If you've got this far, you've bought, borrowed or stolen a copy of *What PC?*. This means you have at least a passing interest in buying a PC or some computer accessories. That's why we're here. In this section we'll tell you the basics of how computers work – hardware and software – and tell you what to look for and what features you should consider before buying any of them.

Buyers tables

Our comprehensive tables at the back of the magazine list all the major items of hardware and software, together with details of features, prices and suppliers: all in a readily accessible format so you can easily find what you need.
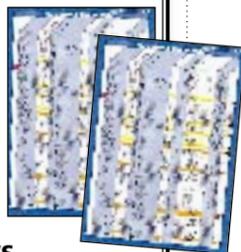
Group tests and reviews

In between Getting Started and the tables are all the tests and reviews for which *What PC?* is famous. You'll find independent tests of new and interesting items (see the Up Front and In Brief sections) as well as comparative tests of similar products.

Our verdict at the end of each product review includes a quick-reference panel. This shows you how we rated the product's performance, features, value for money and so on.

Dynalink 32A P90

	1	2	3	4	5
Performance	1	2	3	**4**	5
Documentation	1	**2**	3	4	5
Features	1	2	**3**	4	5
Value for money	1	2	3	4	**5**

1 = Poor	**2** = Moderate
3 = Average	**4** = Good
5 = Excellent	

You, the reader, are very important to us and we want to know what you like or dislike about *What PC?*. If you have any comments or suggestions, please address them to the editor. We read every letter sent to us and, even if we can't respond to them all on our Letters page, we listen very carefully to what our readers have to say about the service we provide.

Question Time

Questions about your PC, or the software you use with it, can be answered on our Question Time pages. We welcome all contributions to Question Time, whether from absolute beginners or seasoned computer users.

Mick Andon, Editor

Our regular section aimed at newcomers to the world of computing but with useful sections of information and buying advice for anyone thinking of buying computer hardware or software

getting started...

What is a PC?

A PC (Personal Computer) is a computer generally small enough and cheap enough to be reserved for the use of one person. It will probably fit onto a desktop (or even into a briefcase) and will be employed for a range of different purposes. It's as simple as that – there is no fancy definition.

What does a PC do?

A computer processes information. You put instructions and information in at one end and the computer processes them in some way to provide results (output) at the other.

This input, process and output sequence is familiar to all of us, though we don't often think of the real world in terms of these particular labels. However, call a washing machine a clothes processor, and you'll get the idea. We expect the output (clean clothes) to be different from the input. The same goes for computers: if we type in lists of names and addresses (customers, perhaps), we expect the computer to process the information in a useful way – perhaps sorting the names into alphabetical order, counting them or grouping them by location. The output can be more printed lists (now sorted) or address labels or, perhaps, hundreds of letters with a different name and address on each one. We also expect the computer to be able to store the details we have typed in for future use. It is the computer's ability to process raw data and turn it into something structured and accessible that makes it so invaluable.

Input

The most obvious way of putting information into a computer is by using a keyboard. Games addicts prefer joysticks and users of Windows would find it extremely inconvenient not to have a mouse. There are many more input devices, some with specialised functions for use in the design, publishing and manufacturing industries. Most users manage perfectly well with a standard keyboard and a mouse.

The keyboard is laid out in the same way as a typewriter keyboard. But, there are many extra keys related solely to computer operations.

A mouse is simply a plastic controller designed to fit the palm of your hand and be rolled around the surface of your desk. There is a ball on its underside that tracks your movements. The mouse's movements are shown by a pointer on the computer's screen. At the front of the mouse is at least one, usually

Bolt-on goodies

● **Modems** – These connect to telephone sockets and allow your computer to communicate with other computers and to dial in to subscriber information services or the Internet. Many also enable you to send and receive faxes with your computer.

● **Multimedia upgrades** – The most basic of these consists of a CD-Rom drive and a sound card. You'll also need speakers. Multimedia adds sound and music to your computer and the massive storage capabilities of CD-Roms. These look like conventional CDs but are used to store data. They can store as much data as 450 floppy disks but you can't save onto them. Thousands of CD-Roms are available, including encyclopaedias, reference works, games and libraries of graphics, sound and video clips to enhance business presentations.

● **Scanners** – These are used to translate printed pictures or text into electronic form so that they can be used on a computer. Cheaper handheld devices are fine for home use but for serious use you need an A4 flat-bed scanner.

two, and sometimes three buttons. Pressing a button while pointing at a particular area of the screen causes the computer to perform a specific action. As with the keyboard, exactly what you can do with your mouse will depend on the software you are using.

