



Choosing a Router for Home Broadband Connection

Why use a Router?

The main reason for choosing a router, as opposed to a simple modem, which can also connect to Broadband, is twofold. First it adds a layer of security, protecting the network device(s) – one or more computer, printer, game console etc. – in the home from direct internet attack. Second it allows the Broadband connection to be shared between those devices. Most routers offer a built-in switch, or they can be easily expanded by adding a simple Ethernet switch. This is the simplest way to share a Broadband connection without needing to leave another PC switched on.

The availability of routers which also add wireless networking features greatly increases the flexibility of connection around the home for devices with a compatible wireless card or adapter.

Types of Routers

For the purpose of connecting to Broadband at home there are two main connection methods – Cable or DSL.

Broadband access is normally delivered over a bridge (modem) which is normally provided by your Broadband Service Provider. Occasionally your Service Provider will offer a combined Router-Modem, which incorporates the modem functionality and a firewall/router.

You will have to determine how your broadband service is to be supplied, and then you can look at selecting a suitable Router, if necessary.

Router Functionality

When choosing a router, consider the functionality that your home network will require, both now and in the future, in order to minimise expense later. We'll start with some definitions:

Hardware Features:

- Switch – Multiple interface ports for connecting devices,
- Wireless – Great for using the laptop from the couch or the garden,
- USB – Allows a PC without a network adapter to connect – the downside is that there will likely only be one connection,
- VoIP – Allows direct connection of standard telephones for Internet Telephony,
- Cost – Fairly obvious but in general you will want to minimize this.

Security Functions:

- NAT – (*Network Address Translation*) Although primarily used to allow multiple LAN PCs to connect via

a single external IP this also provides some security by hiding your internal network IP addresses from the outside world,

- Firewall – Specific rules to define how traffic passing through the Router is handled
- SPI – (*Stateful Packet Inspection*) a firewall function which analyses the headers of the data packets,
- Port Forwarding – This feature allows you to selectively permit specific TCP/UDP port traffic to be forwarded through the Firewall to designated client systems,
- DMZ – (*De-Militarized Zone*) This is another Firewall feature that allows you to define a client PC on your LAN that is unprotected by the Firewall – sometimes useful for Games Consoles or Servers requiring many port forwarding rules,
- Wireless Security – Due to the Broadcast nature of Wireless Networking, Wireless enabled Routers will normally have additional security features to control wireless client access such as:
 - Encryption – WEP/WPA/WPA-PSK – Increasing level of security,
 - Hidden SSID – concealing the Routers Wireless Identity,
 - MAC Address Filtering – Only allow defined client MAC addresses,
- VPN – (*Virtual Private Networking*) This is actually a combination of various security features that allows controlled access – using authentication and encryption – to LAN resources via the Internet/Wan connection. Some Routers offer full VPN server capabilities while others only offer VPN *Pass Through* which requires additional VPN software to be hosted on the LAN,
- Advanced Firewall Features such as:
 - Cookie Blocking,
 - URL Blocking,
 - Intrusion Detection,
 - DoS – Denial of Service Protection,
 - Java/ActiveX/Script Blocking,
 - DPI – Deep Packet Inspection.

Additional Hardware and Software Features:

- ADSL2/2+ Compatibility – These are faster alternatives to the standard ADSL: ADSL2 offering a maximum speed of 12Mbit, Adl2+ offering a maximum speed of 24Mbit,
- PPPoA/PPPoE Support – Helps ensure ISP Compatibility,
- QoS (*Quality Of Service*) Allows users to classify relative priority of traffic types through the Router – useful for Voice and Video streaming and VOIP etc.,

