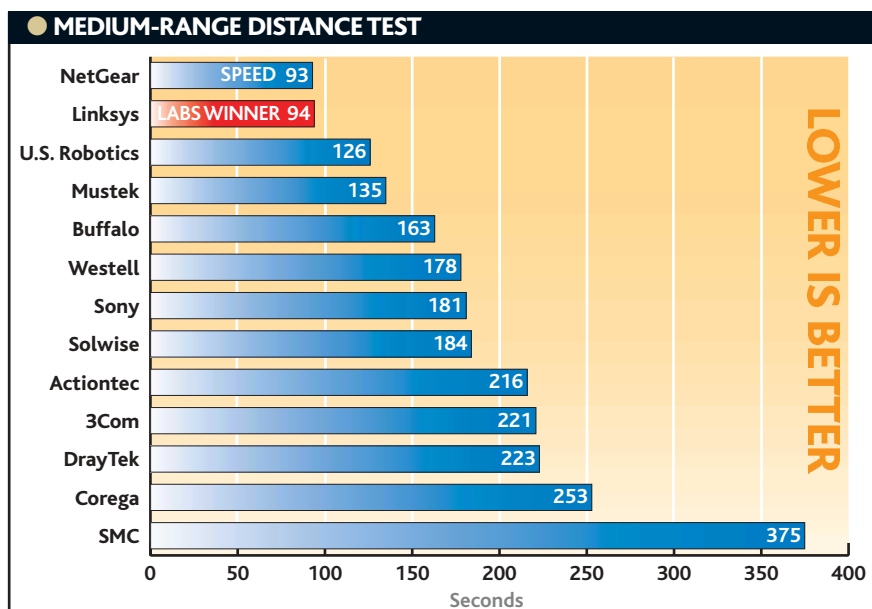

Windows XP makes Wireless LAN connection easy.

CLOSE-RANGE OFFICE TEST

	Seconds
NetGear	55 (SPEED)
Buffalo	66
Linksys	82 (LABS WINNER)
U.S. Robotics	126
Mustek	135
Solwise	172
Westell	172
SMC	173
Sony	176
Actiontec	203
3Com	211
DrayTek	221
Corega	243

LOWER IS BETTER

OWN ADAPTOR

CLOSE-RANGE OFFICE TEST

	Seconds
Linksys	154 (LABS WINNER)
NetGear	171 (SPEED)
Westell	172
SMC	173
Sony	176
Solwise	178
U.S. Robotics	180
Mustek	192
3Com	212
Corega	212
DrayTek	221
Actiontec	257
Buffalo	257

LOWER IS BETTER

CENTRINO NOTEBOOK (802.11B)

MEDIUM-RANGE DISTANCE TEST

	Seconds
NetGear	93 (SPEED)
Linksys	94 (LABS WINNER)
U.S. Robotics	126
Mustek	135
Buffalo	163
Westell	178
Sony	181
Solwise	184
Actiontec	216
3Com	221
DrayTek	223
Corega	253
SMC	375

LOWER IS BETTER

LONG-RANGE DISTANCE TEST

	Seconds
NetGear	98 (SPEED)
Mustek	139
Linksys	148 (LABS WINNER)
U.S. Robotics	223
DrayTek	224
Solwise	257
Westell	265
Corega	308
Sony	312
Actiontec	TIMED OUT – 1,065 SECONDS
3Com	NO SIGNAL
Buffalo	NO SIGNAL
SMC	NO SIGNAL

