# *Buying a Computer*

## *A guide for home and small business users*

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I am often asked by people, “Which computer should I buy?” The choice sometimes seems bewildering – with so many manufacturers to choose from, and ever changing specifications, how do you know what’s actually right for you?

The manufacturers and suppliers don’t make it any easier. They will give you a list of specifications, but raw numbers won’t help if you don’t know what they mean or how they relate to what the computer will actually do. Do you need a “Pentium D 840 processor”? Is a “200 GB hard disk” OK? Is “256 MB RAM” enough?

This guide aims to take some of the confusion out of buying a computer and help you to decide what’s right for you. It is aimed at home and small business computer users, and assumes that you are looking for a PC running Microsoft Windows, as these are the most popular.

However, do bear in mind that there are alternatives to Windows. Some people feel that Apple Macintosh computers are better designed and easier to use – and they are certainly more stylish than most PCs! Even if you choose to stick with a “conventional” PC, you don't have to use Microsoft Windows – *Linux* is an increasingly popular alternative, and some versions are completely free!

Nevertheless, for most people a Windows based PC will be the computer of choice, and the rest of this guide assumes that this is what you will want.

Please bear in mind that things move fast in the computer world, so the prices and specifications quoted here will soon be out of date. I release new versions of this document from time to time, so check at http://www.bovett.co.uk for the latest version.

**Jargon!**

It's very difficult to discuss computers without using some of the jargon. I've attempted to keep it to a minimum, but it can't be avoided altogether, so to help you out there is a **Glossary** at the end of this guide which should help.

# What’s it for?

It’s easy to get lost in a sea of numbers and lose sight of what’s really important, which is **“will it do what you need?”** So, the first thing to decide when choosing a computer is, “What do you want to do with it”? This will determine what type of computer you need, what software (programs) you need, and what other devices (“peripherals”) you need to go with it. Some typical uses might be…

- **Office, home office** – word processing, spreadsheets, desktop publishing etc.
- **Internet access** – E-mail and web browsing
- **Graphics and digital photography**
- **Multimedia** – listening to music and playing video clips
- **Home Cinema** – watching films on your PC
- **Video editing**
- **Games**

The following table highlights the factors that are most important for each of the uses outlined above. We'll discuss most of them in more detail later on. If you're not sure what any of the terms mean, look in the **Glossary** at the end.

| **Office or home office** |
|---|
| Almost any PC will be suitable, but you will probably need:<br>• Some office software – see the section on software below<br>• A printer<br>You will probably also want some form of backup device such as a CD or DVD writer to take periodic backup copies of your work. Most PCs these days include one of these. |
| **Internet access** |
| Any modern PC will be suitable. You will also need a suitable modem – the type will depend on how you connect to the Internet (dial-up or broadband). |
| **Graphics and digital photography** |
| The priorities here are:<br>• A good monitor (screen)<br>• Plenty of memory (RAM). 512 MB will be OK, but 1GB is better (1GB is 1024 MB).<br>• A photo quality printer<br>• A reasonable sized hard disk – 200 GB is typical these days and will be plenty<br>• A suitable graphics program<br>A CD or DVD writer may also be useful for saving your pictures, and a scanner will probably come in useful. |
| **Multimedia** |
| For listening to music and playing video clips, you will want:<br>• A good “sound card” – this is the part that generates the sounds<br>• Good quality loudspeakers<br>• A large hard disk – needed if you intend to store music or video on the PC |
| **Home cinema** |
| If you want to watch DVDs on your PC, you will want:<br>• A DVD drive – most PCs come with one these days<br>• A home cinema projector, or a TV output, or a large monitor<br>• A good sound card<br>• Good “surround sound” speakers |
| **Video editing** |
| If you want to edit your home movies on your PC, you will want:<br>• A fast processor<br>• Plenty of memory (RAM) – 512 MB is OK, 1 GB or even more is better.<br>• A good monitor (screen)<br>• Video editing software (may be included with the computer)<br>There are two main ways of getting the video into the computer to be edited. If you use a conventional camcorder or video recorder, you will need a video capture card or device. If on the other hand you have a digital video recorder, you will probably want an IEEE1394 (also known as “FireWire”) interface<br>You will also want a DVD writer to save your videos once you have finished. |
| **Games** |
| Any computer will play basic games, but for the latest 3-D action games, you will want:<br>• The best 3D graphics card you can afford<br>• A fast processor<br>• Lots of memory (RAM)<br>• A good sound card |

# Software

A computer is not much use without some software applications (programs) to run on it. Most computers come with some software included, but the “bundled” package varies from computer to computer, and won't necessarily include what you need. For example, I often encounter people who assume that *Microsoft Word* is included with every Windows PC, but in fact most computers *don't* include it (see the section on **Office Software** below).

It’s tempting to buy the computer, and then think about the software you will need afterwards. However, this is really the wrong way around. There are two main reasons for this:

- Some software is much cheaper when bought “bundled” with a computer than when bought separately. This is particularly true for the Microsoft Office suite of programs, which includes the *Microsoft Word* word processor and *Microsoft Excel* spreadsheet.

- Some software has specific hardware requirements. You need to know that the computer that you buy can run the programs you want to use.

Below we will consider some of the more popular items of software that you may need.

## *The operating system*

All computers need an operating system – this is the program that controls the computer. It allows you to install and run other programs and to manage the files stored on the computer. In the case of most PCs the operating system is a version of **Microsoft Windows**, though others (such as *Linux*) do exist. When you buy a new computer it will normally come with a copy of Windows already installed. There are several versions of Windows that you may encounter (see the Appendix - Windows versions) but unless you are buying second hand the only ones you will encounter are *Windows XP Home Edition* or *Windows XP Professional Edition*. The *Home Edition* is fine for most purposes, but people using computers on corporate networks will find that the *Professional Edition* is better suited to their needs.

**IMPORTANT**

You should ensure that when buying a PC, you receive the following:

- **A Windows license**. This may be a sticker on the PC itself (newer Windows versions) or a separate license document. It proves that your copy of Windows is valid.

- **A setup or restore CD**. If the worst comes to the worst and your hard disk fails or becomes badly corrupted, you will need this to reinstall Windows.

## *Office software*

Most computer users will want office software such as a word processor, spreadsheet etc. *Microsoft Office*, which includes *Word* and *Excel*, is the most popular choice but it is also rather expensive.