- DHCP Server – Eases the administration of client IP addresses,
- DHCP Relay – Allows the router to forward client DHCP requests to a separate server,
- Multi-NAT or Multiple Public IP Address Binding – Allows the Router to present multiple Public IP addresses to the Internet as opposed to a single one – useful when hosting servers, which need their own public identity,
- Bridge/Half-Bridge/ZipB Mode – Allows the Router to act like a simple modem allowing pass through to another network device sitting behind the Router – e.g. dedicated Firewall Appliance or another Router,
- DDNS (Dynamic DNS) Allows you to use a fixed hostname such as myrouter.dyndns.org to access your router without the need for your ISP to allocate a static IP – usually supports several DDNS service providers,
- Time Based Scheduling – Provides time based access controls over LAN clients – allows parental control over kids PC access times and download time-windows etc.,
- SNTP – Allows router to act as network time server for all LAN clients. Also ensures that all router-based logging is correctly time-stamped,
- UPnP – *Universal Plug and Play* – In this context primarily allows UPnP enabled client applications (such as Microsoft Messenger) to control the router in order to allow necessary network ports to be opened as required without the need for any manual port forwarding,
- Wireless Bridging/WDS – *Allows Wireless Enabled Routers* to connect to other compatible Wireless Access Points to extend the wireless network range,
- Wireless Antenna – Not all Wireless Routers have an external antenna – external antennas are usually better and preferably should be removable to allow a higher gain antenna to be fitted if necessary or an antenna extension lead to be fitted to allow better antenna positioning for improved reception.

Consideration of the above areas should allow you to sketch out what you want from your Router and with this in mind you can start to compare various models from different manufacturers.

It is worth noting that it is often possible to buy virtually the same router hardware from several manufacturers – often much cheaper than the well-known manufacturers.

Most routers today come with NAT, at least a basic firewall and DHCP server as a standard offer. This is probably enough for the majority of home users. Gamers (or bit-torrent users) will probably want some sort of port-forwarding capability. Power users will want to add DMZ features for their home servers.

It is quite convenient to have wireless access, so built-in wireless is good, but only if the router offers some encryption to keep your neighbor from sapping your bandwidth or capturing your tax return in transit.

The Benefits of Open Source Firmware

The last thing to think about is the nature and type of software on your router. If you select a router hardware platform which has its firmware based on Open Source Software (such as a version of Linux or BSD) then you are no longer dependant on the hardware manufacturer for support of your router functions.

Many of today's home routers run firmware that is based on a Linux Kernel, and there is a thriving community of developers out there who are constantly seeking to improve on the original manufacturers (often unstable and poorly featured) firmware.

One example of this is the wide range of routers from several manufacturers which are based on the Texas Instruments (Ti) AR7 Chipsets.

For a list of just some of the models which are AR7 base see this website ar7.wikispaces.com/Routers. There are already third-party alternative firmwares available which address issues with the original manufacturer supplied firmware and also add extra functionality.

Additionally if your router has a Linux based firmware then you will normally have some form of command shell access available to you which gives you much greater control over the router than the Web Interface usually does, enabling, for example, much more sophisticated router filtering via direct access to the iptables (firewall) command etc.

We both utilize third-party firmware on our routers. Author 1 uses firmware from www.routertech.org on his AR7 based wireless router. Matthew uses firmware from openWRT on his Linksys WRT based router. We have been very impressed with the increased stability, improved web interface and enhanced functionality options available.

Alternative third party firmware development is also underway at the following sites (among others):

- openwrt.org,
- www.dd-wrt.com/dd-wrtv2/ddwrt.php,
- oleg.wl500g.info,
- wiki.openwrt.org/AR7Port,
- ar7-firmware.berlios.de/openwrt.

by Jim Maxwell (RouterTech.org Support Team Member) and Matthew Sabin.

Users' opinions

Asmax BR-604

In the beginning of my adventure with routers I tried to set up a linux router/bridge from an old 486 and a few ISA



and PCI network cards. I had some difficulties with configuring it, it did not work fast, and was a little loud. I thought that I needed an *ordinary* router for a home office usage (simple LAN) at a moderate price. That is why I decided to buy a more dedicated device. Asmax BR-604 is quiet (no coolers), small enough, easily configurable, just great for a SOHO usage. It is my first router of this kind.

Generally I'm pretty satisfied – it just works :), although I am not a networking geek and I cannot say much in detailed way. Configuration is pretty simple – via web browser. There is a drawback about the *web page* (the interface for configuration): it cannot be properly displayed in some text-based web browsers (e.g. *lynx*). The page uses some javascripts and frames, so the Advanced Configuration could be impossible if you only have *lynx* or *elinks* (Standard Configuration might be possible). I think this should be fixed by the producer.