LOWER IS BETTER

● FEATURE TABLE

Feature	3Com OfficeConnect Wireless Cable/DSL Gateway	Actiontec Wireless Cable/DSL Router	Buffalo AirStation WBR-G54	Corega BAR-WL	DrayTek Vigor2600We	Linksys Wireless-G Broadband Router	Mustek Wireless Access Point AP-22	NetGear WG602	SMC Wireless ADSL Barricade	Solwise SAR715-PW	Sony VAIO PCWA-A220	U.S. Robotics 22Mbps Wireless Cable/DSL Router	Westell WireSpeed 2410 ADSL Wireless Gateway
Overall rating (access point)	97	99	111	101	95	114	102	108	95	101	81	105	99
Access point/router price (inc VAT)[1]	£109 (£128)	£79 (£93)	£89 (£105)	£80 (£94)	£189 (£222)	£93 (£109)	£57 (£67)	£79 (£93)	£169 (£199)	£120 (£141)	£110 (£129)	£105 (£123)	£159 (£187)
Code	3CRWE52196	CE144000-01	WBR-G54	COR-BAR-WL	2600We	WRT54G	AP-22	WG602	SMC7404WBRA	SAR715-PW	PCWA220.CED	USR0.18022	2410
Supplier	Insight 0870 700 7350	dabs.com (web only)	dabs.com (web only)	MicroWarehouse 0870 516 8671	SEG Communications 0870 745 8550	IT chest 0870 162 0840	Redstore.com 0870 870 4457	IT chest 0870 162 0840	SMC Europe 01234 831415	Solwise 0845 458 4558	Sony 0207 365 2947	MicroWarehouse 0870 516 8671	Broadbandstore.co.uk 0870 744 7886
Supplier's website	www.insight.com/uk	www.dabs.com/211WWS	www.dabs.com/281PWS	www.microwarehouse.co.uk	www.seg.co.uk	www.itchest.co.uk	www.redstore.com	www.itchest.co.uk	www.smc-europe.com	www.solwise.co.uk	www.sonystyle.co.uk	www.microwarehouse.co.uk	www.broadbandstore.co.uk
Manufacturer's website	www.3comc.co.uk	www.actiontec.co.uk	www.buffalo-technology.com	www.corega-international.com	www.draytek.co.uk	www.linksys.com	www.mustek.de	www.netgear.co.uk	www.smc-europe.com	www.solwise.co.uk	www.sonystyle.co.uk	www.usr.com	www.westell.co.uk
Basic warranty	Limited lifetime RTB	1yr RTB	2yrs RTB	3yrs RTB	3yrs RTB	1yr RTB	1yr RTB	3yrs RTB	Limited lifetime RTB	1 yr RTB	1yr RTB	2yrs RTB	5yrs RTB
ACCESS POINT													
Radio technology	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS	DSSS
WLAN type	802.11b	802.11b	Draft 802.11g	802.11b	802.11b	Draft 802.11g	802.11b+	Draft 802.11g	802.11b	802.11b	802.11b	802.11b+	802.11b
Aerials	2	2	1	1	1	2	2	1	1	1	1	2	1
Aerial type	Fixed external	Fixed external	Fixed internal	Fixed external	Removable external	Fixed external	Fixed external	Fixed external	Fixed external	Fixed internal	Fixed internal	Removable external	On removable PC Card
Network port (number)	10/100BaseTX (4)	10/100BaseTX (4)	10/100BaseTX (4)	10/100BaseTX (4)	10/100BaseTX (4)	10/100BaseTX (4)	10/100BaseTX (1)	10/100BaseTX (1)	10/100BaseTX (4)	10/100BaseTX (4)	10/100BaseTX (1)	10/100BaseTX (2)	10/100BaseTX (4)
USB port	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Power supply	External	External	External	External	External	External	External	External	External	External	External	External	External
Broadband connection	Ethernet WAN – cable or ADSL	Ethernet WAN – cable or ADSL	Ethernet WAN – cable or ADSL	Ethernet WAN – cable or ADSL	ADSL	Ethernet WAN – cable or ADSL	✗	✗	ADSL	ADSL	✗	Ethernet WAN – cable or ADSL	ADSL
MAC address cloning	✓	✓	✗	✗	✗	✓	✗	✗	✓	✓	✗	✓	✗
Cables and accessories (see key)	1E	1E, 1U	1E	1E	1E, 1T	1E	1E	1E	1E, 1T	1E, 1T	1E	1E	1E, 1T, 1F, 1U
Other features	✗	PC Card slot	✗	✗	Voice over IP, channel scheduling	✗	✗	✗	Print server, parallel port, client setup utility	✗	✗	Print server, parallel port, client setup utility	✗
SECURITY													
40-bit WEP	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓
64-bit WEP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
128-bit WEP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
256-bit WEP	✗	✗	✓	✗	✗	✓	✓	✓	✗	✗	✗	✗	✗
MAC address control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓
DMZ	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✗	✓	✓
VPN	Passthrough only	Passthrough only	✗	✗	✓	Passthrough only	✗	✗	Passthrough only	✓	✗	✗	✓
Application filtering	✓ Limited	✓ Limited	✓	✓	✓	✓	✗	✗	✓	✓	✗	✓	✓
Port redirection	✓	✓	✓	✗	✓	✓	✗	✗	✓	✓	✗	✓	✓
Hide SSID	✗	✗	✗	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓
Other security features	Website blocking	Website blocking	Packet filter, intrusion detection, UPnP	URL blocking	DoS protection, IP filtering, RADIUS	✗	✗	✗	IP/MAC address filtering, URL blocking, intrusion detection	Intrusion detection	✗	Stateful packet inspection firewall	Stateful packet inspection firewall
MANAGEMENT													
CLI	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
Management software	Gateway Discovery Wizard	✗	AirStation Manager	✗	Firmware upgrade, Quick-start Wizard, Syslog monitor	Setup Wizard	Wireless AP-22M utility	✗	✗	✗	Scan utility	✗	✗
Web management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PROTOCOL SUPPORT													
DHCP server	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓
IP address assignment	Manual/DHCP	Manual	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP	Manual/DHCP
TRANSMISSION RATE SELECTION													
Manual	✗	✗	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓
Dynamic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PC CARD													
PC Card price	£59 (£69)	£25 (£29)	£39 (£46)	£33 (£39)	Hardware not supplied	£49 (£58)	£26 (£31)	£49 (£58)	Hardware not supplied	£34 (£40)	Hardware not supplied	£40 (£47)	Hardware not supplied
Model	Wireless LAN PC Card 3CRWE62092B	PCMCIA 802.11b Wireless PC Card	54Mbps Wireless CardBus Card WLI-CB-G54A	Wireless PCMCIA Adaptor PCCL-11	✗	Wireless-G Notebook adaptor	Enhanced 22Mbps Wireless PCMCIA Card	WG511 802.11g 54Mbps Wireless PC Card	✗	PheeNet WL-0022	✗	22Mbps Wireless PC Card	✗
WLAN type	802.11b	802.11b	Draft 802.11g	802.11b		Draft 802.11g	802.11b+	Draft 802.11g		802.11b+		802.11b+	
OS support	Windows 95B or above	Windows 98 SE or above	Windows 98 SE or above	Windows 95 or above		Windows 98 SE or above	Windows 98 or above	Windows 98 or above		Windows 95 or above		Windows 98 SE or above	
USB ADAPTOR													
USB adaptor price	£47 (£52)	£31 (£36)	Hardware not supplied	£47 (£52)	Hardware not supplied	£41 (£48)	Hardware not supplied	Hardware not supplied	Hardware not supplied	£47 (£52)	Hardware not supplied	Hardware not supplied	Hardware not supplied
Model	OfficeConnect USB Adaptor 3CRSHEW696	USB 802.11b Wireless adaptor	✗	Wireless Pocket-Size USB adaptor	✗	Wireless USB adaptor	✗	✗	✗	PheeNet WL-303AR	✗	✗	✗
WLAN type	802.11b	802.11b		802.11b		802.11b				802.11b			
OS support	Windows 98 SE or above	Windows 98 SE or above		Windows 98 SE or above		Windows 98 SE or above				Windows 98 or above			
PCI ADAPTOR													
PCI adaptor price	Hardware not supplied	Hardware not supplied	Hardware not supplied	Hardware not supplied	Hardware not supplied	£49 (£58)	£40 (£47)	Hardware not supplied	Hardware not supplied	£42 (£49)	Hardware not supplied	£43 (£51)	Hardware not supplied
Model	✗	✗	✗	✗	✗	Wireless-G PCI Card	Enhanced 22Mbps Wireless PCI Card	✗	✗	PheeNet Wireless PCI Card	✗	22Mbps Wireless PCI adaptor	✗
WLAN type	✗	✗	✗	✗	✗	Draft 802.11g	802.11b+	✗	✗	802.11b	✗	802.11b+	✗
Type	✗	✗	✗	✗	✗	integrated	integrated	✗	✗	integrated	✗	integrated	✗
Aerial position	✗	✗	✗	✗	✗	Directly attached	Directly attached	✗	✗	Directly attached	✗	Directly attached	✗
OS support	✗	✗	✗	✗	✗	Windows 98 SE or above	Windows 98 or above	✗	✗	Windows 98 SE or above	✗	Windows 98 SE or above	✗

