



**An independent guide
to buying a desktop PC**



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1.0 Introduction

This guide is designed to give the potential PC buyer a ‘heads up’ on what to look out for. We will try to cover all the aspects which are important in the ‘purchasing a PC’ decision and try to give you information which will make that all important purchase a smoother transaction. The guide itself is quite long, but we will provide summaries where possible, and a checklist at the end to be consulted before making your purchasing decision.

1.1 Deciding on PC use

The purchase of a new computer requires thought as a PC needs to fit your needs and be able to withstand the ravages of time and use. In this guide, we will be referring to stand-alone PC’s (although network connectivity is standard and should always be included anyway).

There is obviously some ‘trigger’ which has identified the need for a new PC, and it is here we would direct your interest first. You need to sit down and actually ask yourself what the PC is going to be used for mainly, what software or games it is likely to be running, what peripherals are likely to be needed and what the future is likely to hold for its use. Once you have done this, then it becomes a relatively easy job to identify what specification of PC you actually need.

Assuming we are discussing a stand-alone computer – normal uses include:

- Home internet surfing (Basic PC is all is required)
- Student/home study (Basic again, with maybe extra storage)
- Home office use (Basic PC, with business software added)
- Normal business use (Various specifications will apply according to specifics)
- Graphical design/CAD use (Highly graphical, so needs a PC to reflect this)
- Multimedia applications (High on graphics/audio capabilities and storage)
- Gaming (Very high spec in CPU, Graphics, Audio, etc)

Each of these uses has a bearing on the specification that you actually require, now and in the future. We refer regularly to ‘the future’ because we always recommend that a little additional specification is included with your PC to allow for future uses – this will build the redundancy into your PC which will extend its lifespan and therefore make it more of a value-for-money purchase.

1.2 Deciding where to make the purchase

PC’s have become much less expensive nowadays, and can even be picked up at your local shopping mall. We would recommend that you consider the possibilities, and the advantages/disadvantages that come with each.

Some of the main PC reseller types are:

Mail order

Mail order companies offer aggressive pricing on a 'boxed' product, in that they will ship you the machine and you are generally 'on your own' from there on in. For the purely price-driven purchaser who is happy to work out the machine for themselves, this can be an attractive option. Support is not generally available, except via posting the machine back during the warranty period, or via a telephone call centre (which a lot of people have nothing very nice to say about).

Chain stores and computer superstores

These 'superstores' offer a walk-in service, with many machines on display. They tend to focus on aggressive pricing, but try to sell the buyer a number of 'additional' products and services. Extended warranty/insurance is their pet item, and they try to talk all buyers into this. They tend to offer little by way of support, although it is visible (just tends not to be very good). Again, the price-driven buyer finds this option useful, and providing there are no problems usually ends up happy.

Computer dealers

Computer dealers are often focussed on a few 'brands' of hardware, usually offering only a minimum of software, and variable amounts of service and support. Their pricing tends to be higher than the superstores as they are tied to a 'brand' name and their support tends not to be so good, as they focus on their larger customers most of the time.

Custom-builders

Like ourselves, custom-builders tend to aim their machines at those interested in a quality PC, custom-designed to meet their current and future needs. Because they are not tied into any particular brand, they can come in a few levels – those who will build using the cheapest components available, thus pricing themselves on a par with the superstores, or those who focus on 'branded' components and who tend to build quality PC's to last the distance. The support offered tends to be much better – they actually built the PC, so will be in a much better position to provide the support it needs. Custom-built PC's can be designed in such a way as to allow future upgrading very easily, and they tend to be less prone to breakdowns, providing they are bought from a reputable builder.

Auction Sites

This needs to get a mention because there are serious numbers of PCs being purchased from auction websites lately. The problem here is that you have no real idea (unless you really *know* your PCs) whether or not you are getting value for money at all. You can pick up a bargain, but more likely than not, you will find that you have been sold less than what you actually wanted/needed. There have even been stories of people purchasing their PC and finding that the internal components were all second-hand, built inside a new case.

Regardless of where you actually purchase your PC, it is imperative that you check the whole specification as far as possible. Some will place emphasis on only a small portion of the specification, thus giving the impression of a great PC, only for you to

find that the machine is lacking functionality in one or more areas. An example of this might be someone advertising a PC with a huge Hard Disk Drive (HDD), loads of Memory (RAM) and a very nice Monitor – the problem here is that the Graphics Card could be very low-end, and the Processor (CPU) could be quite low-end too.

Conclusion – be careful wherever you decide to make your purchase. Investigate the complete specification, and ask for the portions of the specification which are being omitted. That way no nasty surprises are waiting down the line for you.