Besides, I had small problem with this model – at least it seems an issue for me:

The router can work as a DHCP server. It has also a setting for one or two IP's (let us call them *good*) for domain name servers. The problem is that when serving as DHCP for computers in LAN, it gives, when requested, its own IP as the DNS IP instead of the one (or two) I have set at config time (the *good* one (or two)). And then the DNS does not work – I have to change the DNS IP at hosts in LAN to my *good* ones. Either I can't use the router configuration properly, or it is a bug.

The router sounds like a good solution as for home or small office.

For me, it works just fine – since I do not work too much with configuring network, the mentioned issues do not ruin my world.

My note: ★★★★★

by *piotrko*

DL 604 and DL 524

I currently use d-link routers (a DL 604 and a DL 524). I use one wired, and then a wireless as a bridge. I chose d-link because it is an established brand, the price was right, reviews were positive, it was one of the models listed as compatible with the Nintendo DS (for my younger brother), and, importantly, d-link offers support to Mac users. I refuse to buy Linksys brand routers despite their popularity because the company does not officially support the Mac platform.

I used a wired router from a company that no longer makes them and a Netgear 802.11b router. I changed the wired router out for a d-link because the one I had stopped functioning. Later, when Nintendo released information on supported routers, I decided it was time to switch from Netgear even though I was happy with it; the natural choice at that point was a d-link wireless router. I also wanted an 802.11g router because of the enhanced features and speed.

In the past, I have considered other brands such as Apple, Netgear and SMC. I chose not to go with an Airport router even though almost all of our computers are Macs because of price and the fact that I am comfortable configuring a third-party router. I chose not to go with Netgear because the model that was compatible with the Nintendo DS was not on sale whereas the d-link model was. I chose not to go with SMC for the same reason. And I chose not to go with Linksys for the reason stated above.

The d-link routers work great. I have not had any substantial issues with them. The internal configuration web pages are easy to use and understand, and they are very reliable – no need for reboots or resets. And, when I had a question about the router, d-link customer service by phone was easy to get a hold of and was able to promptly and satisfactorily assist me. That is in contrast to Netgear customer service, which, IIRC, is only available by email.

I would definitely recommend d-link routers to others.

My note: ★★★★★

by *Ari Rubin*

Solwise SAR600EW

I used an Origo AWR-8210 before. That was limited but functional and reliable. It was replaced by a SWAMR-54108. The SWAMR is an 11g router, while the AWR-8210 was an 11b router, and so the theoretical increase in wireless throughput made the change stick – especially once RouterTech developed a custom firmware for the AR7WRD platform. The Solwise SAR600EW has a far better wireless range than the SWAMR, due in part to a much longer antenna. The manufacturer also has a strong physical presence in the UK, and my experience of dealing with the manufacturer was pleasant. Beside that it was *cheap* (i.e., a free review sample from the manufacturer), and turned out to be an excellent replacement for my router at the time. These factors made moving from the SWAMR to the SAR600EW a no-brainer.

During my using of this router I looked at one or two AR7WRD routers, but there was no need to change from the Solwise. The AR7WRD platform is pretty standard and there is not much to choose between routers based on this platform as far as the system board is concerned. Things that make a difference are the quality of the firmware, after-sales support, things like a better antenna, and price. This model works well with my hardware, and works perfectly fine under both Windows and Linux. This is more a firmware issue however. Some firmwares do not work well under Linux and some require Internet Explorer for configuration. Third party firmware support (RouterTech) is strong. The GPL source code to the firmware is freely available. With the RouterTech firmware, the SAR600EW does all I need it to do, and if I need

it to do something else, I have the source code. These are its strong points. I cannot think of any weak point as far as the hardware is concerned.

I had no special breakdowns or hardware problems. Of course it was *bricked* a few times, when testing firmware snapshots under development – but this is hardly the fault of the router. The Solwise SAR600EW is a solid router that seems to be well supported by the manufacturer. The original series are supported by the RouterTech firmwares, and so users have a choice of firmware. I would definitely recommend it.