There are several other office suites available, each with different combinations of applications included, with costs ranging from free to several hundred pounds. When choosing an office package, the things to consider are:

- **Compatibility** – do you need to share files with someone else? If so, using the same programs will make this easier.

- **Included applications** – different suites will include different combinations of programs. Make sure the suite you choose can do what you need.
- **Ease of use** – some are easier to use than others. It's also easier to get help and advice with the more popular packages such as Microsoft Office.
- **Cost** – this varies widely. It's usually cheapest to buy an office suite "bundled" with a computer.

The table below highlights some of the most popular office suites.

| **Microsoft Office** |
|---|
| This is the most popular, particularly for business use, and thus it's probably the best choice if you intend to exchange files with other people. It's also among the easier ones to use – at least for basic tasks.<br><br>However, it is the most expensive to buy on its own, so if you want it try to buy a computer that has it included. There are several variants with different combinations of programs – all include *Word* and *Excel*, but the other components vary so check that the version you are getting includes the programs you want. |
| **Microsoft Works and Works Suite** |
| *Works* is a cheaper suite from Microsoft aimed at home users. It's OK for occasional or less demanding users and is a lot cheaper than *Microsoft Office,* but is not suitable if you need to work on files created by people using *Office*.<br><br>*Works Suite* is a version of *Works* that includes several extra programs, including the popular *Microsoft Word* word processor in place of the simple one included with the standard *Works* package. |
| **OpenOffice.org** |
| This is a free (yes free!) alternative to Microsoft Office, and includes a word processor, a spreadsheet program, a presentation package (like PowerPoint) and a drawing program. These programs contain almost all of the features of their Microsoft Office equivalents. They will also open files created by Microsoft Office, and can save files in Microsoft Office format. The compatibility between OpenOffice.org and Microsoft Office is not perfect, but it is very good, and fine for all but the most demanding users. As an example – the original version of this document was created with Microsft Word, but was updated using OpenOffice.org (running under the Linux operating system!)<br><br>OpenOffice.org is an "open source" program, and can be freely distributed. It can be downloaded from the Internet (from http://www.openoffice.org) but be warned – it will take a long time unless you have a broadband connection! |
| **Sun StarOffice** |
| StarOffice is OpenOffice.org with a few extras thrown in (such as a database program). Unlike OpenOffice.org it is not free, but the cost is a lot lower than Microsoft Office and it entitles you to support from Sun**.** |
| **Ability Office** |
| This is another good, cheap alternative to Microsoft Office, which can import Microsoft Office files. It is small and runs well on older computers. A free demo version can be downloaded from http://www.ability.com. |
| ***Other options...*** |
| **Corel WordPerfect Office** and **Lotus SmartSuite** were once the market leaders, but are now less popular. For most people, one of the above products will be more suitable. |

Note that office suites will not necessarily contain all of the programs that you need, so you may still need to buy other programs. Popular examples that are not always included in office suites are **Desktop Publishing** (DTP) programs and **business graphics** (diagram drawing) programs. However, bear in mind that most modern word processors (such as *Microsoft Word*) include basic DTP and diagram capabilities that may be adequate for your needs.

## *Internet software*

Most computer users will want to access the Internet for e-mail and web browsing. The most popular software for doing this is *Microsoft Internet Explorer* for browsing the web, and *Microsoft Outlook Express* for e-mail. These are included with all of the more recent versions of Windows (from Windows 98 onwards), and can be updated to the latest versions free of charge.

However, alternatives are available, and generally provide more features and better security against hacking, viruses etc. than their Microsoft equivalents. *Mozilla Firefox* (for web browsing) and *Mozilla Thunderbird* (for e-mail) are excellent choices, and are also free. *Opera* is also worth considering – the free version includes a small advertisement panel but it is non-intrusive and can be disabled if you pay a small registration fee.

## *Security software*

The Internet is becoming a more and more dangerous place, with viruses, spyware and hackers (more correctly called *crackers*) trying to gain control of your computer. Connect up without suitable security and it may only be minutes before your computer is “owned”.

There are three types of security software you will need:

- Anti-virus
- Firewall
- Anti-spyware

You can get separate programs for each function, or buy an integrated package such as *Norton Internet Security*. Some of the programs are free for home use (such as AVG anti-virus, the ZoneAlarm firewall, and Ad-Aware anti-spyware program).

Whichever you choose, it's *vital* that you **keep it up to date**. In the case of anti-virus, that generally means **updating weekly** from the Internet. The program will probably offer the option of updating automatically, but you should still keep an eye on it.

## *Other software*

There are many other programs and applications that are available – far too many to discuss here. Some are very expensive, some are cheap, and some are free. Some will be included with a computer when it is bought, and others will be bundled with a new peripheral device (such as a camera or scanner). Many are available off the shelf from computer shops, but it is often cheaper to buy by mail order, which will give a greater selection.

Consider what you want a computer for, and select the software to suit. It’s worth looking for reviews in the computer magazines – even if you don’t understand everything they say, it will give you a guide to whether a particular program is any good.

Some programs are available to “try before you buy” – either as time limited demo versions or as “shareware”. Shareware is “good faith” software – you can try it for free, but are asked to send money to the author(s) if you choose to continue using it. Surprisingly, it works!

# Peripheral devices

Before coming to the specification of the computer itself, let's have a look at some of the other devices, or *peripherals*, that you are likely to want with the computer. It's important to select suitable peripherals for your needs and take their cost into account when selecting a computer. As with software, you may get a better deal by buying them with the computer, but this may also restrict your choice.

## *Monitor (screen).*

Monitors are usually included with the PC, but it is possible to specify which monitor you want with some suppliers. It's important to get the best monitor that you can afford. The quality of the monitor will make more difference to most people than the quality of the PC itself. Factors to consider are:

- Thin flat screens (TFT) or conventional cathode ray tube (CRT). TFTs are the more popular these days. They take up less desk space but are still more expensive and don't provide as good a resolution as CRTs – so for photo editing you may still be better off with a good CRT.

- Size of screen – these days you should not consider anything less than a 17 inch CRT or a 15 inch flat screen unless you have a very limited budget (or space!)

- Picture sharpness and quality – particularly at high resolutions (PCs in shops are often set to a low resolution to hide the poor quality of the display)

- Flatness of the screen (with a CRT). A flat fronted display is much more pleasant to use than a curved one.