1 Prices were correct at time of going to press. Key: E = Ethernet cable, T = phone cable, F = ADSL filter, U = USB cable.

THE LABS
Wireless broadband kits

3Com OfficeConnect Wireless Cable/ DSL Gateway

PRICE £109 (£128 inc VAT)
SUPPLIER Insight 0870 700 7350
VERDICT All the features you could need plus a user-friendly web interface, but the distance performance lets it down.

3Com needs little introduction – its founder, Bob Metcalfe, was one of the inventors of Ethernet. But being first doesn't always give you an advantage.

The OfficeConnect sticks with 802.11b and offers typical physical features: a four-port 10/100BaseTX switch, a fifth port for connecting an Ethernet-attached ADSL or cable modem, and twin external aerials. A Wizard utility helps you find the router on the network, after which it's over to the web management tool. On first entry, this leads you through a Wizard to configure country – for WLAN channel settings – and broadband options including MAC address cloning.

This Wizard can be recalled at any time from the Welcome screen, while further menu options give access to the extensive features. The OfficeConnect may be secured with WEP, MAC address control and you can even hide the SSID. Port redirection may be used to give local systems Internet access for one or more services, or one IP address can be designated as the full access demilitarised zone. The firewall allows you to choose which applications can gain Internet access on a general or per-PC basis.

The OfficeConnect's Achilles heel is its wireless performance. At short range, it was on the slow side, but throughput got worse with distance, failing to post a result in our most strenuous test. This is disappointing, because otherwise the 3Com fits the bill nicely – it lacks none of the important features and the web interface is user-friendly.