1.3 The importance of having a budget

It is crucial that you decide upon a budget before going anywhere to purchase a PC. It is very easy to go into a store, or elsewhere, and keep adding slight improvements to the specification until you have bought something way above the price you originally intended.

For example, another £20 might get you a little more Memory (RAM), a further £30 might add to the size of the Hard Disk (HDD), another £30 will increase the size of your monitor, a further £50 might step you up a couple of Processors (CPU's).

There has to be a line drawn, which you should not cross. If you have a definite budget in mind, then you can either compromise (with a view to future upgrading) or at least take away with you something which was inside the original price-bracket. It is very easy to get carried away, and there may not actually be any real tangible benefit for the additional purchases (or these could have been added at a later date, when they were more necessary).

Remember, if you specify the PC correctly in the first place, it is not difficult to add to it, or upgrade it should the need arise. If you buy the correct machine, the addition of RAM or a further HDD is a relatively simple matter.

2.0 The Specification

This is the all important part of any PC buying decision. Once you have decided upon your budget, the PC and its likely uses, and your potential supplier(s) – then you are ready to have a look at what is available. Do not get too hung up on all of the terms used here, we have provided a glossary at the end of this guide, and will highlight to you the ones we feel are most important.

2.1 The Chassis/Case

This is first on our list, as it is very important, yet not considered to be so with a lot of the retailers/suppliers.

There are a number of things to consider when choosing the case:

External Space

Do you have the space to house a midi tower, or do you need something which will sit easily on the desk (such as a mini-desktop case or a mini tower)?

Internal Space

Does your case have the capacity to house additional drives, internal cards, fans, etc?

Looks

Do you actually ‘like’ the looks of your case? There is no need nowadays to go for the basic-looking beige PC case.

Cooling

It is imperative, more so nowadays, with the heat generated from the higher spec components, to have sufficient cooling for your components. Your case is crucial to this as it has to have enough space inside for airflow, and it must be able to house all the necessary cooling fans. It is quite crucial not to block the external vents on your case, so always give consideration to where it is actually going to be located.



Figure 1. A stylish Midi Tower PC Case

2.2 Motherboard

Whilst a number of the PC retailers do not advertise which motherboard is actually used in their PC, this is a crucial component. The motherboard provides all of the interior connectivity and distributes the power around the various components.

Most motherboards provide internal sound, networking, USB connectivity, and can also house internal graphics connectivity. Onboard graphics (as it is referred to) can be sufficient for the home surfing applications, along with most normal business activities. The gaming users, or the design/graphical users will normally opt for a separate video card to provide a higher graphics capability.

The type of motherboard actually decides which processor (CPU) you can install. Without getting into this in too much detail, there are motherboards designed for AMD processors (Socket AM2) or Intel processors (Socket 775). There are others, but they are not generally something you will come across unless you are looking for something specific.

The important consideration when looking at your motherboard, apart from the connectivity capabilities, is the Front Side Bus (FSB). This is a measure of the speed at which the motherboard and the processor (CPU) communicate with each other. Your motherboard must support the FSB your CPU demands, and the higher this number, the quicker your PC is likely to be.

2.3 Processor (CPU)

There are so many processors on the market now, that the decision is difficult for the average user. It is still really a straight choice between AMD and Intel, although both now have very good ranges, and are comparable both in price and performance. It is difficult to compare one against the other because of their complex performance rating systems.

You can purchase an AMD processor, ranging from the AMD Athlon 64 X2 (various speeds) to the AMD Phenom (for power users). You can purchase an Intel processor, ranging from the Pentium D (previous Pentiums are almost obsolete now), through the Dual Core range, now extending to the Quad Core range (again for power users).

The importance of 'Clock Speed' is not to be understated, as this is a measure of the actual speed of the CPU. This is measured in MHz, and the higher the clock speed, the higher the processing speed. The clock speed between the two families of processor (AMD and Intel), are not a like for like comparison, so should not realistically be used to compare processors from the different families.

The basic principle is to buy as high a processor as your budget allows, although the high end processors (Quad Cores etc) are not really necessary for anything except the heaviest of tasks.

2.4 Memory (RAM)

The memory is where your computer keeps information for currently running programs. The larger the amount of computer memory your system has means it will be able to cope much better running all the processes of Windows and shutting down/starting up

Most modern computers use a type of memory called DDR2. There is a high-performance DDR3 available, but this is quite expensive and only required for high spec applications. Some older systems, or budget systems may still use the older DDR or SDRAM standards, but this is probably best avoided nowadays.

