You can improve your Broadband.

In our rural location, broadband speed and reliability are not what we would hope for. But are they as good as they could be? With ten years' experience with my own service, I now have a reasonable speed and have learned much in the process. If you have a conventional copper-wire based service (and not yet fibre), are interested in improving your own speeds and have even basic DIY skills, this guide will help you get the best from your broadband.

Why is some broadband slow? Broadband is actually a very clever technology, applying 20th/21st century techniques to transmit data over 19th century technology (copper wires). The broadband signal is a high-frequency signal which shares the phone line with our voice calls. A filter (splitter) separates the voice and data signals – the filter may be one-per-phone or it may be within your BT Master socket. But the key things in terms of speed and reliability are the issues of *noise* and *line length*. And here is the nub: broadband technology accommodates these problems *by slowing down your broadband speed*.

What speed should I be able to get? Broadband technology has to deal with the length of copper wire back to the Exchange. Long lines "attenuate" the signal and speeds must be reduced so some signal actually gets through. There is an *approximate* relationship between phone line length and the speed you should get[1]:

Length	Best speed	Length	Best speed
up to 1.5 km	>20 Mbps	4.3 km	3 Mbps
2.2 km	15 Mbps	4.6 km	2 Mbps
2.8 km	10 Mbps	5+ km	theoretically no service[2]
3.7 km	5 Mbps		

How far am I from the Exchange? To find which Exchange you are connected to and its distance, go to http://www.kitz.co.uk/adsl/broadbandchecker.php Drumoak and Durris are generally connected to Drumoak, code "NSDMK". However, the above site is slightly out of date and reports wrongly that Drumoak has only ADSLMax – it has been upgraded to ADSL2+ (approx. last winter, I believe). Bearing in mind the nature of the distance/ speed estimates, check the table to find the line speed you should roughly be aiming for.

What speed am I actually getting? You may already know your approximate line speed, but most website based speed tests (e.g. www.thinkbroadband .com/speedtest .html) measure your data download speed, which in fact is only a secondary measure. What matters are two key figures, your "Sync" speed and your "Profile" speed.

To get your **Sync speed**, go to http://www.kitz.co.uk/adsl/frogstats.php , find your Router in their list and follow the instructions. Your Sync speed will be listed there in the resultant web page output, usually in kbps, kilobits per second. Divide by 1024 to get Mbps, megabits per second.

To get your **Profile rate**, go to BT Wholesale's site – speedtest.btwholesale.com. Carry out their initial test, (which will also give you your current data download speed), but importantly *then click the "Further Diagnostics"* button. Enter your phone number in the "ADSL and Fibre to the Cabinet" space and click "Run Diagnostic Test". Confirm your phone number and then wait for the test to complete. The key item to note is the "IP Profile for your line", in Mbps.

Is my speed slow? You may well find your Sync and Profile speeds are some way below the Best Speed listed on the table above. The broadband equipment at the Exchange, together with your Router, maximises your speed within the actual noise level prevailing and apparent line length, including conduction imperfections. This fastest speed negotiated is called the **Sync speed**. To allow a safety margin and maximize reliability the Exchange will however only send data somewhat slower, at what is called the **"Profile" rate**. The important things to note are:

1. the speed at which you actually get your data from the internet *cannot be faster than the Profile rate* (typically it will be 90-95% of this rate),

2. *the Profile rate depends directly on* (and will be 88.2% of*) your Sync rate[3] and

3. recurring noise or conductivity problems on your line will depress your Profile rate in the short and long terms.

Compare your Sync rate with the table above. If you are within say 15% or so of the Best Speed, you are doing reasonably well and you are unlikely to achieve much faster speeds (until Fibre comes along). But if you are well down, e.g. you are 3 km from the exchange but are only getting 3 Mbps, things can be improved.

How could I improve my speed? Fibre may be some way off for you, and short of moving house you can't do much about your distance from the exchange, but you can address noise and excessive attenuation. You are aiming for the best Sync speed possible; everything else flows from that.

There are a number of things you can experiment with, such as your internal wiring configuration, filters etc, and we will cover these briefly later, but the easiest and best option which I would strongly recommend is to…

Fit an "ADSL-Filtered NTE5 Faceplate". You can isolate the often negative effects on broadband speed created by your phones or your internal house phone wiring using a

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[1] Based on the "ADSL2+" service now available from Drumoak exchange

[2] in practice you will get a service somewhere up to 1 Mbps

[3] see ADSL2+ section at http://www.kitz.co.uk/adsl/IPprofile.htm

special telephone Master socket. This incorporates its own Broadband Filter (which you often have in each phone's connection) and it therefore splits the voice and data signals right at the entry to the house. It has two output sockets, one for your phone(s) and one for your Router.