My note: ★★★★★

by *thechief*

Safecom SWAMR-54108/54125

My first router was a Dynamode R-ADSL-C4 wired ADSL modem router; I changed the router to the SWAMR for an all-in-one wireless solution. After my purchase of the SWAMR, I have worked with other routers; such as the KCorp, 3Com and TrendNET they all seem to function well; but they do not have the same user base as the AR7WRD hardware. With the RouterTech firmware, the router got a lot better; more reliable and stable.

I chose Safecom SWAMR-54108/54125 as it was the best product for the amount it cost; it had all the features I needed at the time, and moving from a wired to wireless solution it was a quick cheap option.

Actually I considered one of the Netgear DG834 routers; but after reading up on them in various media's and learning that they sometimes do not like heavy traffic or lots of concurrent connections I was put off; and looked elsewhere. Although on reflection, it was only down to the firmware installed on the router and not the hardware itself as these also use the AR7WRD board.

After installing the RouterTech firmware it works flawlessly on both Windows and Linux operating systems; even the new Windows Vista does not seem to effect the router in anyway. With the user base that this hardware now has; with each new release it just gets better and more functional. There is no bad points to the hardware in the SWAMR; I think the only bad point was the original firmware which was installed by the manufacturers; and unfortunately the support given by the manufacturers was poor to say the least. With the original manufacturers firmware my connection would not last more than a week; a frequent reboot of the router was needed to get it working again; but after the install of the RouterTech firmware I have not had one problem; and my highest uptime was over 30 days (at time of writing).

The hardware has performed very well over the few years I have had it, and I am sure that I will use the SWAMR for some time to come; with the wireless turbo

features you can still reach 125mbps so there is no real need to change in the near future. I would recommend the hardware to other users; but I would also recommend they move over to the RouterTech firmware; as this would open up the true potential of the router and improve its reliability and stability.

My note: ★★★★★

by *Studioeng*

Safecom SWAMR-54125

I had an Origo ASR-8400 for a while that fully met my needs (although that also did not have the makers firmware on it). For a while I was using that router with a d-link AP to get wireless. I moved to a Billion 7402VGP to play around with the built in VoIP features, the wireless capability and the ADSL2+ future proofing. The Billion was not good though, with many bugs relating to the VoIP and wireless signal strength (at least on the firmwares that I tried up until I replaced it).

When it was clear that I could have more fun playing with the RT firmware I went and bought a router to put it on. I was only interested in getting a router that would run the RT firmware so I chose the cheapest on ebay that met the requirements.

The hardware meets all my needs now. This is due largely to the RT firmware which has significantly improved on the vendor delivered solution. I have tried a variety of OS platforms, cable connections, wireless etc. and not had any reasons to regret the decision to buy it.

Memory handling appears to be an occasional gripe on this hardware. With the RT firmware in place I can schedule jobs to optimise the RAM, reboot the router if the WAN fails and to report the DSL signal margins to the log for line monitoring. With all this in place I have a rock-solid router on my slightly wobbly ADSL line.

In my opinion the combination of hardware and firmware give a very cheap, feature rich platform which should meet the needs of most users.

My note: ★★★★★

by *Sy Borg*

Safecom SART/GART-4115

I decided to purchase this model because it was cheap and seemed well featured for the money. To be honest, it was my first router and afterwards i did not consider buying any other.

It works well with RT firmware, before I moved over the router was terribly unstable. Would crash 5-6 times a week; could not handle online gaming or p2p with more than one client in use simultaneously. In short, it was awful. The RT version is much, much better, although sometimes it does flake out (when too much p2p is going on) and it is very difficult to diagnose problems or know what to tweak to improve things. Lack of RAM in the router is an obvious handicap.



As far as problems are concerned i had occasional crashes, usually when disconnecting/reconnecting the router to get onto a better ISP server/switch. Otherwise very solid, uptime well into the hundreds of hours.