In terms of amount, this will be dependent upon the application and the Operating System (see separate section on Operating Systems). Most lower spec PC's will have a minimum of 1Gb of RAM, although a lot of the newer machines running Vista perform better with 2Gb.

All PC's will have a maximum installable memory, dependent upon the motherboard – this will be 4Gb or 8Gb, although there is no need for this amount, unless a specific application requires it. 1Gb or 2Gb will suffice for most situations.

Always ensure that memory is installed in 'matched pairs' as this will increase its functionality. That is to say, if you are having 2Gb installed, ensure this is installed as a matched pair of 1Gb modules.

A great way to breathe life back into an older PC is to increase the RAM, and a wide range of types are available dependent upon the motherboard currently installed.

2.5 Hard Disk Drive/Storage (HDD)

These really come down to speed and size. Most drives run at 7200rpm, but there are high performance drives available at 10,000rpm (only required for serious power users), such as the *WD Raptor* drives.

There are two types of connection available, the older IDE standard (also referred to as 'Parallel ATA', or PATA) and the newer Serial ATA (SATA). There is a difference in terms of speed, with SATA being quicker, and it would be the most widely used in modern machines. Again, without getting into it too much, IDE/PATA drives have a transfer rate of 133MBs, whilst SATA has 150MBs and now SATA-II has 300MBs. Most drives nowadays will utilise SATA-II connections, yet there are still some lower end machines using IDE.

It is easy to identify which type of connection your PC is using. If you remove the side panel and look you will either see a wide, flat ribbon-type cable linked to the HDD (IDE) or a much smaller (quite often Red in colour) cable with a small end (SATA).



Figure 2. Top connector is IDE, bottom one is SATA-II

The size of your HDD will matter really only to you. We would suggest that the minimum purchased is 160Gb, but there are many disk hungry uses which may well require more (such as multimedia, video storage, etc). We would also suggest that, rather than simply having a single 500Gb HDD, it might be better to utilise two separate disks of 160Gb and 320Gb. The 160Gb could be used as a system drive, with all applications and OS loaded onto it, and the remaining larger disk for storage only. This way when an application is hitting the HDD, it only has to search through the one, smaller disk – therefore speeding up the whole process. This decision will really depend upon what you think you will actually be storing on the PC.

It is always better to have a larger disk, rather than running a disk at nearly full capacity, and it is cheaper to have a larger one installed when purchasing the PC than it is to add another one later on. That said, most modern cases (midi towers especially) have capacity for numerous HDDs to be installed, and adding one is relatively simple.

We would recommend that, if you are going to a custom-builder, you request SATA-II HDDs. These are similar in price, but are faster.

The final thing to be on the lookout for is the amount of Cache a HDD has. Most old drives only offered 2Mb-4Mb, but the newer drives can offer 8Mb-16Mb. This cache memory is a buffer used by the drive, and can improve the overall access speed of your PC.

2.6 Optical Drives

All PCs need some sort of optical drive. Older machines started off with CD-ROM drives, then progressed to CD-RW drives and DVD-ROM drives. Most nowadays have a DVD-RW drive as standard, or maybe even two.

Types of optical drive:

- CD-ROM (no writing capability, but reads CDs)
- DVD-ROM (no writing capability, but reads both CDs and DVDs)
- CD-RW (can read and write CDs)
- DVD-RW (can read and write both CDs and DVDs)
- Blu-Ray drives (capable of reading and writing to Blu-Ray DVDs)

Types of media:

- CD-R (writable CD, although only the once)
- CD-RW (re-writable CD, can be used repeatedly)

- DVD –R or +R (writable DVD, can only be used once)
- DVD-RW (re-writable DVD, can be used repeatedly)
- BD-R (writable Blu-Ray DVD, holds 25Gb compared to a standard DVD which holds 4Gb)

It is really up to the user what the requirements are likely to be, although most PC's now come with a DVD-RW drive as standard. If required a Blu-Ray drive can be specified, although this is a more expensive option. A second drive is useful, particularly when copying or backing up a DVD/CD – the PC can read from one and write to the other, saving the time taken to create a temporary disk image onto the PC's HDD.

2.7 Video/Graphics Card

Video/Graphics card technology changes very regularly and newer PCs will have more video capability than anything that has come before. The new MS Operating System, Vista, requires more video memory than any OS before it. See our section on Windows Vista for further information.

If you are not really doing any gaming, 3D graphics, or design work, then the integrated (also called onboard) graphics may well suffice for your needs. Really for basic office applications, there is little need for anything other than a 128Mb Graphics card and most integrated ones now offer this as minimum.