If buying from a shop, have a good look at the monitor, and (if you know how) try increasing the resolution on the computer. Look for image sharpness and a lack of flicker. If buying by mail order, check out some reviews or get some advice on good monitors before making your choice.

## *Speakers*

There are many different combinations of speakers available, varying from a simple stereo pair to a full surround sound system. Speakers may be included with a computer but check that they are suitable for your purposes. If you mostly intend to use your computer for office work, then a stereo pair may well suffice (if you even want speakers at all!) but for watching DVDs or playing 3D games a surround sound system is best.

Surround sound systems are rated according to the number of speakers – for example "5.1" means that the system has five small speakers plus a bass unit. For decent surround sound aim for at least "5.1". Bear in mind that a surround sound system has speakers positioned behind the computer user as well as in front, so you will need to consider where your computer will be positioned when making your decision. The system may also include a separate amplifier.

## *Printer*

When selecting a printer you need to take into account how much you are going to use it and what you will be printing. For most home users the best choice is an *inkjet* printer (or the closely related *bubblejet* type). These are relatively cheap and can print full colour images. There are many available, with widely varying prices. Many computer suppliers will bundle one with the computer. However, these are usually the cheapest models and the quality tends to be poor.

Here are some points to bear in mind when selecting a printer:

**Print quality** can vary significantly. What's more, different printers will be better at different types of printing – for example, some are better at printing black text, whilst others are better at colour pictures. Before choosing, it's useful to look at some sample printouts illustrating the type of printing you are likely to do. If your main concern is printing text and diagrams, look for crisp clean edges, dark solid blacks and rich even colours. If you are interested in printing photographs (for example from a digital camera), pay particular attention to how well flesh tones and fine detail such as hair are reproduced. Some printers are classed as "photo quality" and these will usually be better at this type of printing.

**Print speed** can vary widely. Printer manufacturers quote speeds in pages per minute, but these figures are usually optimistic, as they usually assume that the printer is printing plain black text. Colour, graphics and (particularly) photographs will slow the printer down considerably – most will produce a page of black text in a few seconds, but many will take several minutes to produce a full A4 size photograph.

**Cartridge type and cost.** Almost all inkjet printers use replaceable cartridges to hold the ink. Typically there will be a black cartridge and a colour cartridge with three or more colours in it (photo quality printers tend to use more colours), though some of the better printers may have separate cartridges for each colour. Cartridge prices vary between printers and can be quite expensive, so bear this in mind. It is sometimes possible to refill the cartridges, but this will usually reduce the print quality.

**Connection type**. There are two different types of connector commonly used to connect printers to a computer – known as *Parallel* and *USB*. Most newer computers and printers will use the smaller USB type (a small rectangular connector), though most computers still support the older parallel type (a large "D" shaped connector). If you are buying new, USB is preferable, though older computers may only support the parallel type so it may be an issue if you are purchasing second hand.

The main alternative to an inkjet printer is a *laser printer*. These are faster than inkjet printers and offer superior print quality, particularly for office type applications. The cost per page also tends to be lower. However, they are generally more expensive, though some smaller monochrome models are now cheap enough to compete with inkjets. Colour laser printers, however, are still very expensive and are usually only a realistic choice for business users.

## *Scanner*

A scanner is a popular addition to computers these days, allowing you to add pictures to documents, e-mail them to friends, or modify them using graphics programs. They vary in quality, but unless you are a very keen and demanding user, most scanners these days are good enough. As with printers, check that the interface (connector) is right for your computer. Most these days use *USB* interfaces, which are generally the best unless your computer is too old and does not have a USB interface.

## *Other peripherals*

There are many other types of peripheral device which can be added to a computer – far too many to go into here. If considering an additional device, it is important to check that it is compatible with your computer. In particular:

- Does it work with your version of Windows?
- Is your computer powerful enough?
- Has your computer got the correct interface (connector) type?

These requirements will usually be stated on the packaging or in the promotional literature – check before you buy.

# Understanding computer specifications

The title of this guide is “Buying a computer”, but so far we have looked at everything except the computer itself! However, this is deliberate, as the choice of computer is often less critical than the choice of what goes with it. Modern PCs are so powerful and well specified that unless you are a particularly demanding user, even the slowest and cheapest will usually do a more than adequate job.

However, computers do vary, and it’s worth understanding a bit about their specifications so that you can make an informed choice. That is what we will do next.

## *Processor speed and type*

The processor (or *CPU*) is the “brain” of a computer. The most common types these days are the *Pentium* and *Celeron* made by Intel, and the *Athlon* and *Sempron* made by AMD.

Recent developments in processors have made this a real minefield – much too complex to cover in any detail here. However, for most applications it really doesn't matter – any modern processor will be more than adequate. The faster the better of course, but it's only really important for things like 3D gaming and video editing. For office tasks and Internet access, any processor will do the job.

Until recently processors were labelled according to their *clock speed* in gigahertz (GHz). However, because different models running at the same clock speed perform differently, the manufacturers now use model numbers, though the clock speed will often still be quoted in advertisements. Confusingly, AMD and Intel use completely different model numbering schemes, so it can be difficult to compare processors.

The tables below gives a rough guide to the most common processor families produced by Intel and AMD. Within each family there are different members with different model numbers and speeds. The significance of the *64 bit* and *Dual Core* columns is explained below.

| **Intel** | ***Model*** | ***64 bit?*** | ***Dual Core?*** |
|---|---|---|---|
| Budget | Celeron | Some | No |
| Mid range | Pentium 4 | Some | No |
| High end | Pentium D | Most | Yes |
| | Pentium 4 Extreme Edition | Yes | No |

| **AMD** | ***Model*** | ***64 bit?*** | ***Dual Core?*** |
|---|---|---|---|
| Budget | Sempron | No | No |
| Mid range | Athlon 64 | Yes | No |
| High end | Athlon 64 X2 | Yes | Yes |
| | Athlon 64 FX | Yes | No |

### 64 bit

An explanation of what this means is beyond the scope of this guide – instead I'll just explain the main implications.

Until recently all processors were 32 bit, but most recent high end processors (and some mid range and budget ones) have moved to 64 bit. This potentially improves the performance and allows them to use more memory – but only if the software being used

is 64 bit software. A 64 bit processor will run software written for a 32 bit processor, but a 32 bit processor will *not* run software written for a 64 bit processor.
With AMD the 32 and 64 bit models are easy to tell apart, but with Intel you have to check the individual model number, I'm afraid.

