

How Your Mains Sockets Can Give You Internet Access Throughout Your Home

This article shows you how to:

- ✓ What ‘powerline networking’ is and how it works
- ✓ The benefits of using powerline adapters in your home
- ✓ How to set up your own powerline network in minutes

Wi-Fi doesn’t work for everyone. Perhaps your home is too large – or too solidly constructed – for your router’s Wi-Fi signal to reach every room. Or perhaps you have Internet-enabled devices that don’t support Wi-Fi?

That leaves you with the prospect of stringing network cables between your devices and your router, but you probably don’t want long cables trailing all over the house! Fortunately, there’s a better way: use your home’s electrical wiring for broadband data!

Read on to learn how it works and how to set up one of these ‘powerline networks’ yourself, cheaply and easily.



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- **The Basics: How Powerline Networking Works** B 580/2
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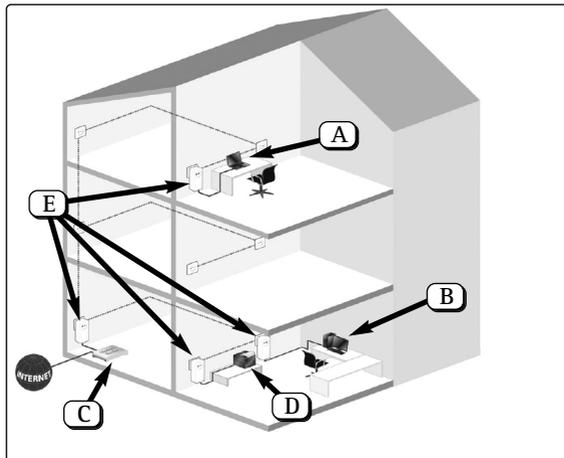


For the purposes of this article, we're using the popular 'Devolo dLAN 1200+ Starter Kit', costing around £95 at the time of writing. However, you can find similar powerline adapters from companies such as D-LINK, Netgear, TP-Link and ZyXEL, all of which work in much the same way.

The Basics: How Powerline Networking Works

Various devices in your home need Internet access

To set up your home network and use the Internet, you somehow need to connect your computers (A) and (B) to your broadband router (C). There may be other devices you'd also like to connect to the network, such as a printer (D).



Wireless networking isn't always possible

Ideally, you'd create a wireless network (a WLAN), but that's not always possible: if some of your computers or other devices are too far away from your router, separated by walls and floors, they may be out of reach of the wireless signal.

Why not just move your router to somewhere more accessible? If you can, that certainly might help, although much still depends on the size of your home, how it's constructed, and which rooms have devices needing Internet access.

However, with modern high-speed broadband connections, your router must be connected to your home's master telephone socket – you can't plug it into a handy extension – which means you may have no choice in the matter.



Even if you do have a wireless network, you may have one or two devices which can't use it. For example, some printers and smart TVs don't have built-in Wi-Fi.

The other option is to connect everything to your router using network cables, but that's probably impractical. If your computing devices and your router are so far apart that they can't communicate wirelessly, they're probably too far apart to reasonably run cables between them too!

But why would you need to? If you think about it, your home already has a network of cables strung around it, although you can't see them: the mains electricity circuit. This circuit can also be used to carry computer data – a technology known as 'powerline networking'.

To use it, all you need is two or more 'powerline adapters' (E). You plug these into electrical sockets and connect your router to one of the adapters and your computers, printers, smart TVs and other devices into the others.

Each adapter has at least one network socket (F), and some models offer two or three, allowing several computing devices to be connected to a single adapter. Many also have a 'pass-through' electrical socket (G), meaning that the wall socket occupied by the powerline adapter can still be used.

Some devices don't support Wi-Fi

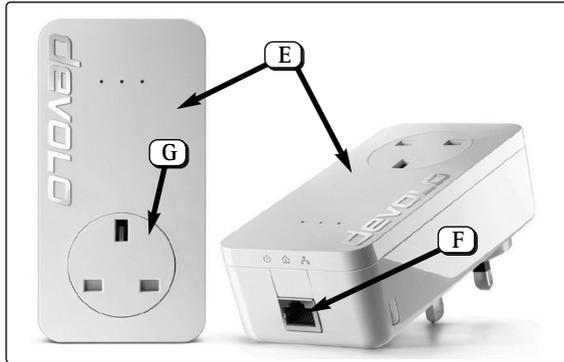
Network cables are often impractical

The solution: powerline networking

Two or more powerline adapters

Connect devices to adapters using network cables

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How does powerline networking work?

Your home's electrical wiring forms a network

The electrical circuit in your home already forms a network (of sorts), connecting all your mains sockets with one another. The electrical wiring in your home can handle a variety of frequencies. The electricity itself uses frequencies of 50 or 60 Hz, and powerline networking uses far higher frequencies to transfer computer data so that the two don't interfere with each other. Effectively, the electrical wave carries the data along, in much the same way that water in a river carries a twig dropped into it.

Your devices use this network to transfer data

The result is almost exactly the same as if you plugged all your devices directly into your router, but with the obvious benefit that you're using your home's hidden electrical wiring rather than a long tangle of network cables. You should also achieve better speed than you would using wireless networking, not to mention better security.