PC PRO RATINGS
OVERALL
97
FEATURES	PERFORMANCE	VALUE
107	88	98
100 IS THE AVERAGE

Actiontec Wireless Cable/ DSL Router

PRICE £79 (£93 inc VAT)
SUPPLIER www.dabs.com/211WWS
VERDICT In spite of the under-par performance and mediocre feature set, the Actiontec offers good value.

Actiontec's Wireless Cable/DSL Router is unique in this Labs as it features a built-in PC Card slot as well as an integrated 802.11b radio. Actiontec claims this will be used for expanding wireless capabilities in the future or for adding VoIP (Voice over IP) and print server features.

Otherwise, this is a standard 802.11b wireless router, with four 10/100BaseTX Ethernet ports plus an extra WAN port for an Ethernet-attached ADSL or cable modem. A USB port is included too for direct attachment to a host PC.

Management is purely via a web interface. A Wizard helps you set up your broadband connection, guiding you through MAC address cloning if your ISP has locked the connection to a specific address. The intuitive interface offers a grab bag of features, including the requisite 128-bit WEP. However, MAC address control isn't available. You can set up a demilitarised zone to give one PC on the network unrestricted Internet access and use port redirection to set up PCs on the LAN as virtual servers, but only for a few limited apps such as FTP.

However, it was performance that let the Actiontec down. It was the joint slowest using the Centrino notebook and was only slightly faster with Actiontec's own 802.11b PC Card. While the router coped better with moderate distance and obstacles, it was almost unusable beyond that. As the cheapest router on test, though, it still represents decent value.

PC PRO RATINGS
OVERALL
99
FEATURES	PERFORMANCE	VALUE
93	89	108
100 IS THE AVERAGE

Buffalo AirStation WBR-G54

PRICE £89 (£105 inc VAT)
SUPPLIER www.dabs.com/2B1PWS
VERDICT Very good performance at short range with 802.11g and a decent feature set for a good price.

Buffalo has always pushed the market for value, and the AirStation WBR-G54 is no exception, being the cheapest 802.11g AP with routing abilities on test. The WBR-G54 integrates a four-port 10/100BaseTX Ethernet switch for attaching your wired network. Ethernet-connected broadband may be added via the WAN port, so you'll need to add your choice of cable or ADSL modem.

An AirStation Manager utility gives access to the relatively well laid-out web-management interface. Security options are extensive, with MAC address control and advanced firewall features including packet filtering and intrusion detection. You can filter which applications you want to allow through to the Internet and put a PC in the demilitarised zone to give it full Internet access, as well as redirect ports to allow multiple PCs to serve different Internet services.

There are four wireless operating modes: 802.11b only, an automatic 802.11b/g mixed combination, a turbo setting for 802.11g only and a turbo mixed mode. We tested using the latter, as most users will want to leave 802.11b available for occasional use, even if the majority of clients are 802.11g-enabled.

At close range, the WBR-G54 achieved stunning throughput, but this quickly fell with range and obstacles. It was also slow with the Centrino notebook, although Buffalo offers a selection of antenna add-ons, which could help the range problems.

Overall, the WBR-G54 offers a lot of features for your money, but you'd need to factor in the extra antenna expense for use over a wide indoor area. Because of these distance problems, it narrowly misses out on an award.

PC PRO RATINGS
OVERALL
111
FEATURES	PERFORMANCE	VALUE
110	110	115
100 IS THE AVERAGE
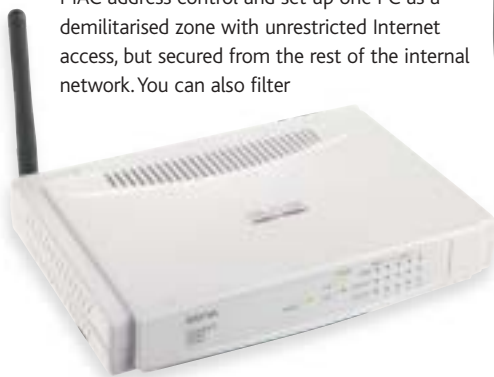
THE LABS
Wireless broadband kits

Corega BAR-WL

PRICE £80 (£94 inc VAT)
SUPPLIER MicroWarehouse 080 516 8671
VERDICT Not the fastest wireless router around, but it's still great value if you're on a tight budget.

You may not have heard much about Corega, although it operates under the umbrella of networking specialist Allied Telesyn. The company seems to specialise in keeping size to a minimum, and this diminutive wireless router is no exception. It manages to fit a four-port 10/100BaseTX switch, Ethernet broadband connectivity and an external aerial into one of the smallest packages on test.