As almost all current software is 32 bit, and is likely to be for some time yet, there's no real problem buying a 32 bit processor – but a 64 bit processor will allow you to take advantage of 64 bit software as it becomes available.

In other words – if you can afford a 64 bit processor, it's the better choice, but don't worry too much about it.

### Dual Core

Some of the latest processors are *Dual Core*, which means that they have two processors in one. So they're twice as fast, then? Well, not exactly. Under some circumstances they can be almost twice as fast as a single core processor, but in other circumstances you won't see any advantage at all. It all depends on the software being used.

What you *will* find, is that the computer is better at doing several things at once – less irritating pauses because it's thinking about something in the background, for example. So for day to day computer users, dual core processors are a definite advantage – they make for a smoother running computer.

One group of users who *won't* see much advantage at the moment are 3D gamers. games are not (yet) written to take advantage of the second core so you're probably better off (at the moment) with the fastest single core model you can get your hands on.

For most people, though, if you can afford a dual core processor, go for it. Your computer will be faster and more responsive, and multiple core processors is definitely the way of the future.

## *Memory (or RAM) size*

This is more important than the processor speed for most purposes, and often has more effect on the overall speed of a computer. Though it may be counter-intuitive, memory size does *not* affect how much information you can store in a computer (that’s controlled by the hard disk size). The RAM is the “working memory” and if there is not enough the computer will slow down, particularly when doing demanding tasks such as photo or video editing.

RAM is normally measured in megabytes (MB) or gigabytes (GB). 1 GB is the same as 1024 MB.

So how much do you need? This is partly affected by the version of Windows you run – Windows XP in particular likes its RAM. As a rough guide you should expect at least 256 MB in a modern computer, and preferably 512 MB or 1 GB. Users of older versions of Windows such as Windows 98 will be OK with 128 MB for most purposes, but try to avoid going below that if you can help it.

It’s worth noting that it is relatively easy to increase the amount of memory by buying additional RAM modules, but prices fluctuate dramatically, and bear in mind that you may have to discard some of your current RAM modules and replace them with bigger ones if all of the RAM slots in the PC are already full. Also be aware that RAM standards change continually, and older RAM may not fit a newer computer.

## *Hard disks*

The hard disk is a large, fast disk drive permanently fitted inside the computer. Your work (letters, documents, pictures etc.), your programs and applications, and Windows itself are all stored on the hard disk.

Whilst hard disks do vary in speed, the difference is not enough to affect most users. Of more importance is the size. However, as with processors, modern hard disks are so large that unless you are a demanding user you are unlikely to run out of space. If you wish to do video editing or store large amounts of music on your computer you should consider a larger disk – 200 GB or more. For other users, a 20 GB disk will usually be more than adequate, though you should expect at least 100 GB in a modern PC.

## *Graphics*

The graphics device in a computer is the part that generates everything that is seen on the screen. For “desktop” computers, it may be integrated into the *motherboard* (the main circuit board in the computer) or it may be a separate card that is plugged into a special slot inside the computer. With notebook (laptop) computers it's normally integrated into the motherboard.

For many users this is of little consequence, though some versions do produce better images than others.

The people to whom graphics hardware matter most are those who play fast-moving action games. These games require powerful “3D” (three dimensional) graphics devices to allow them to produce the realistic images and smooth motion that these games require. In general, separate graphics cards are more powerful (but more expensive) than the graphics devices integrated into motherboards so these are preferred for game players. They can also be swapped for newer more powerful cards when they become available – which happens quite frequently as this is one of the fastest moving areas of the computer business.

Almost all graphics cards are based around chips from one of two manufacturers – **nVidia** and **ATI**. At the time of writing, the most powerful cards are based around the nVidia GeForce 78000GTX chips, but who's to say for how long? If this is where your interest lies, then you should check some reviews to see which graphics cards are currently giving the best performance. Prices of graphics cards vary widely – from £20 or £30 to £300 or more, with a corresponding variation in performance.

Note that standards for graphics card slots are changing. The older standard, **AGP**, is gradually giving way to the newer **PCI-Express** (or **PCI-E)** slots. As the newer standard, PCI-E is preferable, but AGP is likely to be supported for some time yet. If buying a graphics card separately, make sure you know which type your computer needs.

(Note – PCI-E is used for more than just graphics, but for the moment graphics is the main use for most people).

For other users the graphics capability is less important, though the more powerful cards will generally provide a smoother, faster responding image. Some cards are better at full screen video (important if you want to watch DVD movies on your PC) – *ATI* have a good reputation in this area. Some graphics cards also provide additional features such as an output to connect to a TV.

## *Sound*

As with graphics hardware, the audio device in a computer can be integrated into the motherboard, or provided by a separate card. Again, the separate cards tend to be better quality and provide more features, but at a premium. How much this will matter to you will depend on what you want to use the computer for. If you want to watch DVDs or play games then you should make sure that the computer provides at least “5.1” surround sound (see the section on speakers above). Most PCs these days have 5.1 capability, but if you want to save space and surround sound is not important for you, you can still plug in a basic pair of stereo speakers.

## *CD and DVD drives*

All modern computers have a CD or DVD drive of some form – some will have two. These drives are necessary because most software is supplied on CD. However, there are several different variants – they all look much the same but provide different capabilities. The table below illustrates the main types in use today and what they can do.

| *Type of drive:* | *CD-ROM* | *CD-RW* | *DVD-ROM* | *DVD-RW DVD+RW DVD RAM* |
|---|---|---|---|---|
| ***Reads CD ROMs*** | ✓ | ✓ | ✓ | ✓ |
| ***Plays music CDs*** | ✓ | ✓ | ✓ | ✓ |
| ***Writes (records) onto CD-R and CD-RW disks**** | | ✓ | | most |
| ***Plays DVD disks**** | | | ✓ | ✓ |
| ***Records onto DVD disks*** | | | | ✓* |

* There are several different types of recordable DVD drive. Different types of drive (DVD-RW, DVD+RW and DVD RAM) will record different types of disk. Some multi-standard drives will handle two or three of the formats.
** Some "combination" drives are also available which combine the capabilities of a DVD-ROM drive with those of a CD-RW drive.