Process

The processing hardware is all contained in one box called the system unit. The most important piece of equipment in the system box is the CPU (central processor unit). This is often referred to as simply the 'processor'. The CPU can be considered as the heart or engine of the computer.

Other essential components inside the system unit are the graphics controller, the computer's memory (Ram), and the internal and external disk drives that form the computer's long-term storage.

The graphics controller is just a set of electronic components that control the computer's screen. The type and sophistication of the graphics controller deter-

mines things such as how many different colours you can display on the screen and how many coloured dots are used to make up the picture.
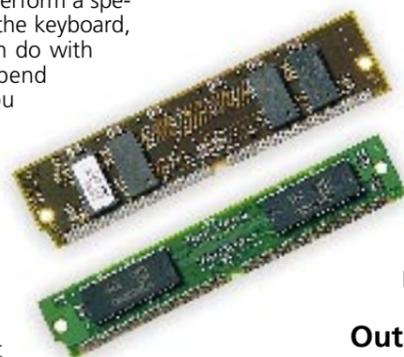
Because a computer's working memory is blanked every time you switch off the system unit, the internal disk drive is used to store data so that it can be used again. These internal drives are called hard disks for the rather prosaic reason that the data is magnetically stored on hard metal disks. Usually, you can't see the disk drive itself because it is mounted inside the system unit, but there is nearly always a light on the system unit to show that the hard disk is working.

The external disk drive is for floppy disks. All modern computers use a 3½in floppy disk, encased in a rigid plastic holder. The floppy disk fits into a slot in the system unit, behind which is the floppy disk drive itself. Hard and floppy disk drives work in essentially the same way but hard disks are much faster, can store a lot more and cost hundreds of pounds.

Software not supplied on CD-Rom will come on several floppy disks and before you can use it you have to copy the contents of each disk onto the hard disk inside the computer. This process is called installation. Another use for floppy disks is to store extra copies of your work in case your hard disk breaks down, or to pass on to someone else.

Output

Output can take many forms. The primary output of a modern PC is via the screen on the monitor. Actually, the computer will work without a monitor but if you can't see what's happening on the screen it's almost impossible to use.

Monitors vary in performance and price. The most significant factor affecting the price is the size of the screen: a 15in monitor may cost around £300 but every extra inch above this is very expensive. The average price for a 17in monitor is around £600; for a 20 or 21in model, expect to pay £1,500 or more. Most work done on a PC will eventually end up on paper so some sort of printer is essential. (See

the guide to printers a few pages on.) Another common output is sound, either synthesised (artificially created) or digitised (taken from life), but a PC can be used to drive almost any type of device, given the right connections, so the control of other machines such as plotters, pattern cutters and manufacturing equipment also counts as output.

Fitting parts

Everything connects to the system unit which draws its power from the mains. The two input devices (keyboard and mouse) plug directly into the system unit and do not require a power supply.

The monitor is connected to the graphics controller in the system unit via a 15-pin D-shaped plug. It also needs mains power, but many system units have an auxiliary connector on the back which supplies power to the monitor.

Printers receive data from the computer via a cable connected to the system unit. Printers usually incorporate mains transformers and must draw their own power from the mains.

Value for money?

A basic configuration includes the main system unit containing the CPU, memory, hard and floppy disk drives and graphics controller. Apart from this unit, you get a monitor, keyboard, all the necessary cables and connectors and, more often than not, a mouse.

The complete systems offered by most vendors are designed to make sure that all the components work together without conflict but it also means that you might have to spend a lot of time finding a supplier who has put together exactly the specification you want to buy. Most vendors will deliver a modified system (with perhaps a larger hard disk or a bigger monitor) if it entails selling an extra or more expensive item of kit, but they are not all so willing to remove items from the basic configuration. It's worth asking.

Essential extras

● A printer is not normally included with the basic system so this must be budgeted for separately.
● To make your computer do anything useful you'll need software for each type of task: word processing, accounts, graphics, spreadsheet, and so on.
● Disposables such as floppy disks, paper, toner or ink.
● Staff training (or time spent teaching yourself) can be quite expensive. See The Learning Curve, page 18. ▶

These days you can buy a PC in any high street, but how do you choose between dozens of identical beige boxes? Our guide tells you how to compare specifications

Buying a PC

There are literally hundreds of PC manufacturers and suppliers. Look through the tables at the back of *What PC?* and you'll see for yourself. The surprising thing is that almost all the machines you see are based on the same original design from IBM. There have been advances in technology and different manufacturers add their own bells and whistles – but learn to use any one of these machines and you can use them all.