I can definitely recommend this type for home use – very simple but solid with the RT firmware, and it was dirt cheap (~£20). Could not ask for more at that price. Some of the features are somewhat redundant when the router does not have the power to properly use them (e.g. uPnP, SNMP, IP Account etc.) which is a bit disappointing. For all the basics it is perfectly adequate and secure (seemingly decent NAT and firewall support), although for new users, the lack of good uPnP support could be a problem. Works well with Linux and Windows, good LAN transfer speeds and very streamlined once it has been optimised (turning off the features mentioned above).

My note: a solid ★★★★★

by *melat0nin*

Safecom SWART2-54125

I have chosen this one due to its cheapness and active Open Source developer support base. I also like having telnet access to my network devices. Maybe my choice would be different, but I heard bad things about the cheaper D-Link WiFi modems and went for a cheaper generic option with an active support community.

However my first router was Solwise SAR715PV – I loved it, its paranoid firewall was great, after a lightening storm it would not sync to the ADSL line, took it apart and found that one of the IC's on the modem circuit had blown apart and its no longer available from Solwise.

My present router works fine, I have not really played with it as much as the SAR715PV, but the RouterTech firmware is friendly and does not need much reconfiguration. Regularly has 4+ hosts running through it with no problems.

In the beginning I had some problems when I decided to enable SNMP monitoring, this was on an early firmware version and it was only because I like messing. The router would hang after a time, I put this down to the internal logs filling up and hanging the router. Since then I have not bothered with SNMP and it never hangs even though its up 24/7.

Its not a professional piece of kit, but I would and have recommend it to techies and technophobes alike as a simple to configure, but tweakable (if you want to), box with a solid user support base and full features. Also gives a 100% stealth result on a GRC.COM shields-up test straight out of the box.

My note: ★★★★★

by *Liberator*

Safecom SWAMRU-54108/54125 + SWBRU-54108 in WDS Configuration

I was looking to extend my home network which was a single PC on a Connexant Router (non-wireless) to

include my two childrens PCs via wireless. As I live in an older property with thick internal walls I couldn't get wireless reception with a single wireless Access Point downstairs so I added a SWBRU-54108 which I could bridge to the SWAMRU-54108.

I chose the Safecom Units at the time because they were by far the best value for mone units which met my requirements and they had an extremely active and well supported support forum.

Before I made my mind, I considered various other wireless router and Access Point solutions from Linksys and Netgear and D-Link but I couldn't get the same *value for money* ratio from them for similar hardware as I could get for the Safecom branded units. The router/Bridged Router combo has served me well for the past two years but I recently have upgraded to a Solwise SAR-600EW Wireless ADSL2/2+ Wireless router in combination with some Solwise Homepluh – Ethernet Over Power Adapters – due to increasingly poor wireless reception in my area due to several neighbours adopting wireless routers.

To have a wider overview about this router take a look at good and bad points (in my opinion) Good Points – Cheap – well made – reliable – good firmware support (initially while current models) – good tech forum support (for a while) – very good feature list. Bad Points – proprietary (non open source) firmware – poor firmware support after model no longer current – abysmal forum tech support after a period of time as Tech resources (who were non safecom/adsltech staff) left forum and were not replaced. Generally the hardware has performed very well over the few years I have had it. There were no real problems other than lack of support for anything other than WEP wireless encryption when wirelessly bridged to the SWBRU – despite both units supporting WPA-PSK encryption. As the hardware is now a couple of years old I would hesitate to recommend it [other than to a potential purchaser of my units] and instead I would recommend an AR7 BASED ROUTER SO THAT THEY COULD TAKE ADVANTAGE OF THE Excellent 3rd Party Router-Tech Firmware which would no doubt be more stable and functional than the Manufacturer supplied Firmware.

My note: ★★★★★

by *Shotokan101*

D-LINK DSL-G604T

Before I bought my present router I had Belkin which blew up in the hot weather last summer and prior to that I used NetGear which also died after about a year's constant use. D-Link was the only wireless modem/router available in PCWorld, so I decided to give him a chance. *It works fine, with a small wired/wireless network of up to 5 PCs running Windows XP, with an ADSL1 2 Meg connection. I access my network from work, and very occasionally the router has lost its WAN connection and I have therefore been unable to connect. The Router-*

Tech GPL firmware offers a solution to this (reboot router on loss of WAN) which will prove really useful.