Most modern PCs now include at least a CD writer (CD-RW) or DVD writer. They are useful for keeping backups of your important files, or for saving files to pass on to other people, and have largely replaced the venerable floppy disk – in fact many new PCs don't include a floppy disk drive.

## *Modems*

To connect to the Internet for web browsing, e-mail etc. you will need a modem of some description. The type you will need depends on the type of Internet connection you have.

**Dial-up**. The oldest and slowest way of connecting to the Internet, using a conventional telephone line and modem. Many computers have such a modem (often called a *V.92* modem, a *fax modem* or a *56k* modem) built in – if not they can be purchased for less than £10.

**ADSL broadband**. This is broadband over a telephone line. Most Internet service providers will offer to supply a modem when you sign up for their service. Often these are “USB modems” (i.e. they plug into a USB port on your computer) but for most people a much better choice is an *ADSL Router*. These are available for around £25 to £50 and plug into an *Ethernet* port. Most modern computers have an Ethernet port – if not, one can be added for less than £5. ADSL routers are more secure, allow an Internet connection to be easily shared between computers, and are “always on” so you don't need to wait for them to connect.

**Cable.** This is broadband provided over dedicated cables (the same as those used for cable TV). For this you need a cable modem, and the Internet service provider will usually supply it. As with ADSL modems, Ethernet is a better choice than USB for connecting the PC to the modem.

## *Interfaces and ports (connectors)*

Interfaces and ports are the connectors on the computer that allow you to connect other devices such as printers and scanners. Some of the devices we have discussed above

(such as the graphics and sound devices) provide interfaces to connect to things like the monitor and speakers, but there are several other interfaces available. Here is a brief list of some of them and what you can connect to them.

| *Interface* | *Used for* |
|---|---|
| ***USB ports**** | Printers, scanners, external modems, keyboards, mice, external disk drives, digital cameras – in fact almost anything! |
| ***Parallel port*** | Older printers and scanners. Now more or less obsolete – replaced by USB. |
| ***Serial ports*** | External modems and specialist equipment. Now more or less obsolete – replaced by USB. |
| ***PS/2*** | Keyboards, mice (USB can also replace these). |
| ***FireWire (IEEE 1394)*** | Digital camcorders, external disk drives |
| ***Ethernet*** | Networking (connecting computers together), broadband modems |

You will notice that some uses appear against more than one interface – for example, printers can connect to a parallel port or a USB port. Which port you use will depend on the device that you buy – not all of them can connect to all interfaces.

* Note that some computers have USB 1.1 interfaces, but most now support the newer USB 2.0 interface, which is a lot faster. Computers with USB 2.0 will still work with devices designed for USB 1.1.

# Desktop or Notebook?

Most users still choose a conventional “desktop” computer, with a separate system unit, monitor (screen) and keyboard. However, notebook (or laptop) computers are becoming a more popular choice because of their small size and portability. So what are the advantages and disadvantages of each?

**Notebook computers**

**Advantages**
- Small – take up less space.
- Don't need a dedicated desk or table
- Can be taken with you to meetings, to work, on holiday etc.

**Disadvantages**
- More expensive
- Slightly less powerful (i.e. slower) - less suitable for 3D games etc.
- Displays are smaller
- Keyboard less convenient
- Cannot be upgraded to the same degree as a desktop system
- Easier to break, harder to repair

| Desktop computers |
| --- |
| **Advantages**<br>• Cheaper<br>• Easier to use<br>• Better display and keyboard<br>• Can be more easily upgraded by adding new components (depends on the system)<br>• More powerful – more suitable for games etc.<br>**Disadvantages**<br>• Take up more room – generally need a dedicated desk or table.<br>• Can be noisy (fans etc.)<br>• Not easy to move around |

If you are considering a notebook computer, make sure that it has all the capabilities that you are likely to want, as they cannot be easily upgraded. In particular check which disk drives (floppy disk, CD, CD-RW, DVD etc.) it has. Some are larger than others, but these generally include more facilities, so you must choose between function and portability.

For some people a notebook computer plus a separate monitor, mouse and keyboard provides the best of both worlds. When at home the notebook is plugged in to the external devices (possibly via a “docking station”) and effectively becomes the system unit for a desktop system.

# Budget

So now we've had a good look at the features and specifications, how much should you expect to pay? Prices vary continuously, but this section tries to give you some idea of what you should expect to pay at the time of writing.

## *Desktop Systems*

**£400**. It is possible to get a new PC for £400, but the specification will be (by today’s standards) fairly basic. However, if you shop around, you can get a system suitable for basic needs. You will probably have to buy from one of the budget manufacturers to get a PC at this price, and you will get very little software – Windows may be included but probably nothing else. Nevertheless, this is enough for basic Internet access, and with the addition of one of the free office suites such as OpenOffice.org and perhaps a low cost printer (£40 or less) you have a system suitable for basic home office use.

| WARNING |
| --- |
| You may see PCs advertised for considerably less than £400, but you need to check what is really included for the price. These prices will often exclude a monitor, which must be bought separately, and may also exclude Windows. Since the cost of buying Windows separately is significantly higher that when included with a computer, you will need to look at these offers very carefully. |

**£500**. At this price, you can get a PC with reasonable performance and a reasonable monitor (say 15” or 17” flat screen) from one of the budget manufacturers. However, you will not have many (if any) extras such as bundled software. Nevertheless this is a very usable basic system and will perform most tasks well.

**£600**. At this price you have a little more choice. You could go for a well specified PC from one of the budget manufacturers or a more basic PC from one of the mainstream manufacturers such as Dell or HP. You may also get some basic software bundle such as

Microsoft Works. Add a printer and you have a good all-round system for a user with basic requirements.

**£800**. For this price you can get a good basic system from most of the mainstream suppliers, with a decent monitor and some bundled software. Sound and graphics capabilities will be adequate for most people, though it may be a bit underpowered for serious gamers. You are unlikely to get any extras (printer, scanner etc.) at this price – if you do they will be bottom of the range budget items.

**£1000**. At this sort of price you are looking at a well specified PC for most purposes, including games (though hardcore gamers will want more). Another option is to go for a basic all-round package with a reasonable PC, printer, scanner and a basic office package.

**£1250**. At this sort of price, you can get a powerful PC with good graphics and sound, a fast processor and plenty of RAM – good for all but the most demanding of users, and quite adequate for serious gamers. Alternatively, you could get a good all round PC with a decent printer and scanner, plus a good office suite such as Microsoft Office.