Personal computers are also available from manufacturers who strayed from the path marked out by IBM. The most successful example is the Macintosh, made by a company called Apple. But, to keep it simple, in this feature we'll use the term PC to mean an IBM-compatible personal computer.

Choosing a system

Just as there is never a good time to start a new business, there is never a right time to buy a PC. Newer, faster, cheaper models are always around the corner. But, even if you delay your purchase, there will still be something better just about to be released.

The lesson to be learned from this is that you should ensure the PC you buy is at least capable of running the software you intend to buy now and that it has as much extra capacity as possible to cope with future developments.

A question of balance

How well your PC works depends on the way the individual components are matched to each other. For example, a fast processor may be held back by a slow display controller or too little memory.

Reputable suppliers will put together PC systems that are sensibly configured, but beware of box shifters putting together so-called cheap systems that have small hard disks or an inadequate 2Mb of memory.

Multimedia

Multimedia is the buzzword of the moment. It usually means adding a sound card, speakers and a CD-Rom drive to a computer to enable you to record and play back voice, sound effects and music. CD-Rom
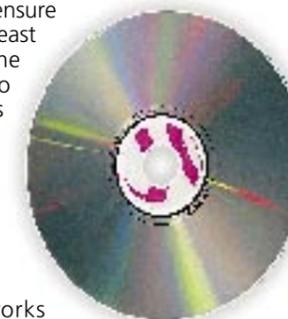
sales are booming and many programs, reference works and libraries of artwork are available in this format. You can also use a CD-Rom drive to play conventional audio recordings. If you want multimedia capabilities, it's often cheaper to buy them built in than to add them later. Check with your supplier.

Whether you buy built-in multimedia or add it afterwards, make sure that the CD-Rom drive is at least a double-speed model and that you buy a 16-bit sound card. Many computers now come with quad-speed CD-Rom drives.

Which processor

IBM-compatibles share a common processor family, designed by Intel, but also available from other manufacturers. Chips in the family are identified by code numbers ending in 86. These are the 80286, 80386 and 80486. For marketing reasons, Intel christened the 80586 the Pentium. Intel is not known for its sense of humour!

Don't consider any machine with a processor chip other than the 80486 or Pentium. The 80486 (usually abbreviated to 486) is the current minimum ▶
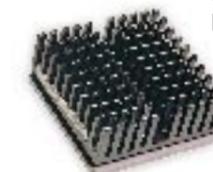
standard and is available in a range of speeds up to 100MHz. The higher the number, the faster your computer will work.

As if it wasn't confusing enough having to know a 486 processor's speed, there are also slight variations in the way these chips operate. This leads to the extra designation of SX, SX2, DX, DX2 or DX4 after the 80486. Don't worry about these differences: if you are comparing 486 chips, just look at their speeds in MHz.

The latest processor for IBM-compatible PCs is the Pentium and we'd advise buyers to choose Pentium-based PCs if they can. Prices are already very reasonable. It is currently obtainable in speeds from 60MHz to 133MHz.

Pentium chips work faster than 486 chips of the same MHz and the design of Pentium machines is more advanced. They are, therefore, a more future-proof investment.

On the outside most computers look pretty much the same

Monitor

Floppy disk drive

CD-Rom drive

Multimedia speaker
It's worth spending a bit extra on a decent pair of speakers if music is important to you.