Setup is entirely via the web interface, where you can configure WEP security, turn on MAC address control and set up one PC as a demilitarised zone with unrestricted Internet access, but secured from the rest of the internal network. You can also filter

which applications you want to allow through to the Internet and set up PCs on the LAN or WLAN as virtual servers via port redirection. This allows you to configure different PCs for different tasks – say one for FTP, another for game serving. The only security feature missing is the ability to hide the SSID.

The interface is well organised and easy to use. The major omission when configuring the broadband connection is that if your ISP locks you to a specific MAC address for the client system this can't be cloned to allow the router to be attached instead – you'll need to call your ISP and have the router added manually.

Performance was rather poor across the board, although the Corega was curiously quicker with the Centrino test notebook than its own PC Card adaptor. On the plus side, it managed a usable score in the long-distance test, unlike 3Com, Actiontec, Buffalo and SMC. In spite of the slow throughput, the Corega's adequate feature set makes it a fair choice if you're on a tight budget.

PC PRO RATINGS
OVERALL
101
FEATURES | PERFORMANCE | VALUE
101 | **89** | **112**
100 IS THE AVERAGE
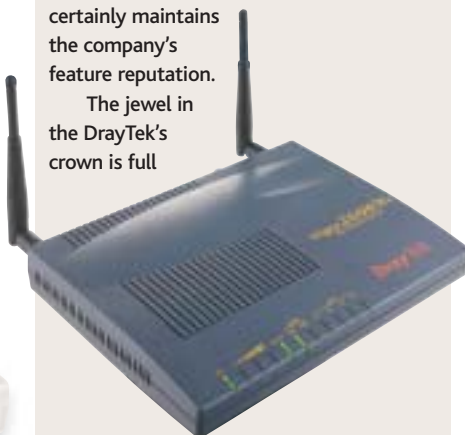
DrayTek Vigor2600We

PRICE £189 (£222 inc VAT)
SUPPLIER SEG Communications 0870 745 8550
VERDICT The most comprehensive feature set on test with good long-range performance, but you pay for it.

DrayTek is a favourite at *PC Pro*. Its broadband routers always offer a few more features for the professional. The Vigor2600We, while not leading the way with 802.11g, integrates built-in ADSL and a four-port 10/100BaseTX switch. It certainly maintains the company's feature reputation.

The jewel in the DrayTek's crown is full

hardware support for IPSec- and PPTP-based VPNs, making it ideal for offices with teleworkers. Every security option except 256-bit WEP is covered, including MAC address control, demilitarised zone, application filtering, port redirection and hiding the SSID. There's even a built-in firewall with Denial-of-Service protection and IP filtering. All of this is configured through a web interface, which manages to keep the myriad of features readily accessible from one screen. Separate quick-start Wizard, firmware upgrade and Syslog monitor utilities are also supplied.

The Vigor produced some curious performance results. It wasn't the fastest 802.11b product in close proximity, but throughput scarcely dropped with greater distance, making it the quickest in its class for the most strenuous test. The Vigor is therefore suited to distributing broadband across a house or multifloored office.

The 2600We costs more than the other routers with integrated ADSL modems, but it has the fullest feature set. Professionals who want security features should shortlist it.

PC PRO RATINGS
OVERALL
95
FEATURES | PERFORMANCE | VALUE
119 | **92** | **81**
100 IS THE AVERAGE

Linksys Wireless-G Broadband Router

PRICE £93 (£109 inc VAT)
SUPPLIER ITchest 0870 162 0840
VERDICT Good performance and a full feature set for the money make this a tempting buy, especially for cable modem users.

Linksys was the second ever manufacturer to send us 802.11g-based kit, and it remains at the cutting edge with this keenly priced wireless broadband router. The broadband routing comes in the form of an Ethernet WAN port, so would be compatible with either a cable modem or an Ethernet ADSL modem, but factor in an extra £50 to purchase the latter.

The Wireless-G Broadband Router BEFW11F4 is respectably endowed with features. Four 10/100BaseTX ports allow it to double as the switch for your wired network. A setup Wizard guides initial settings, after which advanced options can be accessed through a web management interface.
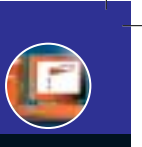
For the security-conscious, MAC address control can be enabled. The port redirection facilities allow PCs on the

local network to provide services like FTP or serving online games, and application filtering lets you limit Internet traffic to only the ports you wish to permit, or your web server can be kept entirely separate from the internal network via a demilitarised zone. You may also hide the SSID, so your WLAN can only be found by those who already know it's there.

While the Linksys wasn't the fastest 802.11g wireless when used within the office, it made up for this with good performance at range and the fastest score in our Centrino test. However, it still couldn't beat the NetGear overall. This good all-round performance, allied with all the right features and a competitive price, make the Linksys a worthy Labs Winner, particularly for cable modem users.