**£1500**. At this price your options become increasingly diverse, so I won't quote detailed specifications. However, you should be able to get a pretty powerful PC, plus a reasonable selection of peripherals and software.

**£2000+**. At this sort of price, we are either talking about a very powerful PC for the serious enthusiast, or a very good all-round package with decent software, a good quality printer, and plenty of other extras.

## *Notebook or Laptop computers*

**£300**. It is possible to pick up reconditioned notebook computers for £300 pounds or even less. The specification will be low by today's standards but adequate for basic office tasks. However, read the specifications carefully. Does it include Windows? Is there a CD or DVD drive? You need to be careful that you don't get a "bargain" that's actually of no use to you.

**£500**. New notebook PCs are now available from as little as £500. The specification will be basic, but adequate for office tasks, Internet etc. However, corners are often cut at this price – the build quality may not be particularly good and the display is unlikely to be as good as more expensive models.

**£800**. This will buy you a reasonably well specified notebook from most of the major manufacturers, which will be more than adequate for most people. It will handle day to day computing tasks with ease and should be of reasonable quality.

**£1000+**. At this price and above, you can choose – higher specification or less weight. At the one end of the scale are notebook PCs which rival the power of high end desktop systems, with large (often wide screen) displays. However, they have the disadvantages of weight, heat and (often) poorer battery life. At the other end of the scale are smaller, thinner, lighter notebooks. They will generally be less powerful, but will often compensate with better battery life (though their smaller battery size can work against them here).

# Where and how to buy

Once you've settled on your budget and decided what sort of specification PC you are looking for, you have to decide where and how you will buy it. The main choices are shop or mail order, and they both have their advantages and disadvantages.

## *Buying from a shop*

One advantage of buying from a shop is that you can look at the computer before you buy it – assuming they have a suitable display model. However, with a desktop PC there is not a lot that you can tell from looking at it that can't be determined from the specifications, other than the quality of the display. Nevertheless, many people feel more comfortable about buying something that they have seen.

With notebook computers it's not quite the same. Because they are handled a lot more you may wish to look for yourself to assess the look, feel and quality of the PC, and to decide if the display suits you, as they can vary widely.

People also like buying from shops because they can ask for advice from the salespeople. However, this is a dubious advantage at best, as many of them are not very knowledgeable and often give misleading advice. Another perceived advantage of buying from a shop is that you can go back there if something goes wrong. However, this is not the advantage it appears to be as the standard of support available from computer shops is often poor.

## *Buying via mail order*

As long as you know what you want, there are several advantages to buying computers via mail order. You will generally get a far wider choice of specifications, and the quality of the PCs is often better. The standard of support varies, but is usually better than the shops, and the prices are usually lower (though the shops sometimes do better bundled deals). You can usually buy via mail, phone or the Internet, and many suppliers will build a PC to order to your specification within a few days, should none of their standard offerings be to your liking.

# Conclusion

If you're looking to buy a PC, hopefully this guide will be of some help. Again, I will emphasise that the most important thing is to keep in mind what you want the computer for – don't walk into a shop and let a salesperson talk you into buying something that's not really suited to your needs.

Here is a simple check list that you may find of some benefit.

| **Steps in choosing a computer** |
| --- |
| 1. Decide what you want the computer for. Write down what you expect will be its main uses.<br><br>2. Decide on a target budget. You may find you can't meet all your requirements at this price, but it gives you a good starting point.<br><br>3. Next, write down what peripherals and software you will need – for example, printer, Microsoft Office, etc.<br><br>4. Using this guide to help you, make a note of any other features and specifications that are important for your chosen uses (such as a fast graphics card if you are going to play a lot of games). If necessary, read up on these features in magazines or on the Internet so that you can make an informed choice.<br><br>5. Now, start looking in shops, magazine advertisements and (if possible) on the Internet for systems within your target budget. Use what you have already written down as a guide when deciding if a system is suitable for you. Bear in mind that you may have to buy some items (such as a printer or some of the software) separately if you cannot find it bundle |

Hopefully, once you have worked your way through this check list, you will have the right computer system for your needs.

# Appendix – Windows versions

Below is a brief guide to the various versions of Microsoft Windows. It does not cover all versions – just the ones from the last 10 years or so. They can be split into *Home/Small Office* and *Professional* versions. The professional ones are more suitable for use on corporate networks, but are (or were) more expensive.

Home/Small Office versions

**Windows XP Home Edition**. Most new computers will come with this. It's fine for home or small office use, and is cheaper than the Professional edition – in fact it is basically a (slightly) stripped down version of the professional edition, unlike earlier home/small office versions of Windows which were quite different from the professional versions.

**Windows Me** (or **Millennium Edition)** was the version that replaced Windows 98 and preceded Windows XP for home users. A few computers (mostly second hand or reconditioned) may still be available with this version, but it was not well regarded and is best avoided.

**Windows 98** is only likely to be encountered on second hand computers. Only consider this if you are on a tight budget and have modest computing requirements. It is not as stable as Windows XP, and some newer hardware and software will not work with it. It is still supported by Microsoft but this support will cease in June 2006. The “Second Edition” (or *Windows 98 SE*) is better than the original.

**Windows 95** was the first of the modern “32 bit” Windows operating systems, but is now obsolete and unsupported and should be avoided.