You can also have two monitors running from the same PC, extending your desktop and allowing you to have numerous applications open on each. This is possible on those graphics cards with both a VGA and DVI output (see figure 3) and a little configuring on your PC.

2.7.1 Direct X

There is a 'DirectX' requirement for all video cards, DirectX 10 being the latest version (only available on Windows Vista). DirectX is software which handles the playback of media and games on your PC. The newer the version of DirectX, the better the visual effects produced. You should, if you are buying a PC with Vista, ensure that your card supports DirectX 10

2.7.2 Nvidia v ATI

There are really only two big players in the graphics card technology arena – ATI and Nvidia. They produce most of the components used in the manufacture of video (graphics) cards, and most other manufacturers adhere to them.

2.7.3 Video Memory

The other, most important probably, thing about video cards is the amount of memory (RAM) contained on them. The more of this supplied on your card, the better the performance generally. Gamers or 3D graphics require a minimum of 256Mb. You have to be careful for the specification of integrated video on motherboards, because

this RAM could actually only be 'shared' RAM not giving the full amount to the graphics alone.

2.7.4 Connectors

There are a number of different connection types available on video cards now. The original VGA connection (also referred to as D-Sub) is always still available, but there may also be a DVI connection. VGA is an older 'analogue' connection, whilst DVI is a newer 'digital' connection – giving a clearer image at higher resolutions. If you are sending your video out to a TV, for instance, it is much preferable to use the DVI connection to get the clearer picture. If your monitor does not match your connector, you can purchase a simple and inexpensive adaptor.



Figure 3. A typical graphics card (VGA port on right, DVI port in middle, S-Video port being the small black round one at the left)

The DVI connector and the VGA connector together give you the option of running two monitors from the one video card.

2.7.5 Resolution

This is a measure of your graphics card's ability to output a video signal at a particular size (in pixels). Generally referred to in the format 1280x1024, but the numbers are often much higher. Most PC users (well a high percentage anyway) use 1024x768 pixels.

Modern graphics cards are now all capable of producing extreme resolutions. You'd be hard-pressed to find a monitor that can display a native resolution higher than your graphics card can produce. As such, it isn't usually an important factor when choosing a graphics card.

2.7.6 SLI and Crossfire

These refer to dual (or more) graphics cards in the one PC. The only users are generally high-end gamers, and those doing 3D rendering/modelling. Whilst you may install 2 cards, you will not generally get twice the performance.

Many games are unable to utilise the extra performance effectively, and it's actually possible for a game to run slower on dual-card system, because of peculiarities in the way the game runs. The graphics card software will typically have various settings you can try to improve performance with two graphics cards.

SLI and Crossfire refer to the dual-card systems of Nvidia and ATI respectively. They are not inter-compatible, so you will need to check which system your computer supports (if either). Motherboards, etc are clearly labelled if they are SLI/Crossfire

compatible.

2.7.7 TV-Out or VIVO

Some graphics cards are designed to give you the option of connecting your TV to your computer. TV-Out signifies this functionality, and usually means the graphics card has an S-Video or component output.

VIVO (Video in, Video out) means that the graphics card also has the ability to record video signals from your VCR, Satellite Tuner, Camcorder or DVD player. This is sometimes seen on models featuring an integrated TV Tuner.

2.8 Sound Card

Sound cards are almost always integrated into motherboards, with 6 channel or 8 channel HD audio being produced. This is enough for most users, except those who want to perform multimedia tasks or sound recording, etc. There is a wide range of additional cards available for this.

Sound cards are available that will allow you to record and replay full frequency, audiophile quality, multi-channel DVD Audio. This latest audio format is accepted as being the very best digital format available. Surround sound can also add a new edge of realism to gaming. Directional sound offers the gamer a competitive advantage.

As stated though, the vast majority of users will be more than satisfied with the audio provided onboard their PC, and will not require a separate card for this.

Obviously the speakers you use with your system will also limit or enhance your audio experience.

2.9 Monitors

There are many choices when it comes to monitors. Firstly do you want one of the 'older' type of CRT monitors (ie the large TV type), or do you want one of the newer TFT monitors (flat panels)? The vast majority now sold are the flat panel (TFT) type.



Figure 4. CRT Monitor on left, TFT on right.

2.9.1 Size of monitor

Because of the price reduction over the last while, it is now easily affordable to have a 19" or larger flat panel monitor. Basic PC's will come bundled with a 17", and these are fine. The difference in size is a personal and budgetary choice. Unless of course

you are working in design, etc, when you might want a 22" monitor as this can display two full A4 pages alongside each other on one screen.