PC PRO LABS WINNER
PC PRO A LIST

PC PRO RATINGS
OVERALL
114
FEATURES | PERFORMANCE | VALUE
107 | **118** | **118**
100 IS THE AVERAGE

Client services

Chosen your wireless kit? Add a client adaptor to complete your network

A wireless broadband router or access point (AP) isn't much use without clients to wirelessly attach to it. Fortunately, there are now plenty of choices for every pocket and type of system. A PC Card for your portable can cost as little as £25 – Actiontec's 802.11b adaptor is available from dabs.com for this price, and its USB-based desktop adaptor is only slightly more expensive at £31.

During the early days of wireless, most manufacturers simply bundled a PCI PC Card adaptor with one of their notebook cards to cater for desktop PCs. However, this has never been an elegant solution, partly because it was likely that your PC case would obscure the wireless aerial. Nowadays, you can choose between a PCI card with integrated radio and omni-directional aerial or a USB adaptor. One advantage of the latter is that most versions come with lengthy cables, allowing you to place the aerial in the best position for line of sight with your AP. This will enhance performance at range. Corega's Wireless Pocket-Size USB adaptor doesn't have an attachment cable, but its unique feature is that it's no bigger than a USB Flash memory drive and is intended for portability.

If you're happy with the performance of 802.11b, the standard is sufficiently mature to consider shopping around for the best deal on adaptors, particular now Windows XP has made connecting to the WLAN mostly hardware independent.

claiming to be 802.11b+ will be compatible with another from a different vendor. For the time being, it's safer to assume the same for 802.11g. All the products on test this month claiming to be 802.11g actually operate using Draft 802.11g, as the standard is still awaiting formal ratification. This is due later in the year and there's a good chance that anything you buy now will be firmware- and driver-upgradable to the official standard, but again there's no hard and fast guarantee.

Still, the performance benefits of 802.11g or even 802.11b+ are tantalising enough to tempt early adoption, even without formal standards. Draft 802.11g offers up to three times the real-world bandwidth of 802.11b and little or no price premium over it, plus full backwards compatibility. There are certainly few reasons not to go for 802.11g.

To complete the wireless picture, we asked our wireless broadband router and AP suppliers to send us companion adaptors for their products. Not every manufacturer has a full range of adaptors, but we still received adaptors for every need, and you'll find product and pricing information for these on the feature table on p143. It's worth noting that nobody yet offers 802.11g or 802.11b+ in USB form, although Linksys, Mustek and U.S. Robotics have PCI

However, if you want to benefit from the fastest wireless kit on test this month, we recommend you buy your client adaptors from the same manufacturer as your AP or router.

The 802.11b+ system isn't a standard, and is unlikely ever to be one, so there's no guarantee that one product

cards. If you accept our recommendation and go for the latest wireless systems, bear in mind that you may be limited to 802.11b for your desktop PCs.

JAMES MORRIS

Mustek Wireless Access Point AP-22

PRICE £57 (£67 inc VAT)

SUPPLIER Redstore.com 0870 870 4457

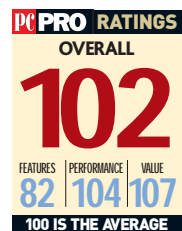**VERDICT** The respectable performance and incredibly low price make the AP-22 worth considering.

M ustek is better known for its budget scanners and digital cameras, but the company clearly knows a thing or two about keeping the costs down for wireless networking too. The AP-22 is easily the cheapest access point on test, although you'd need to add a wired broadband router – the cheapest start from a little over £60 – for Internet connectivity.

The Mustek uses the obscure 802.11b+ system – we can't call it a standard as it's not IEEE ratified, and probably never will be. Even 802.11b+ NICs from other manufacturers could cause problems, so it's best to stick with Mustek adaptors as well.

As it's just an access point, the AP-22 only offers a single auto-sensing 10/100BaseTX port for connection to a wired LAN. Similarly, firing up the web interface via the Wireless AP-22M utility shows a limited range of features. There's WEP up to 256-bit and MAC address control for locking down security, and you can even hide the SSID broadcast, but there are no routing functions so there aren't any other features. Still, this covers all the bases you'd expect in an AP.

Most impressive of all for such a cheap access point, performance results showed good in-office throughput and little fall-off with range. In our most gruelling distance test, the Mustek was second only to the 802.11g-based NetGear. Centrino results could only be described as respectable, though.

The only real drawback with the Mustek is that to get its speed benefits you'll need to use Mustek's own client adaptors. Fortunately, Mustek's adaptors are as cheap as its access point. If you're willing to accept this constraint, the AP-22 offers great value.

PC PRO RATINGS

OVERALL

102

FEATURES	PERFORMANCE	VALUE
82	104	107

100 IS THE AVERAGE

THE LABS
Wireless broadband kits

NetGear WG602

PRICE £79 (£93 inc VAT)
SUPPLIER ITchest 0870 162 0840
VERDICT The fastest kit on test by some margin. If you're looking for a quick access point, choose the WG602.