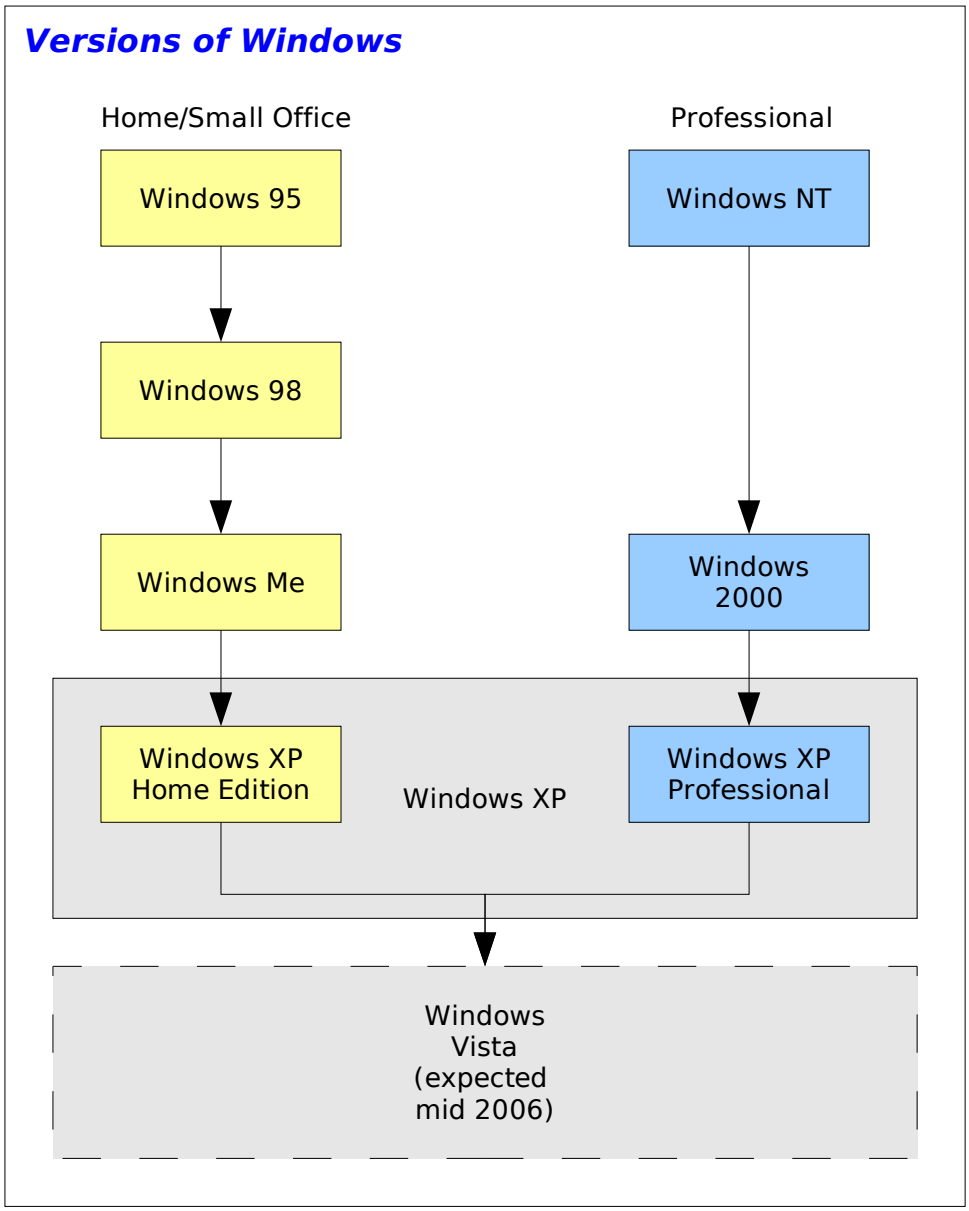
Professional versions

**Windows XP Professional Edition.** This is the current professional version. It is the best choice for use on a corporate network. It is very similar in use to the home edition, but has better control over security features (amongst other enhancements).

**Windows 2000** was the precursor to Windows XP Professional, and the successor to Windows NT (see below) – it was *not* the replacement for Windows 98 as some people suppose (that was Windows Me). It is a competent operating system, though not very suitable for gaming. It should only be encountered on second hand equipment.

**Windows NT** was the precursor to Windows 2000. It is now obsolete and should be avoided.

Prior to Windows XP, the *Home/Small Office* and *Professional* versions of Windows were quite distinct. However, with Windows XP, Microsoft has merged them to produce two versions of the same basic operating system. The following diagram may help to understand the relationship between the various windows versions.


Versions of Windows
Home/Small Office
Professional
Windows 95
Windows NT
Windows 98
Windows Me
Windows 2000
Windows XP Home Edition
Windows XP
Windows XP Professional
Windows Vista (expected mid 2006)

# Glossary

Here are the basic meanings of some of the terms that you may come across when looking at computer specifications. (Note - the definitions aim for clarity, so simplifications have been made in some cases.)

**AGP** A special slot inside a computer for plugging in a fast graphics *card*. Some computers come with a suitable card already fitted (which can be replaced with a faster one if required), whilst others have graphics built into the *motherboard*. The latter type may or may not have an AGP slot. AGP is now being replaced by PCI Express (PCI-E)

**AMD** Manufacturer of the *Athlon, Sempron* and *Duron* range of *processors*

**Application** Another name for a program *such* as a word processor, spreadsheet or game

**Athlon** The name given by *AMD* to their mainstream and high-end processors. Older models were named *Athlon XP*, whilst newer 64 bit ones are called *Athlon 64*.

**BIOS** "Basic Input Output System" – some low level *software* permanently built into your computer, which controls the *hardware* and starts the *operating system* when you switch the computer on.

**Broadband** The term for fast *Internet* access (using technologies such as cable or ADSL). Broadband connections are much faster than a normal *modem*, but require special installation and are not available to everyone (it depends on where you live). An ADSL or cable modem is required to use a broadband connection.

**Byte** Bytes are used as a measure of storage capacity – a single byte is (in simple terms) the smallest element of information that a computer can manage as a separate item. A single byte of memory will typically store one character (like the letter "A" or digit "1") or a small number.

**Card** A plug-in circuit board that can be fitted into a slot inside a computer.

**CD-R** A recordable form of CD-ROM disk. Note that unlike CD-RW disks, the content of a CD-R cannot be altered once it has been written.

**CD-ROM** A Compact Disk used for storing computer files instead of music. A CD typically stores up to 650 MB of data. The name is also used as an abbreviation for "CD-ROM drive", which is the device in a computer into which you insert the CD-ROM disks to read their contents.

**CD-RW** A Rewritable Compact Disk – that is one that can be recorded, then erased and re-recorded. Also used as an abbreviation for "CD-RW drive" – a CD drive that can record onto CD-R and CD-RW disks.

**Celeron** The name used by *Intel* for their budget processors (as opposed to *Pentium*).

**Centrino** The trademark for a set of components from *Intel* designed for notebook computers. Features include wireless networking (WiFi) and (hopefully) good battery life. Centrino notebooks are available from various manufacturers.