2.9.2 Refresh Rates

This is the number of times the image is redrawn on the screen per second and is measured in Hz. Higher refresh rates reduce flickering, etc.

2.9.3 Resolution (see also video cards)

CRT monitors can work perfectly up to the quoted maximum resolution. The TFT is recommended to be used at only one resolution. The reason for this is the pixel makeup differs between CRT and TFT. The most common resolutions are 1024x768 and 1280x720, but of course you may have your own preference.

2.9.4 Response times

This used to be an issue with TFT monitors, in that their response times were only 125ms etc, causing problems with moving images. This has since been sorted out and they are usually 2ms to 8ms now.

3.0 Connectors & Devices

3.1 Keyboard

Most PCs in a store or suchlike will have a basic ‘wired’ multimedia keyboard included, suitable for most uses. If you are having a PC built, then you will be able to specify the type of keyboard you require, namely a ‘Wired’ keyboard, ‘Wireless’ keyboard or a more specialist ‘Gaming’ keyboard.

Keyboards are generally in the category of ‘you get what you pay for’, but the normal one supplied with a PC is sufficient. Most are of an ergonomic nature nowadays, reducing hand cramps and RSI.

3.2 Mouse

The original mechanical ‘ball’ type of mouse is disappearing fast, as they do not tend to last as long as some of the newer types. The one we would tend to suggest is an ‘Optical’ mouse, which uses light to detect mouse movement on almost any surface. These have no ball and hardly even need a mouse mat. Again, a wired or wireless mouse is optional.

3.3 Speakers

Speakers supplied with PCs tend to fall into one of a few categories:

- Stereo Speaker sets (referred to as 2.0) which are simply a pair of stereo speakers.
- Speaker/Sub woofer sets (referred to as 2.1) which include a pair of stereo speakers, with a sub-woofer
- Six-piece surround sound speakers (referred to as 5.1) which include a set of 5 speakers to provide surround sound, plus a sub-woofer.



Figure 5. 2.0, 2.1 and 5.1 speaker systems

The majority of needs are satisfied simply with a set of stereo speakers (2.0) or a simple speaker/sub set (2.1), but the gamers, sound recorders or multimedia users amongst us may well prefer to have a full surround sound set (5.1). The speaker sets range from very inexpensive 2.0 sets for around £10 up to almost £200 for a 5.1 surround sound set.

There are also 7.1 sets available, which provide revolutionary advanced audio for users. These can be priced from £250 upwards and include a set of tweeters in addition to a full set of surround sound speakers and a sub-woofer. These are really only needed for those requiring the highest quality in sound.

3.4 Ethernet/LAN

The majority of computers have a LAN (Local Area Network) port integrated on their motherboard, giving a fast Ethernet connection (100Mbps), although these are fast being replaced by Gigabit Ethernet connections (1000Mbps). These are used to network your PC into a LAN, or to provide connectivity to a Router for broadband/cable internet connections (usually 100Mbps).



Figure 6. Ethernet port and cable

You can buy additional Ethernet cards which simply slot into your PCI expansion slots, provided with most PCs.

3.5 Wireless connectivity

Whilst nearly all laptops provide wireless LAN connectivity as standard, this is not so for desktop PCs. We would always advise that a desktop PC user uses a wired link (ie a cabled link) rather than a wireless link, due to the speed and reliability of the wire.

There are, however, situations where it is just not possible to have a cable, so a wireless link is necessary. To provide a wireless link to your desktop PC, you will need to add a Wireless Ethernet adaptor, either internal (a PCI card which slots inside your PC) or external (like a USB 2.0 device)



Figure 7. Wireless PCI adaptor (left) & USB adaptor (right)

You are limited in range with wireless connections, and thick walls and suchlike can lower the speed of the link. There are ways around this, however, by using high-gain antennas and additional Access Points. If these are required, it is worth getting specific advice from your supplier.

3.6 USB 2.0 & Firewire

Many peripherals now connect through external interfaces (such as USB, Firewire, etc) instead of internal cards. Most modern computers come with at least 4 USB 2.0 (USB 1.1 is now out-dated) ports, on the rear and front of the PC, plus a Firewire (also known as IEEE 1394) port (used mainly for digital camera/camcorder connectivity).



Figure 8. USB (left) and Firewire (right) ports

You should ensure that your PC has at least four USB 2.0 ports, preferably as many as six, with two of these on the front for ease of access. The rear ones can be connected to static items (such as printers, scanners, etc) and the front ones can be used for items you need constant access to (memory sticks, etc). You might be amazed at how quickly you can run out of USB ports, so more is better.