You don't have to regard powerline networking as an 'either/or' situation though; you can use it in conjunction with a wireless network. For example, perhaps you already have a wireless network set up in your home,

but you also need Internet access in a room that's out of reach of your router's Wi-Fi signal, or you want to connect a device that doesn't have built-in Wi-Fi. In that case, continue using your wireless network just as you always have, but use powerline adapters to connect that extra device.

Quickly Set Up Your Own Powerline Network

If you'd like to make use of powerline networking, it's time to go shopping! What you need is a 'starter kit' consisting of at least two powerline adapters, and various manufacturers offer these at prices between about £60 and £120. Make sure the product you choose has the following features (as most do):

- **Cables included:** for each adapter, you'll need a network cable to connect your router or PC (or some other device) to it. Along with the two adapters in a starter kit, you should also receive two network cables, but it's wise to make sure. Buying these separately would obviously add to the price.
- **Encryption:** powerline networking uses encryption to provide added security for your data. It's helpful if this encryption is self-contained in the adapters, rather than requiring you to install special software on your PC and then having to set up an encryption password yourself.
- **Integrated mains socket:** look for adapters with a 'pass-through' mains socket, as pictured on page 4, so that you don't lose access to a wall socket by plugging an adapter into it.
- **Data speed:** look for adapters quoting a data speed of at least 500 Mbit/s (megabits per second). This quoted speed

You need a powerline starter kit

Each adapter needs a network cable

Easy built-in encryption

Pass-through mains socket

Speed of at least 500 Mbit/s

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is the adapters' absolute maximum, and the transfer speed between adapters diminishes the further apart they are. Starting with a reasonably-high quoted speed should mean that data still moves around the network at a respectable rate, even if your adapters are a long way apart.



Consider also whether you'll need powerline adapters with more than one network socket. If you have two devices in the same room which both need to be connected to the network, it's better (and cheaper!) to use a single adapter with two network sockets than to use two separate adapters. .

Step-by-step: setting up your powerline network

Once you've arrived home with your powerline starter kit and unpacked its contents, you're ready to set it up. Here's what to do, using the Devolo dLAN 1200+ as a typical example:



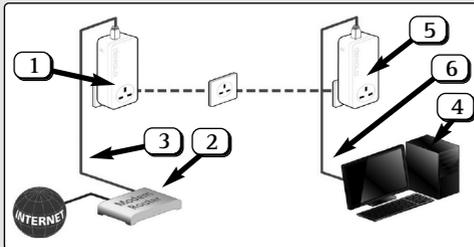
1. Plug one of the two (identical) powerline adapters **1** into an empty socket near your broadband router **2**. Ideally, this should be a single-gang socket rather than a double-gang socket. If you only have a double-socket available, it's best to leave the second socket empty if you can.



Don't plug the powerline adapter into a multi-gang power strip – particularly one with surge protection – as this could vastly reduce the performance of the powerline network or prevent it from working altogether. Instead, plug the adapter directly into the wall socket and plug the power strip into the adapter.

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- Next, use one of the supplied network cables (3) to connect your router to the adapter. Your router will probably have several identical network sockets, and it doesn't matter which you use. Likewise, if the powerline adapter has two network sockets, use either.



- Go to your PC (4) (or whichever device it is that needs to be connected to the network). Plug the second powerline adapter (5) into a wall socket somewhere near it, again ideally into a single-gang socket or a double-gang socket in which one isn't being used. As mentioned above, don't plug the adapter into a multi-gang power strip, but directly into the wall socket.
- Use the other network cable (6) to connect the PC to the powerline adapter.

Connect your router to the first adapter

Connect your PC to the second adapter

Some recent notebook PCs and tablets don't have a network socket (technically known as an 'RJ45 socket'). To get around this, you can buy a 'USB-to-LAN' adapter which plugs into a USB socket and gives you a network socket on the end of a short cable. If your notebook or tablet offers a USB 3.0 socket (with a blue plastic tongue), look for a USB-to-LAN adapter which supports the USB 3.0 standard to make the most of the increased speed.



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Press the encryption button on the first adapter...

...and then on the second adapter

5. That's got the basic setting-up done. The final step is to get these two powerline adapters to 'speak' to each other and to enable their built-in encryption for your data. Start by going back to the first powerline adapter, to which your router is connected. Press the little encryption button (7) on the side of the adapter and hold it in for about one second.

6. Now go back to the second powerline adapter and press the encryption button on this one for about one second. (For Devolo adapters, you must press the encryption buttons on both adapters within two minutes of each other.) When you've done this, the two adapters will then be connected to each other and little LED lamps will light up on both as confirmation.



Quick tips for powerline networking

Easily add more adapters

- You can buy additional powerline adapters if you need them. After plugging a new one into a mains socket, press the encryption button on either of your existing adapters, then (within two minutes) press the same button on the new adapter.

Stick to a single manufacturer

- Most powerline adapters conform to a standard known as 'Homeplug' and they should all be compatible with one another, regardless of manufacturer. However, it's generally best to stick to a single make if you can.

Best speed and reliability

- Always plug powerline adapters directly into wall sockets, not into power strips or extension cables. As the powerline adapter uses clever filtering to improve data performance, it's a good idea to plug other nearby computing devices into the powerline adapter's own mains socket, using a power strip if you have more than one device to plug in.