**Clock Speed** A measure of the speed of (amongst other things) a *processor*. It is measured in *MHz* or *GHz*. A processor running at a higher clock speed will be faster than the same type of processor at a lower clock speed, but since different processors do different amounts of work per clock cycle or "tick", it is not a very good way of comparing processors. Consequently manufacturers now use model numbers instead of clock speed to denote processor performance.

| | |
|---|---|
| **CPU** | The Central Processing Unit – the full name for the *processor.* |
| **Duron** | The name given by *AMD* to their older range of budget processors. It has now been replaced by the *Sempron*. |
| **DVD** | Digital Versatile Disk (or Digital Video Disk) – a disk like a CD but capable of holding much more data – 4.7 GB with regular disks. In the process of replacing video tape as a means of distributing films, but can also be used for holding computer files and programs. |
| **Ethernet** | The most common type of *Network.* Also used as the name for the *Interface* used for connecting to a network. Ethernet is sometimes also used to connect to *Broadband modems*. |
| **FDD** | An abbreviation for *Floppy Disk* drive. |
| **FireWire** | Another name for the *IEEE 1394 interface* |
| **Floppy disk** | A flexible magnetic disk inside a hard plastic shell, used for storing small amounts of information. A floppy disk normally holds 1.4 MB of data. |
| **Gigabytes or GB** | A measure of memory or disk size. Definitions vary slightly, but a gigabyte is approximately 1,000 Megabytes, or 1,000,000,000 *bytes*. |
| **Gigahertz or GHz** | A measure of *clock speed*. 1 GHz is equal to 1,000 MHz (or 1,000,000,000 “ticks” per second). |
| **Hard disk** | A large magnetic disk, normally permanently installed inside the computer, and used for storing the *operating system*, programs and files. It is the hard disk, rather than the *RAM*, which governs how much information a PC can hold and how many programs can be installed. |
| **Hardware** | The general term for any physical part of a computer. |
| **HDD** | Hard Disk Drive |
| **IEEE 1394** | A type of high speed *interface*, also known as *FireWire.* It can be used for various things, but is most commonly used for connecting digital camcorders to computers. |
| **Intel** | Manufacturer of the *Pentium* and *Celeron* processors. |
| **Interface** | In simple terms, an interface is a connector – usually found on the back of a PC. Also known as *Ports*. |
| **Internet** | A worldwide *network* of computers. The most common uses of the Internet are for e-mail and browsing the *World Wide Web* |
| **Kilobyte or KB** | A measure of memory, disk or file size. 1 KB is approximately 1,000 *bytes* (to be accurate 1KB = 1024 bytes) |
| **Linux** | A free *Operating System* – an alternative to the (rather expensive) Microsoft *Windows* Operating System. |
| **Megabytes or MB** | A measure of memory or disk size. Definitions vary slightly, but a gigabyte is approximately 1,000,000 *bytes.* |
| **Megahertz or MHz** | A measure of *clock speed*. 1 MHz is equal to 1,000,000 “ticks” per second. |
| **Modem** | A device used to connect a computer to the Internet via a telephone line. It may be internal (built into the PC) or external. |
| **Monitor** | The computer screen or display. |
| **Motherboard** | The main circuit board inside your computer. The *processor*, *RAM*, and plug in *cards* all attach to the motherboard, as do the disk drives and just about everything else. |

| | |
|---|---|
| **Network** | A network is a group of computers connected together to share information. The largest network is the *Internet*. Smaller “local” networks can be used to share devices such as printers and scanners, or to move files quickly between computers. The most common type of local network uses *Ethernet*. |
| **Operating system** | The program on your computer that controls all the other programs, and allows you to install and run other programs and to manipulate files. *Windows* is the most popular operating system, though *Linux* is gaining in popularity as it is cheap or even free from some sources. |
| **Pentium** | The name given by *Intel* to their mainstream and high-end processors. The current generation is known as the *Pentium 4*. |
| **Ports** | Another name for the connectors or *Interfaces* on a computer. |
| **Processor** | The common name for the *CPU* or Central Processing Unit. Processor is an abbreviation for Microprocessor, which is a type of silicon chip. The processor is the “brain” of a computer. |
| **Program** | A program is a set of instructions to tell a computer what to do. Programs are normally stored on the *Hard disk*. A word processor, computer game, and Windows itself are all examples of programs. |
| **RAM** | Random Access Memory. RAM is the temporary or working memory inside a computer. It does *not* affect how much information a computer can store, but does affect how fast it runs. If you do not have enough RAM, some programs may not run at all. RAM sizes are normally measured in *Megabytes*. |
| **Resolution** | A measure of the detail on a computer screen or *Monitor*. The resolution is measured as the number of dots across by the number of dots vertically – for example 800x600 or 1024x764. The higher the resolution the more you can fit on the screen, but if it is too high for the size of screen then the writing may be too small to read! Resolution can be adjusted up to the maximum supported by the computer and monitor (the monitor is usually the limiting factor). |
| **Sempron** | The name given by *AMD* to their range of budget processors. The *Sempron* replaced the *Duron*. |
| **Software** | The opposite of *Hardware* – that is, the parts of a computer system that are intangible. More commonly, the term is used as another word for *programs* or *Applications*. |
| **TFT** | A term used to describe thin, flat LCD screens. The letters actually stand for “Thin Film Transistor” - the technology used for most good quality flat screens. |
| **Turion** | The name given by *AMD* to a range of processors designed specifically for lightweight notbook PCs. It is a variant of the *Athlon* 64. |
| **USB** | Universal Serial Bus – a type of *interface* that can be used for connecting a wide variety of devices such as printers, scanners, keyboards, mice and modems. |
| **Web Browser** | A program that allows you to view pages on the *World Wide Web*, such as Internet Explorer, Mozilla, Netscape or Opera. |
| **Windows** | The *operating system* used on most PCs, supplied by Microsoft. |
| **World Wide Web** | Often referred to simply as “the Internet” by many people, the World Wide Web (or “the web”) is actually one of the applications supported by the *Internet* (the other common one being e-mail). The web allows you to look at pages of information stored on many computers around the world, and easily move from one to another. It also supports many more advanced features such as Internet shopping and banking. |

**Bovett Computer Services** providing various PC related support services in the Cheltenham/Gloucester area, including:

- Software troubleshooting (including virus removal)
- Internet and e-mail support
- Hardware repair and upgrades
- Network installation and administration support
- Security advice
- Computer training
- Web site design and administrative support
- Supply of computers, peripherals and software

If you have questions or comments on any of the items in this article, or would like help with any of the areas listed above, please get in touch.

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