3.7 Multi-card readers

These are not supplied as standard on a PC, but are easily added to the specification. You can install a simple multi-card reader into a floppy drive slot at the front of your PC. This allows for the quick reading of SD Flash cards, CF Flash cards, etc – which are storage media used by mobile phones, digital cameras, camcorders and the like.



Figure 9. Basic multi-card reader (internal)

These are an inexpensive, but very useful addition to any PC (ranging from around £7 to £30 each).

4.0 Other important things to consider

4.1 Power Supply

The internal power supply is crucial to any PC system. It supplies all of the electrical power to the components of the PC. These tend not to be mentioned in the specification of systems in stores & retail outlets, but can be specified when using a custom-builder.

There are many low-cost, budget power supplies available, but these tend to be useless when you come to upgrade your PC as they cannot supply the power necessary to drive the additional components. It is imperative that your PC is built with redundancy built into the power supply to allow for additional drives, etc.

Power supplies range from low-end 300W up to high performance 1000W units (used to power quad graphics card systems). They all have a cooling fan integrated, but some are much quieter when operating than others.

For basic PC setups, we would recommend that you look at a decent-quality 400W as a minimum. If you intend to have multiple HDDs installed, plus separate graphics cards, etc – then you should ideally be looking at a 500W. Gaming systems may well be best with a 750W or so, to power all of the additional components they carry.

4.2 Cooling

Cooling has become more and more important as the PC technology develops. All of these newer high-speed drives, fast CPUs and high-end internal cards require cooling if they are to last the pace. This is one of the most overlooked factors in PC building today.

Your CPU will have its own cooling fan attached to it, and this usually looks after itself. There is always an air vent on the side of the PC case to allow this to blow the hot air out. It is crucial that this is not blocked as it may cause your CPU to overheat. There are some very high-end cooling fans available for the top CPUs, but for budget systems, these are a little overkill.

The more components you have and the higher specification you have – the more internal cooling you will need. There needs to be space inside the case to allow for airflow, and additional case fans (usually 8cm or 12cm) should be fitted to circulate cold air through the case, removing the hot air.

If your PC is not cooled sufficiently it may well overheat and damage components, or it may shorten its lifespan. When we build a PC, we always ensure that additional cooling is added as a precaution.

The internal cooling may well not be mentioned when you go to purchase your PC, but you should ask what steps have been taken to ensure the machine stays cool.



Figure 10. A CPU cooling fan

4.3 32-bit systems and 64-bit systems

Most PCs are running 32-bit operation, but most are also now capable of running 64-bit. The difference between 32-bit and 64-bit is that it doubles the amount of data a CPU can process per clock cycle. Most of the medium-high end processors can run 64-bit, but you need to ensure that all of your other components and your Operating System support 64-bit operation.

64-bit will become the standard soon enough, but at present most of us have been hesitant to supply it. High end gaming solutions, etc will want to make use of 64-bit computing, as their games have been designed with it in mind. The average user does not want to move to 64-bit as they will find lots of their existing software is not compatible. There is also the problem of device drivers for the components, as these are not always freely available.

The advice we would give is, if you want a 64-bit PC, then go to a system-builder and ask them to construct it for 64-bit operation. This will cost extra, as most standard components cannot operate at 64-bit. This will change in the next few years though.

5.0 Operating systems

5.1 Windows XP

Most of us have come into contact with Windows XP over the past number of years. It is reliable and quick and has been around since 2001, with many upgrades and patches since then. It was intended that it be completely replaced by Vista, but Vista has had a few teething problems, making PC manufacturers stick with XP at the request of their customers.

There are a few versions of XP, but the three which will matter most to a stand-alone desktop PC buyer are Windows XP Home Edition (targeted at home users, though widely used in the business community too), Windows XP Professional Edition (targeted at power and business users) and Windows XP Media Centre Edition (targeted at multimedia and movie applications).

Windows XP is the most reliable of the Operating systems (OS) available at the moment, and a lot of people have decided to stick with it, rather than move to Vista.

It is purely you, the buyer, who will decide if you want XP on your PC, but a number of the retailers now do not supply it as standard on their systems. It has no problems with peripherals, or old legacy connections. Downloads are available freely for any/all device drivers and it is much quicker on basic machines than Vista.

The other main advantage is that it requires a lesser specification of PC to operate properly. It will happily run on a machine with 256Mb of RAM, although we would recommend that nobody buys a PC with less than 1Gb of RAM these days.