NetGear is primarily a networking company, which doesn't have the best reputation for good-looking products. Nevertheless, NetGear has clearly given some thought to style with the WG602. It's a small, attractively curvy access point, and its beauty isn't simply skin deep – inside lurks the latest 802.11g wireless networking technology.

As it's a basic AP and not a wireless broadband router, the WG602 has just the single 10/100BaseTX port for wired LAN connectivity, and you'd incur additional cost to add a broadband router. The web interface is spaciously laid out, but that's not surprising considering the small number of options. Apart from 64-bit or 128-bit WEP, plus MAC address control, there's

little else to configure, with no ability to hide SSID being the major omission.

However, this can be forgiven when the performance results are taken into account. With NetGear's own WG511 802.11g PC Card adaptor, the WG602 came top in every test. Particularly commendable was the negligible fall-off in throughput in our most gruelling test – something no other 802.11g product in this Labs was able to replicate, and indicative of a strong radio signal. The NetGear even managed equal second in our Centrino test, showing its backwards compatibility with 802.11b is also exemplary.

If you're looking for broadband connectivity with 802.11g, Linksys' Wireless-G gives it to you in one box. NetGear's broadband router version of the WG602 wasn't yet available at the time of writing. But if you're adding wireless to an existing wired network, NetGear's WG602 is the fastest way to go.

PC PRO RATINGS
OVERALL
108
FEATURES **79** | PERFORMANCE **132** | VALUE **100**
100 IS THE AVERAGE

SMC Wireless ADSL Barricade

PRICE £169 (£199 inc VAT)
SUPPLIER SMC Europe 01234 831415
VERDICT Feature-rich, with a parallel port and print server, the SMC is let down by its poor distance performance.

SMC was one of the first companies to offer us wireless broadband routing (*see issue 89, p197*). The Wireless ADSL Barricade is physically similar to the SMC2632W we reviewed then, although it has built-in ADSL. As a result, all four 10/100BaseTX ports are available for connecting wired LAN devices. There's still a parallel port for attaching a printer, as the SMC can act as a print server with no need for a host PC.

Configuration is entirely via a web interface, which is one of the more intuitive ones around. Some features are accessible via more than one route, which saves you hunting through the menus. There are the requisite WEP settings, MAC address control and the ability to limit which applications can gain access to the Internet, but there's

no option to hide SSID broadcast. You can also set up a demilitarised zone to give your server full Internet access, or use port redirection to allow any system on the network to offer a specific service. There are even some firewall features, including URL blocking and intrusion detection.

The real gotcha with the SMC is its surprisingly poor wireless performance. At close proximity, it's one of the faster 802.11b products on test, but at greater distances throughput dropped like a stone. The SMC failed to even get a signal in our most gruelling test. This is a router best suited to short-range use with good line of sight. The performance results are a shame, because otherwise the SMC is well featured.

PC PRO RATINGS
OVERALL
95
FEATURES **116** | PERFORMANCE **88** | VALUE **88**
100 IS THE AVERAGE

Solwise SAR715-PW

PRICE £120 (£141 inc VAT)
SUPPLIER Solwise 0845 458 4558
VERDICT For a wireless router with a built-in ADSL modem, the Solwise offers great value, but beware the confusing web interface.

If size mattered, the Solwise would win the dubious honour of being the largest wireless router on test. However, with four switched 10/100BaseTX Ethernet ports and a built-in ADSL modem, plus a USB port for local connection, the SAR715-PW has at least a few excuses for its portly dimensions.

Setup can be via Telnet and the command-line interface, or through a web page. Either way, it's by far the most confusing router to configure. WEP in 64-bit or 128-bit mode isn't so hard to set up, and neither is the ADSL connection, but everything else is hidden behind unfriendly lists of engineering information. This is a shame, as the Solwise offers plenty of firewall features, including intrusion detection. A demilitarised zone and application filtering are both available, if you can find them, but MAC address control and SSID hiding aren't. It also didn't appear possible to set up virtual servers via port redirection.
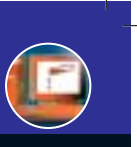
Performance testing was a different story, however. Although only blessed with 802.11b, the Solwise posted respectable results and only showed some fall-off in throughput in our most taxing distance test. It was also as comparably good with Centrino as it was with Solwise's own client adaptors, which is reassuring.

The low price, acceptable feature set and good performance could have made the SAR715-PW a sensible choice, but we can't recommend a product with such a complicated management interface. Plus, the lack of readily accessible MAC address control leaves a security hole, leaving Solwise without an award this month.