Main system unit

Keyboard

Mouse
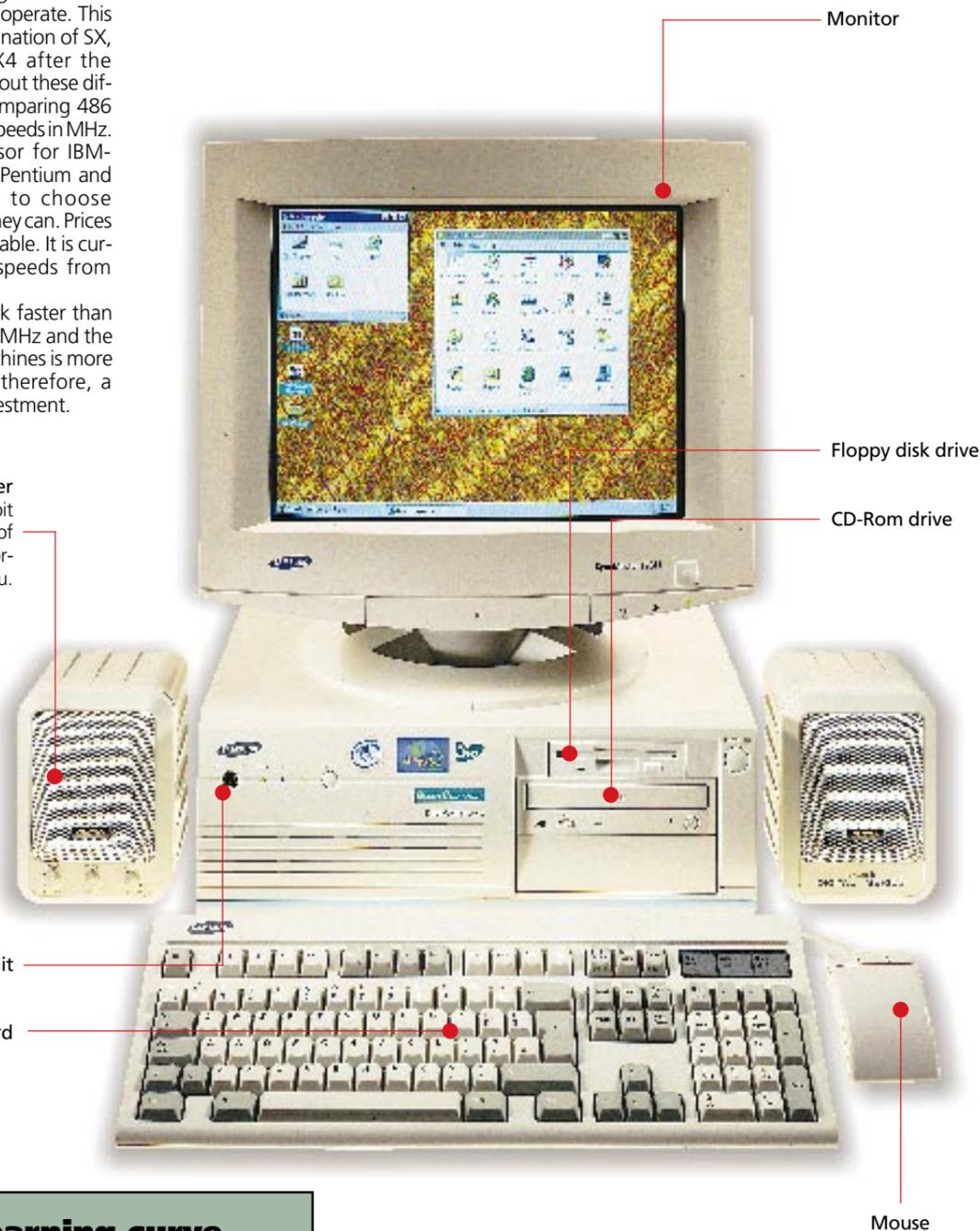
The learning curve

How long does it take to learn how to use a computer? Well, you'll be able to make it do simple things in a few hours and after about 30 hours you'll be able to use it competently.

How far you take it after this depends on you and how much you want to do. Taking a short introductory course to computing at a local college is a good idea. Thereafter, you learn on the job. Most software comes with tutorials, sometimes as part of the manual but increasingly often in interactive form as part of the program. Working through these is well worth the trouble.

The back panel
This is where you'll find connections to the printer, monitor, mouse, keyboard, and so on, as well as slots for add-in expansion cards.
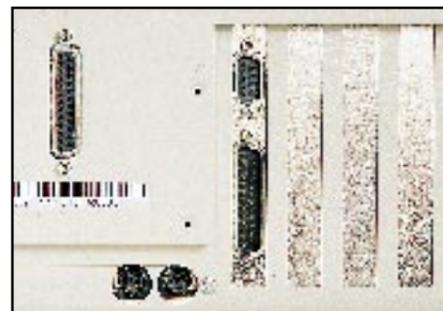
Almost every part of your computer has an effect on performance

The display controller
This is a circuit board (known as a card) fitted inside your computer and it determines how many different colours you can have on the screen at one time and also the number of dots used to produce the image (the resolution). More expensive cards generally work faster, use more colours and work at higher resolutions. Make sure the card is described as being accelerated local bus (it could be VL-bus or PCI) and that it has at least 1Mb of memory.

The amount of memory
Random Access Memory (Ram) is what counts. Memory, like hard disk size, is measured in megabytes and 8Mb is the minimum we'd recommend if you use Windows programs.

The type of processor
This is the component that actually does the computing and you should buy the fastest you can afford.

CD-Rom drive
Most drives today are quad-speed. Don't buy any slower than double-speed.