There is a Service Pack 3 (SP3) being released for XP, which would suggest that it is likely to be with us for some time to come.



Figure 11. Windows XP Pro and Home Editions

5.2 Windows Vista

This was released in January 2007, as the replacement for XP – but it did not work as smoothly as expected, making more and more people loathe it and want to go back to XP. There is a Service Pack (SP1) about to be released for it, which should iron out a lot of the major problems it has been having.

5.2.1 Versions of Vista available

There are more versions of Vista than any before it, each designed with a different purpose:

1) Ultimate

Ultimate is the choice for those users who want all the functionality available with Vista. It combines the best of the Home and Business versions and adds some additional features.

2) Home Premium

This is the preferred edition for home desktops or laptop/mobile PC's. It provides the productivity, entertainment and security necessary for your PC at home or on the move.

3) Home Basic

This version is for the basic home users who simply want access to emails, surfing the internet and photo handling. It permits easier setup and maintenance, with additional security features built in. Realistically, this version has not got most of the functionality that Microsoft are advertising for Vista, but it will permit a user to have a cut-down version of it. Note – Windows Aero is not available with Home Basic.

We do not supply Home Basic at all, as we do not think it offers any advantage over XP to the user. It seems to be a simple way of permitting vendors to offload low specification computers which will run Vista – it has none of the 'nice' features of Vista, yet all of its inherent problems.

4) Business

This is the first version of Windows designed specifically to meet the needs of small businesses. It selects and tailors a number of the new features of Vista specifically for business use.

5) Enterprise

This version meets the needs of larger organisations with more complex IT infrastructures. This is the premium business edition of Vista, with all of the features of the Business edition plus extra capabilities to help lower IT costs and improve data protection.

64-bit editions are available for serious computer users who are running a computer with a 64-bit processor and who require the higher end of functionality to handle media, gaming, technical computing or demanding financial analysis. Unfortunately you will have to ensure that ALL applications, system and devices are 64-bit compatible or you will not be able to run it.



Figure 12. The various versions of Microsoft Vista

5.2.2 Minimum and recommended specifications

The big issue with Vista is what is required to run it properly. When we refer to ‘properly’ we mean quickly and efficiently, at a pace acceptable to the user.

Microsoft has the following ‘minimum supported requirements’ for PC’s that intend to run Vista:

- 800MHz processor
- 512Mb system memory (RAM)
- 20Gb hard drive with at least 15Gb free
- Support for Super VGA graphics
- CD-ROM drive

Realistically, we would not recommend that you even try to run Vista on a PC with this specification. Microsoft ‘*recommended*’ system requirements are:

Home Basic:

- 1GHz 32-bit (x86) or 64-bit (x64) processor
- 512Mb of system memory (RAM)
- 20Gb hard drive with at least 15Gb free
- Support for DirectX 9 graphics and 32Mb of graphics memory
- DVD-ROM drive
- Audio Output
- Internet Access

Home Premium/Business/Ultimate:

- 1GHz 32-bit (x86) or 64-bit (x64) processor
- 1Gb of system memory (RAM)
- 40Gb hard drive with at least 15Gb free
- Support for DirectX 9 graphics with:
 - WDDM Driver
 - 128Mb of graphics memory
 - Pixel shader 2.0 in hardware
 - 32 bits per pixel
- DVD-ROM Drive
- Audio Output
- Internet Access
- Additional requirements for extra functionality (tv card, touch screen, etc)

We recommend the following ‘*preferred minimum*’ to run Vista smoothly:

- 3.0 GHz processor (32-bit or 64-bit)
- 1Gb system memory (2Gb would be better)
- 80Gb hard drive with at least 40Gb free
- Support for DirectX 9 graphics
- Minimum of 128Mb of graphics memory
- Network support, either 100Mb Ethernet or 802.11g (or both)

- All USB ports must be USB 2.0
- DVD-ROM drive
- Audio Output (preferably HD audio – as this will become a requirement)
- Broadband Internet Access

We would ask that you take extra care when installing the 64-bit version – you must ensure that your PC will support 64-bit operation and that all of your devices and applications will support 64-bit operation.

5.3 Windows 7 (also called Vienna)

This will be the successor to Windows Vista. This was previously known under the code name "Blackcomb" but was changed in early 2006 to "Windows Vienna". Initially Blackcomb was announced back in 2001 as a follow on to Vista. Windows Vienna may include features that were dropped from Vista such as the new file system. Additional new features may include a dramatically new user interface (UI) and other new features from the Microsoft Development labs, such as 'GroupBar' and 'LayoutBar'.