If you already have an NTE5 faceplate (which began to be fitted by BT in the 1980's and you can tell as it has a phone socket on the front) this is a fairly easy job. Go to the marvellous Kitz web site at http://www.kitz.co.uk/adsl/socket.htm, look at the photos, and determine what you have installed. If you still have an old hard-wired socketless phone incomer from the street, you will need to get BT to do this.

So, *only* if you already have an (unfiltered) NTE5 socket, you buy a filtered faceplate, unscrew and unplug the old faceplate, plug in the new one, then connect the phones to the phone socket, and your Router to the router socket. This should improve your speed if noise on your property is the issue.

But there is a further tweak: if you have a BT Engineer do this job, they can fit a "Mark III" filtered NTE5 Master Socket. This has extra components which filter out certain interference but in practice have often had the effect of further improving speeds. But before you call your Internet Provider to have BT do this work, you need to find out what sort of improvement might be possible and to check your own equipment and wiring is not the cause of the problem, since if that were the case BT's visit will be chargeable – at not a small sum.

Run a "Quiet Line Test". With everything still connected, from a hardwired phone (*not* a DECT / cordless phone) dial 17070 and option 2. Listen to this "silence" for several minutes. What you want is *dead silence*. If you hear crackling, a hum or buzz, this is likely to be a significant cause of your slow broadband speeds and why your Router will periodically disconnect. Then, if you have an NTE5 faceplate of any type, disconnected everything from the phone circuit by removing its front plate (see the Kitz "socket.htm" web page above) and plug in the phone to the Test Socket behind the faceplate *without* an ADSL filter. Run the Quiet Line test again.

Your results will help you determine whether there is noise generated inside or outside the house. A crackling line is unlikely to be caused internally (unless it is your phone that is faulty) and is more likely due to a near-break, a poorly conductive cable section or joint, or water ingress to the phone cables back to the Exchange. A hum or buzz is more likely to be somewhere internal to the house. Regardless of your broadband speeds, you should *always report* an externally noisy line to your internet provider (it will probably worsen) and have BT remedy it.

If you have found noise internal to the house you need to locate the source by a process of elimination – the source may be your phones, cabling, filters, mains interference, alarm system, or ring wire interference (see Kitz). Disconnect and re-connect items and cables until you find the cause. Note that ADSL filters themselves can be faulty or poor quality, so make sure you try or buy a known good-quality one for your tests.

Find your best broadband speed using the Test Socket. To give your Router its best chance for a maximum broadband speed, and again if you have an NTE5 faceplate, take the faceplate off and plug your Router directly (via a known good Filter) into the Test Socket. This again isolates your entire house and plugs your Router directly into BT's wires. Find your Sync speed and compare this to the Sync speed achieved previously. You may well find this Sync speed is an improvement on previous figures. Note that a noisy external line will still depress this speed somewhat.

By now you should have a good idea of what the theoretical "Best Speed" is, what maximum speed you actually get via the Test socket, what speeds you get with your original installation, whether you have any faulty components and whether noise on the line is an issue. If these results show that you would benefit from changing to a filtered faceplate, I would always recommend that. You don't know what speed you will actually achieve and it may not be quite as fast as the "Test socket speed", but it should be higher than your old speed.

Now call your Internet Provider. If you have a noisy line, and are happy your own equipment is not faulty, ask for BT Openreach to investigate and correct the noise. Another valid request is that your Router keeps dropping the connection. Reporting "a slow line" with no clear evidence of a fault is difficult for Openreach to prioritise.

During BT's visit, ask the Engineer whether your master socket is suitable for an upgrade to a Mk III filtered NTE5 Faceplate. Depending on the condition of the old installation they may decide to change it anyway. But if they cannot make the change right then, re-confirm with them that it is possible and book a separate visit, (*which may be chargeable*). You could instead fit your own non-BT NTE5 faceplate (see above).

Afterwards: I hope these tips will have helped to speed up your broadband or at least to identify problems.

The above is only a brief introduction to this huge subject. For more information, the Kitz web site, although pretty technical, is a great resource – start with www.kitz.co.uk/adsl/linestats.htm . Space prevents me from covering everything so I would be interested to hear back by e-mail from anyone as to how they got on and (if I know the answer) perhaps I can cover further topics in another article.

Good luck - Cliff Grover - cliff.grover@outlook.com