The size of the hard disk
The hard disk stores your software as well as the data you produce when working with your computer. Capacity is measured in megabytes (Mb) and it's really not worth buying anything smaller than 400Mb. Go for a larger disk if you can afford it.

Floppy drive
For 3½in floppy disks.
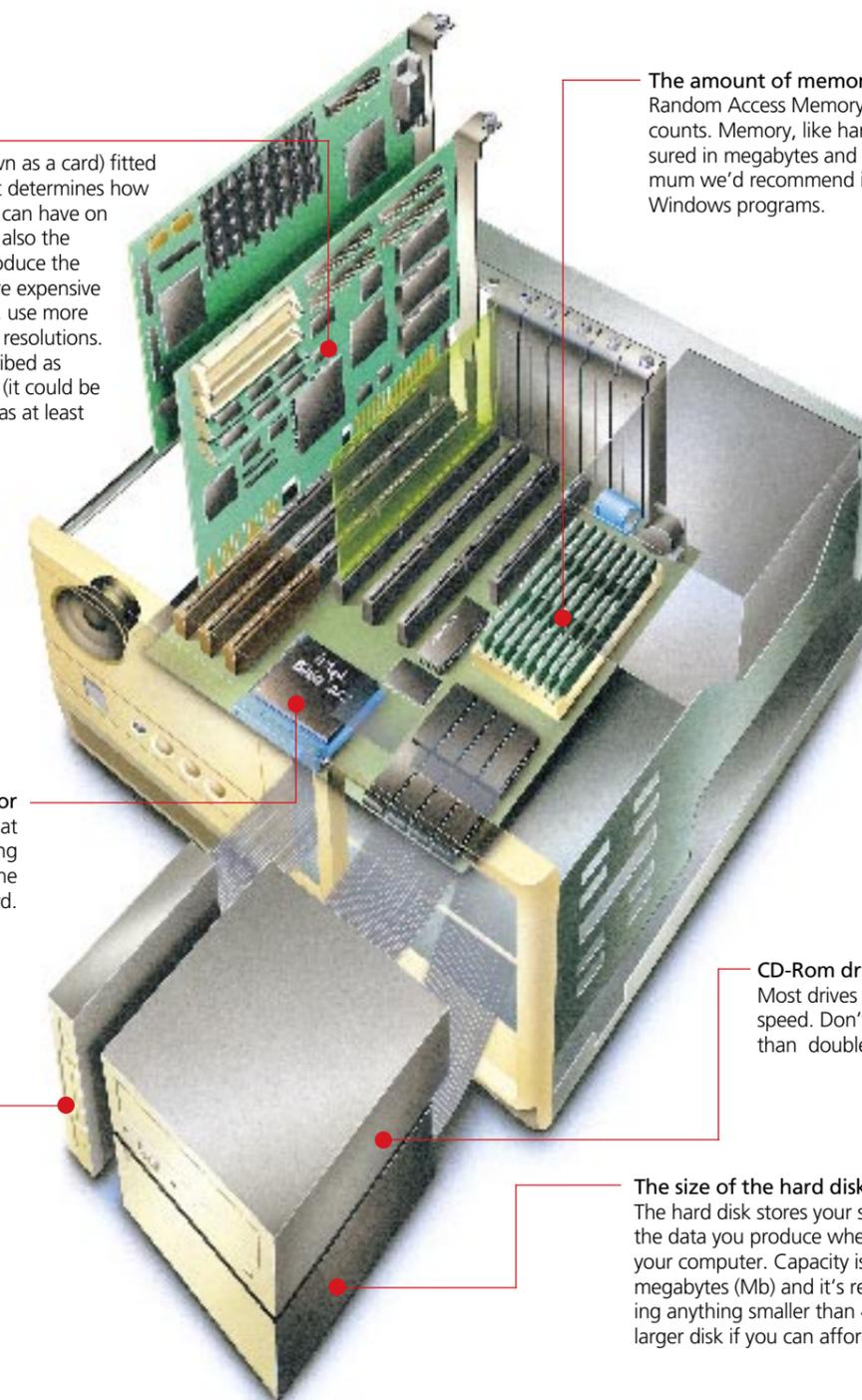
Buying tips

○ Try to keep the features of your PC in balance. A blindingly fast graphics card is useless if the processor struggles to keep up.
○ If you can't afford to buy the right PC for your needs, then wait until you can. Cutting corners now will soon lead to expensive upgrades.
○ If your PC is priced to include a bundle of software, don't be swayed by the separate value of something you would never have bought separately.

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