Security will also be enhanced with applications and external access being placed in a secure sandbox that prevents any effects (i.e. damage or viruses) to other applications and the OS itself.

The debate that is going on at present amongst IT vendors is whether or not there is any point in migrating to Vista, when it will be replaced by this new version (scheduled for release in 2009, although it is likely to be 2010 now after all the trouble Vista caused).

Until this is made clearer, it is entirely up to the potential buyer whether or not they move to Vista. We would recommend that it be purchased with your new PC only if you have no legacy hardware peripherals or software which need to be connected to it. You can always run a check on the internet to see if your peripheral is Vista compatible, or simply ask your IT vendor.

6.0 Summary

6.1 Suggested Specifications

We have listed below our suggested specifications for various applications, which whilst they should not be taken as gospel, they should be considered when making your purchase. Whilst we know that PCs tend to be used for more than one application, we have tried to categorise them to illustrate the important components.

6.1.1 Home Internet use

CPU	AMD Athlon 64 X2 4000+ (Dual Core) Processor
RAM	1Gb (2Gb is always better) DDR2 667MHz
HDD	160Gb SATA-II HDD
CDROM	20x DVD-RW Drive
Graphics	Onboard will suffice
Sound	Onboard will suffice
OS	XP Home/Vista Home Premium

6.1.2 Home Office/Small Business use

CPU	Intel Pentium E2140 Dual Core Processor
RAM	2Gb DDR2 667MHz
HDD	250Gb SATA-II HDD
CDROM	20x DVD-RW Drive
Graphics	Onboard will suffice (minimum 256Mb though)
Sound	Onboard will suffice
OS	XP Pro/Vista Home Premium/Business

6.1.3 Basic Gaming use

CPU	Intel Pentium E6550 Dual Core Processor
RAM	2Gb DDR2 800MHz
HDD	320Gb SATA-II HDD
CDROM	20x DVD-RW Drive
Graphics	512Mb GeForce 8600GT
Sound	Onboard 8-channel Audio
OS	XP Pro/Vista Home Premium

You may want to ensure that you receive a gaming keyboard and mouse for use with this PC

6.1.4 Multimedia & Graphics-hungry applications

CPU	Intel Pentium E6550 Dual Core Processor
RAM	2Gb DDR2 800MHz
HDD	320Gb SATA-II HDD
CDROM	20x DVD-RW Drive
Graphics	512Mb GeForce 8600GT
Sound	HD 5.1 Channel soundcard (eg Pinnacle M-Audio Revolution)

OS XP Media Centre/Vista Home Premium

Please note, we only offer the above very generalised suggested specifications, and these should be used for reference only. Your own application may need something more specific than the above, and we always suggest that you consult your system-builder before embarking on a purchase.

6.2 Buyers Checklist

OK, you have managed to get through our buyers guide thus far, so below is a quick checklist of the things you require detailed information about before you compare your potential purchases.

CPU (Processor)

Check the manufacturer, model number and clock speed (MHz)

RAM (Memory)

Check the amount in Gb, the type (DDR2 etc) and clock speed (MHz). Also ensure that it is installed in 'matched pairs' if applicable.

HDD (Storage Drive)

Check the size (Gb) and type (SATA or IDE). Also check the manufacturers warranty, as some of the quality drives (eg Seagate Barracuda) can give up to 5 years manufacturer warranty.

CASE

Ensure the case is visually attractive to you. Ensure that the air vents are not located in a place which will be blocked when taken to your workstation. Ensure that there is additional cooling and airflow space inside the case.

OPTICAL DRIVE

Ensure the minimum you get installed is a (20x or 20 speed) DVD-RW Drive

VIDEO CARD

Ensure you have sufficient video functionality and capacity to run the OS you choose, plus to satisfy the requirements of your actual PC use.

SOUND

Ensure you have enough onboard sound, or an additional card installed, to satisfy your needs. Also check the speakers that they will suffice for you. If you intend to watch DVD's etc, then a decent 2.1 set is the minimum requirement.

MONITOR

Ensure you get a minimum of a 17" TFT monitor (or CRT if you are that way inclined). 19" is fast becoming the base standard, and 22" are excellent value for money nowadays.

KEYBOARD/MOUSE

Ensure you have a look at the keyboard, and check its actual comfort. Ask for an Optical mouse, rather than the old 'ball' type.

Note from authors:

We thank you for taking the time to read this buyers guide, and hope you found it useful. If you have any comments or suggestions, please do not hesitate to contact us via our website (address at the foot of the page).

If we can be of any help to you regarding your buying decision, please do not hesitate to contact us, as per the details below:

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