PC PRO RATINGS
OVERALL
101
FEATURES **92** | PERFORMANCE **96** | VALUE **110**
100 IS THE AVERAGE

Sony VAIO PCWA-A220

PRICE £110 (£129 inc VAT)
SUPPLIER www.sonystyle.co.uk
VERDICT Good looks and commendable performance for 802.11b can't justify for the huge price for a basic access point.

The PCWA-A220 is the most stylish access point on test, as you'd expect from Sony. There's no router built in, so there's just one 10/100BaseTX port plus the PSU connector.

A scan utility helps you find any access points on the network and fires up the web-based management interface for you, so you don't have to type in the IP address yourself. This is handy, as the Sony doesn't have its own built-in DHCP server. Setup could be tricky if the Sony is to be installed on a network without a DHCP server, although realistically a PC set up to share its Internet connection will perform this

function by handing out an IP address to the A220.

Once the Sony's basic settings have been configured, the web interface offers options for greater levels of security via WEP up to 128-bit and MAC address filtering, although you can't choose to hide the SSID. The web management tool is well laid out and easy to use, but without routing features there aren't that many settings to configure.

Performance was respectable for an 802.11b device, with good throughput at shorter ranges, although the A220 clearly suffered at longer distances. However, the price lets the Sony down. With vendors such as Linksys offering 802.11g with broadband routing thrown in for considerably less, you're paying a lot for the Sony brand on top of what's essentially a standard 802.11b access point. Unless style is your priority, there are better-value options.

PC PRO RATINGS
OVERALL
81
FEATURES	PERFORMANCE	VALUE
70	95	65
100 IS THE AVERAGE

U.S. Robotics 22Mbps Wireless Cable/DSL Router

PRICE £105 (£123 inc VAT)
SUPPLIER MicroWarehouse 0870 516 8671
VERDICT A capable performer with a good feature set, but Linksys offers more for your money.

U.S. Robotics re-emerged from 3Com in 2001 and is attempting to regain its modem fame with its broadband products. The 22Mbps Wireless Cable/DSL Router 8022 opts for the non-ratified 802.11b+ standard, although the company is currently upgrading its 22Mb products to 54Mb via **www.usrobotics. com/4xfaster**. However, the update for the 8022 wasn't available at the time of writing.

Broadband is taken care of via an Ethernet connection, so an Ethernet-based cable or ADSL modem will be a necessary addition. Should your ISP lock you to a specific MAC address, this can be cloned. Like the SMC, the U.S. Robotics has a parallel port and built-in print server for printer sharing. However, the 8022 only has two switched 10/100BaseTX ports, so you'd need another switch for a larger wired LAN.

The 8022 is exclusively managed via its web

interface, which is similarly laid out to SMC's. WEP support goes right up to 256-bit, MAC addresses can be controlled, and it's possible to designate one IP address as the demilitarised zone for ring-fenced Internet access. Again, like the SMC, ports can be opened so specific apps are allowed access to the Internet, and port redirection lets systems on the LAN or WLAN offer services as if directly Internet-connected.

The 8022 achieved a respectable performance score with Centrino and good results in the close-range test with its own 22Mb cards. Only the longest-distance test gave it any trouble. In spite of this and the decent features, both Linksys and Buffalo offer a better deal.

PC PRO RATINGS
OVERALL
105
FEATURES	PERFORMANCE	VALUE
110	104	104
100 IS THE AVERAGE

Westell WireSpeed 2410 ADSL Wireless Gateway

PRICE £159 (£187 inc VAT)
SUPPLIER www.broadbandstore.co.uk
VERDICT The best 802.11b performance and easy to set up, but no MAC address control reduces its wireless security.

The 2410 combines a four-port 10/100BaseTX Ethernet switch with an ADSL modem. A PC Card slot is used for adding wireless networking via the supplied 802.11b adaptor, although there's no mention of an upgrade to future standards.

Management and setup are performed via the Web and the interface is mostly easy to use. WEP up to 128-bit and hiding the SSID can be used to secure the WLAN, although there's no MAC address control to lock out intruders. You can set up local systems as virtual Internet servers using port redirection, but you can't designate one for full Internet access in a demilitarised zone. However, stateful packet-inspection firewall capabilities add to its Internet security. User customisation is through editing a script, but four preset levels are provided so you shouldn't need to bother.

The Westell was the fastest 802.11b AP in our short- and medium-range tests. Short distances and minor obstacles had little effect on throughput, although it dropped off in our most strenuous test.

If you want ADSL, 802.11b wireless and LAN in one package, the Westell offers a good blend of features and value. It even includes an ADSL filter, which is useful for self-install, wires-only ADSL. No MAC address control is a shame, as this is otherwise a well-featured router with a five-year warranty.

PC PRO RATINGS
OVERALL
99
FEATURES	PERFORMANCE	VALUE
113	96	95
100 IS THE AVERAGE