Generally I had no bigger problems yet, however the D-Link firmware seems rather weak and featureless in comparison with the RouterTech version.

This router has been in constant use for almost a year and has served my needs well. It's actually discontinued now, but I would still recommend it.

My note: ★★★★★

by Simon

Safecom GART2-4112

I chose this type because of the cheap price, reliability and open-source firmware alternatives. I preferred a wired router because of the added security. I also wanted it to have only 1 port, because I have a separate 8-port switch. Actually I was looking at Draytek routers but I found their price excessive for my needs and wallet. Before that I used a Safecom SAMR-4110. It was falling over after approx. 10 days uptime. The only way around that was to use a 7-day digital timer to power cycle it for one minute once a week. Safecom GART2-4112 seems to be temperamental when first powered on. Things just do not always work as expected, but after that it seems to be very stable. But it is running ok so far with RouterTech's 2.2 firmware. The good point is DDNS support. The weak point is lack of loopback capability.

I definitely recommend this type to others, as I have recommended it to friends and family. For the price of 14.99 quid, it was one great buy!

My note: ★★★★★

by micronanopico

SOLWISE SAR-600E

This is my first router, suggested by ISP (Kingston Communications). I did not consider any other. *It is connected to PC via LAN / Homeplug technology, so i have not got no problems at all connecting this way. It is reliable as far as I can tell, the only problem encountered so far was due to the telephone line. It would not stay sync'd to ADSL and lose sync every 5 minutes or so. Investigations showed it was a combination of noisy extensions and the telephone line bell wire. Now this has been fixed, the router has remained in sync for over ten days now. But still weak point would be the supplied firmware. However The RouterTech firmware allows for a better set up and can run cron jobs to keep the limited memory clean. I would recommend the router, especially with the RouterTech firmware.*

My note: ★★★★★

by Robsnow

Almost all the opinions were written by RouterTech.Org members. Thanks to RouterTech.Org for the contribution.

Speedtouch ST546v5

I purchased this type of router because there is a DMT tool that allows you to fine tune your line and Alcatel chipsets are generally regarded to be better on longer lines. I have also considered a Netgear DG834GT or DG834Gv3, my mother in law has one and it is rock solid compared to both of my routers, excellent wireless range too. Before this one I had many routers: 3com, SMC, Origo, Safecom. The first 2 died, the Origo was old technology and replaced with an ADSL2+ capable Safecom SART2-4115.

Despite it being an Alcatel chipset this router is not very stable at all, and there are continual line drops due to a noisy line.

I would recommend it to others because the DMT tool allow for lots of tweeking, but i would not recommend it because it is not very configurable or stable.

My note: ★★★★★ (nice looking interface but no configuration options)

by eMuNiX

Safecom SART2-4115

Comparing to Speedtouch ST546v5 it is much more stable on my line and thanks to RouterTech firmware it functions better with P2P software.

Problem is that, it often prone to hanging when not in use needing a reboot to clear (possibly a hardware problem).

But I recommend it to the readers because a price of less than 30 pounds it is a bargain!

My note: ★★★★★ (a basic router that performs quite well)

by eMuNiX

Netgear WPN824

I chose Netgear WPN824 due to good reputation and good support. Had a netgear before (adsl) but changed to cable as faster. Belkins before, but limited support, 2 blew up, had a 3-com business connect in between but tiscali did not support it as thought it was a business line not domestic. Superb functions and interface though.

I did not consider any of others when I wanted to change my old one, but i was told to stay away from Linksys.

It works fine, do not know its there really. Wireless is excellent, reaches parts of my massive house others would not I believe. I have not noticed any serious problems yet.

Seems to be the most reliable yet, although first with cable, so no conclusions really to be made. As said before, wireless range exceeds anything else I've had. No hackers (wireless) have succeeded in breaking in. (Yet.)

My note: ★★★★★

by Barry Mung ●